Improvement of Marine Protected Areas to Enhance Marine Ecosystem Resilience Against Climate Change while Achieving the 30x30 Target

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The role of Marine Protected Areas in fighting climate change

Protecting the ocean is crucial not only for preserving marine biodiversity but also for safeguarding the ecosystem services that sustain life on Earth, such as climate regulation and resource provision. The ocean provides numerous regulating, supporting, cultural and provisional services, yet despite knowing of its global importance, a mere 3% of our oceans are effectively or 'highly protected' (Fox et al., 2024). We must consider that, marshes, mangroves, beaches and dunes, seagrass beds, and reefs are able to buffer shorelines from severe weather, thus protecting coastal human populations, property, and economic activities (Barbier, 2017). As the 2030 deadline for the "30x30" target approaches, there is an urgent need for international collaboration and innovative approaches to designate, enforce, and manage marine areas that are of highly ecological importance. And as Sanjayan M., said "Oceans are the largest interconnected ecosystem on the planet; their conservation requires transforming our approach through unprecedented collaboration between governments and across borders" (2023). To achieve effective protection and promote ecological functions, we must prioritize the creation of ecologically and functionally connected MPAs. This article examines how the 30x30 target, in a global level, underscores the link between biodiversity and climate goals, emphasizing ecosystem protection as essential for sustainable climate solutions. Furthermore, measures are presented to the COP29 decision makers to advance towards the target through the effective protection of marine ecosystems.

Ecological connectivity for MPAs

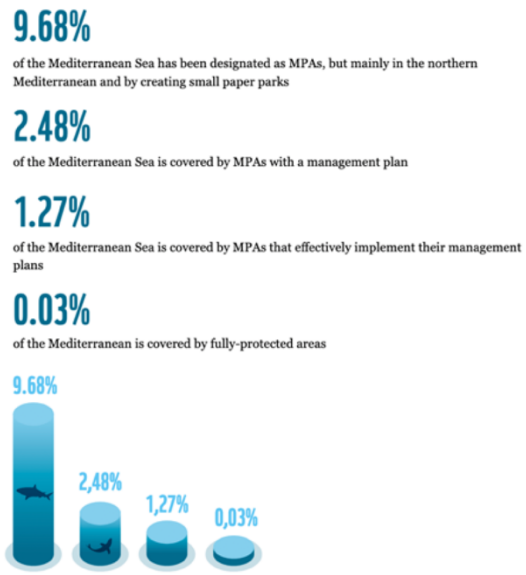
Ecological connectivity is essential for effective MPAs because it supports species migration, genetic diversity, and movement of non-living resources between ecosystems. Enhancing connectivity also bolsters the resilience of species and ecosystems, increasing the capacity to adapt to both natural and human-induced environmental changes (Cannizzo, Lausche, & Wenzel, 2021). This interconnectedness allows marine species to move freely between protected areas, which is especially critical for species with complex life cycles, like fish that use multiple habitats as they mature. International collaboration is vital to protect cross-border ecosystems, as marine life does not adhere to political boundaries. Coordinated global efforts can ensure that MPA networks are more resilient and can adapt to environmental changes, such as climate change impacts, on a larger, more effective scale (Cannizzo, Wahle, & Wenzel, 2020).

The 30 by 30 Framework

The 30 by 30 initiative has already been on the table since 2020, when the High Ambition Coalition for Nature and People launched the project. Now, 120 countries share the ambition to implement the global goal of effectively conserving and managing at least 30 percent of the world's land and ocean by 2030 (High Ambition Coalition, n.d.). In 2022, the 30x30 framework became part of the Global Biodiversity Framework, as one of its main targets. It emphasizes safeguarding biodiversity and ecosystem services through ecologically representative, well-connected, and effectively managed protected areas (Lo & Jang, 2022). This target must be seen as an opportunity to improve our conservation actions thought MPAs or other area-based conservation measures (OECMs) that will also integrate cultural values and promote local engagement and sustainable practices.

The Wadden Sea Trilateral Cooperation was established in 1982 by Germany, Denmark, and the Netherlands to protect the Wadden Sea ecosystem, a UNESCO World Heritage Site, through coordinated efforts in biodiversity monitoring and habitat management. The Trilateral Monitoring and Assessment Programme (TMAP) enables unified responses to environmental challenges, including climate change. As a significant carbon sink, the Wadden Sea's salt marshes and seagrass meadows capture and store carbon, enhancing ecosystem resilience and contributing to climate mitigation, while supporting migratory species and cross-border ecological connectivity through joint conservation strategies (Trilateral Wadden Sea Cooperation, n.d.).

