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Taking climate-smart governance to the high seas

Comprehensive spatial planning in international waters is key to achieving ocean sustainability

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Under the United Nations Convention on the Law of the Sea (UNCLOS), the Agreement on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (ABNJ)—the

BBNJ Agreement—was adopted in 2023 and subsequently signed by nearly 90 nations (1). This agreement calls for integrated approaches to high seas governance (2) and tools to sustain ocean ecosystems, such as marine protected areas (MPAs) and strategic environmental assessments (3). Although highly protected areas can be effective in conserving marine biodiversity in specific locales, in the face of a changing climate, comprehensive climate-smart marine

spatial planning (MSP) (4, 5) must be pioneered in the high seas to deliver long-term resilience of all marine ecosystems and species. At their May 2024 meeting, Parties to the Antarctic Treaty can consider climate-smart MSP and seize an opportunity to demonstrate a collaborative approach to ocean management in ABNJ.

The high seas comprise nearly two-thirds of the global ocean, yet until recently, their remoteness kept much of this vast global commons largely beyond the reach of human activities. These areas are now under increasing demand for resources, as scientific and technological advances couple with growing human populations. Simultaneously, the climate and biodiversity crises have fueled mounting impacts on the high seas, with the international community pushing for the inclusion of ocean considerations in climate policies, fully recognizing the linkages between climate change and ocean health. Effective man-



agement of the high seas can be delivered, but only through a climate-smart approach that is iterative, adaptive, and holistic in addressing all existing and emerging uses of ocean space and resources. Climate-smart MSP (4) is an idea whose time has come, as recognized by the World Bank in 2021 and the UN Educational, Scientific and Cultural Organization (UNESCO) and the European Commission in 2022 (6). Yet, it has not been implemented at all in ABNJ, and although nations worldwide are implementing MSP within national jurisdictions, they are not yet meeting the aims of climate-smart MSP (with dynamic and forward-looking practices) (4).

There is no better place to trial climate-smart MSP in ABNJ than the Southern Ocean. As one of the largest shared spaces on the planet and one that faces the most extreme climate impacts (together with the Arctic) (7), we argue that only the Southern Ocean has existing governance structures strong enough to pioneer climate-smart MSP in international waters. The Antarctic Treaty, initially signed in 1959, promotes peaceful cooperation and information sharing among the 56 nations that have ratified it. The Commission for the Conservation of Antarctic Living Marine Resources (CCAMLR), established in 1982 in response to increasing commercial inter-

An Adélie penguin leaves tracks on pack ice in the Southern Ocean.

est in the region, aims to employ ecosystem-based management to ensure the conservation of Antarctic marine life (8).

CCAMLR, as part of the Antarctic Treaty System (ATS), is required to cooperate with Parties—providing an avenue to advance climate-smart MSP. The ATS is distinct in having a comprehensive regime that governs most human activities and connects multiple stakeholders (Parties, observers, and experts) to exchange information and make decisions in Antarctica (contrary to other international areas where sector-specific management has hampered cooperation)

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(3). Given the existing governance structure and the decades of marine scientific research on biophysical processes, existing and emergent human uses, and impacts of climate change, the ATS is especially well placed to develop climate-smart MSP that can also serve as a valuable demonstration of what is achievable in all ABNJ.

The upcoming 46th Antarctic Treaty Consultative Meeting (ATCM) could capitalize on the opportunity to develop a climate-smart MSP strategy. Options could include tasking an existing intersessional contact group to plan for climate-smart MSP, creating a new group dedicated to this task, or expanding the remit of the existing Subsidiary Group on climate change response actions, among others. Working across the ATS will be required. Furthermore, climate-smart MSP would advance implementation of the 2023 Helsinki Declaration, wherein Parties recognized the need to address climate change in Antarctica (9). We encourage Parties to act on this historic opportunity to pioneer climate-smart MSP to secure a future that includes a healthy, resilient, and productive Southern Ocean.

A MODEL FOR CLIMATE-SMART GOVERNANCE

The Antarctic region is critical to the functioning of Earth's systems, influencing sea level (because of the Antarctic ice sheet's response to shifting temperatures), regulating climate (the Southern Ocean sinks more anthropogenic heat and carbon than any other latitude), and driving global ocean circulation (circulation of the Southern Ocean sustains global marine productivity) (10). As recently highlighted by the UN secretary-general, what happens in Antarctica does not stay in Antarctica—affecting all coastal regions worldwide and the billions of people depending on them. The Southern Ocean is “ground zero” for climate change impacts, given that increased human activities such as commercial fisheries and tourism have accentuated climate-related pressures on Antarctic marine ecosystems (7, 10).

Work is already underway to protect the Southern Ocean. As part of its ecosystem-based management approach, CCAMLR has advanced several conservation-focused initiatives, including biodiversity hotspot identification, design of individual protected areas, and bioregional-scale conservation mapping to identify potential components of a representative network of MPAs (7, 8, 11). However, CCAMLR's remit is limited to marine living resources. Thus, engagement with the wider ATS and other international governance bodies will be

Benefits of climate-smart marine spatial planning

Sustainable climate-smart marine spatial planning in the Southern Ocean may provide a model for the integration of climate change into spatial planning on the high seas.

- Support global ocean sustainability goals
- Promote flexible and dynamic governance
- Plan for alternative sustainable futures
- Put the ocean at the heart of climate solutions
- Provide a “systems view” to centralize ocean health
- Anticipate and integrate social and ecological change

required to manage human activities comprehensively, including tourism, science, and shipping.

The time is now to