The Mediterranean Sea MPAs Network (MedPAN), established in 1990, is dedicated to enhancing the management and effectiveness of MPAs across the Mediterranean (MedPAN, 2021). MedPAN connects MPA managers and stakeholders from over 20 countries, fostering collaboration on sustainable conservation practices, capacity building, and policy advocacy to protect marine biodiversity. By coordinating conservation efforts and promoting knowledge exchange, MedPAN strengthens ecosystem resilience and addresses regional challenges like climate change and pollution, supporting the long-term health of Mediterranean marine ecosystems (MedPAN, n.d). An important player to emphasize on in the Mediterranean Sea is the endemic seagrass species, *Posidonia oceanica*. It is the most effective in carbon fixation and storage among the sixty-four species of seagrass. Particularly in the Mediterranean islands, carbon fixation through *P. oceanica* can be as high as 14.4% (for Corsica) (Pergent-Martini, et al., 2021).



Currently, 9.68% of the Mediterranean Sea is designated as protected, but only 1.27% is effectively protected, and just 0.03% is classified as fully protected MPAs with stringent conservation measures (Gomei, M., et al., 2019). This highlights a significant gap in protection levels needed to ensure ecosystem health, as most designated areas lack effective management or enforcement. MPAs. While world leaders have made numerous declarations regarding marine protected areas (MPAs),

their implementation remains a significant challenge (Gibbens, 2019). Increasing the extent of fully protected areas is essential for sustaining fish stocks, supporting marine biodiversity, and achieving meaningful ecological resilience in the Mediterranean, which both people, the economy (Gomei, M., et al., 2019).
The next chapter explores a third MPA, the Hermandad Marine Reserve in the Galapagos Islands as an example of how political will and innovative financial strategies, like debt-for-nature swaps, can drive impactful marine conservation in the fight against climate change.

Political will, multilateral institutions and innovative solutions for marine conservation

The Hermandad Marine Reserve in the Galapagos Islands, show one of the most innovative solutions for marine conservation. To date, this is the largest debt-for-nature conversion where Ecuador converted $1.6 billion in commercial debt into an $85 million IDB guarantee and an $656 million DFC political-risk insurance that included a long-term conservation finance commitment totalling more than $323 million over about 18 years (IDB, 2023; The Pew Bertarelli Ocean Legacy Project 2023). This debt conversion shows a way in which the creation of an MPA can be an economically viable solution for a country's economy and for the marine ecosystem conservation and Addressing climate change. Finally, as the IDB President Ilan Goldfajn said, "it is an example of how the region is not only tackling global challenges but is also being part of the solution – pioneering innovative approaches and instruments that can be replicated and scaled globally" (IDB, 2023). Political will and multilateral institutions solutions are needed, we need to work together to apply innovative solutions for marine conservation and use our power to create long-lasting connectively efficient MPAs promoting resilience in ecosystems that play a critical role in carbon storage and climate regulation.

Recommendations

1. **Assess and Strengthen MPA Protections**: The COP should urge States to evaluate existing MPAs for their climate impact potential (e.g., areas with high ecosystem service value), adjust their protection levels accordingly, and incorporate these protections into national climate action plans (NDCs).
2. **Promote Cross-Border Connected MPAs**: The COP should recommend that neighbouring maritime States establish dialogues to explore the creation of ecologically connected, cross-border MPAs with robust protections, focusing on ecosystems vital for climate regulation (e.g., marshes, mangroves, seagrass beds, and reefs), and integrate these areas into NDCs.
3. **Prioritize Funding for Climate-Effective MPAs**: The Global Environmental Fund (GEF), under its ecosystem-based coastal and marine zone management pathway, should prioritize funding for ecologically connected MPAs that play crucial roles in climate mitigation and resilience, with an emphasis on cross-border MPAs.
4. **Protect Climate-Regulating Marine Corridors**: The COP should encourage States to identify and establish regional or multinational marine corridors containing vulnerable climate-regulating ecosystems, such as marshes, seagrass meadows, reefs, and mangroves, for protection as MPAs or OECMs, and to include them in NDCs.

5. **Support for 30x30 Climate Goals**: The COP should urge States to seek multilateral institutional support to meet the 30x30 target, specifically emphasizing marine ecosystems that contribute to climate regulation.

Conclusion

Looking at the lack of fully protected and effectively managed Marine Protected Areas and their critical role in the conservation of marine ecosystems that promote carbon sequestration, climate regulation and storm protection; there is a need to create more connectivity opposed to the many fragmented MPAs, in order to fully protect the integrity of the marine ecosystems. We need to remember that well-connected networks of MPAs can also help species and ecosystems adapt to climate change by protecting climate refugia or providing a "safe landing place" for species undergoing range shifts (Cannizzo, Wahle, & Wenzel, 2020). Stronger protection levels are also needed as opposed to many partially protected MPAs. The latter may fulfil the goal of achieving 30x30, but only fully protected marine ecosystems (e.g. No-Take-Zones) effectively maintain the ecosystemic functions to mitigate threats by climate change. For example, Turnbull, Johnston, and Clark "argue that partially protected areas act as red herrings in marine conservation because they create an illusion of protection and consume scarce conservation resources yet provide little or no social or ecological gain over open areas" (2021). To have any positive impact on conservation and climate change, more marine ecosystems must therefore be fully protected. To stem the rising tide, every country needs to act faster and decisively through diplomatic channels, strengthened regulations, and collaborative efforts with local communities, NGOs, and supportive international partners.

References

• Barbier, E. B. (2017). Marine ecosystem services. *Current Biology*, 27(11), R507-R510.

Cannizzo Z. J., Wahle C. M., & Wenzel L. (2020). *Ecological connectivity for marine protected areas*. Marine Protected Areas - NOAA. https://nmsmarineprotectedareas.blob.core.windows.net/marineprotectedareas-prod/media/docs/20201103-ecological-connectivity-for-mpas.pdf

• Cannizzo, Z. J, Lausche, B., & Wenzel, L. (2021). Advancing marine conservation through ecological connectivity: Building better connections for better protection. *Parks Stewardship Forum*, 37(3). http://dx.doi.org/10.5070/P537354731

• Conservation International. (2023, June 26). *The Eastern Tropical Pacific Marine Corridor - CMAR and Conservation International are granted $16 million in GEF funding for protection and management*. https://www.conservation.org/press-releases/2023/06/26/the-eastern-tropical-pacific-marine-corridor-cmar-and-conservation-international-are-granted-16-million-in-gef-funding-for-protection-and-management

• Fox, A., De Valença, A., Tenison-Collins, D., Eijs, E., Lewis, L., Marchetti, L., Porcheron, M., Sierra García, M., Peek, P., Sommer, W., & Metabolic Consulting. (2024). *On track or off course? - Assessing progress toward the 30x30 target for the ocean* (By Bloomberg Ocean Fund, Campaign for Nature, Marine Conservation Institute, SkyTruth, High Seas Alliance, Oregon State University, Pew Charitable Trusts, McKinsey, Ocean Revolution Moçambique, & Nippon Foundation-University of Edinburgh Ocean Voices programme). https://assets.bbhub.io/dotorg/sites/64/2024/10/On-track-or-off-course.pdf
• Gibbens, S. (2019, September 25). Less than 3 percent of the ocean is "highly protected." *Environment*. https://www.nationalgeographic.com/environment/article/paper-parks-undermine-marine-protected-areas
• Gomei, M., Abdulla, A., Schröder, C., Yadav, S., Sánchez, A., Rodríguez, D., & Abdul Malak, D. (2019). Towards 2020: How Mediterranean countries are performing to protect their sea. *WWF World Wide Fund Nat*, *38*.
• *High ambition coalition*. (n.d.). About Us: High Ambition Coalition for Nature and People. https://www.hacfornatureandpeople.org/
• IDB. (2023, May 09). *Ecuador Completes World's Largest Debt-for-Nature Conversion with IDB and DFC Support*. https://www.iadb.org/en/news/ecuador-completes-worlds-largest-debt-nature-conversion-idb-and-dfc-support
• Lo, V., & Jang, N. (2022). *The Global Biodiversity Framework's "30x30" Target: Catchy slogan or effective conservation goal?* International Institute for Sustainable Development. https://www.iisd.org/articles/insight/global-biodiversity-framework-30x30-target
• MedPAN (2021). *The System of Mediterranean Marine Protected Areas in 2020*. Retrieved November 12, 2024, from https://medpan.org/en/system-mediterranean-mpas-2020
MedPAN (n.d). UNEP; United Nations Environment Programme / Coordinating Unit for the Mediterranean Action Plan. Retrieved November 12, 2024, from https://www.unep.org/unepmap/what-we-do/MSSD/MedPAN
• *Pelagos Sanctuary Website* (n.d.). Pelagos Sanctuary. Retrieved November 12, 2024, from https://pelagos-sanctuary.org/
• Pergent-Martini, C., Pergent, G., Monnier, B., Boudouresque, C. F., Mori, C., & Valette-Sansevin, A. (2021). Contribution of Posidonia oceanica meadows in the context of climate change mitigation in the Mediterranean Sea. *Marine Environmental Research*, *165*, 105236.
• Stratton, M. (2022, August 28). How new initiatives are protecting the Galápagos for future generations. *National Geographic*. https://www.nationalgeographic.com/travel/article/new-initiatives-protecting-galpagos-future-generations
• *The Pelagos Sanctuary*. (n.d.). WWF. Retrieved November 12, 2024, from https://www.wwfmmi.org/what_we_do/wildlife/the_pelagos_sanctuary/
• The Pew Bertarelli Ocean Legacy Project. (2023, September 14). *To protect Galápagos Islands, Ecuador turns to innovative financing*. The Pew Charitable Trusts. https://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2023/05/to-protect-galapagos-islands-ecuador-turns-to-innovative-financing
• *Trilateral Wadden Sea Cooperation*. (n.d.). Wadden Sea World Heritage; Trilateral Wadden Sea Cooperation. Retrieved November 12, 2024, from https://www.waddenseaworldheritage.org/trilateral-wadden-sea-cooperation
• Turnbull, J. W., Johnston, E. L., & Clark, G. F. (2021). Evaluating the social and ecological effectiveness of partially protected marine areas. *Conservation Biology*, *35*(3), 921-932.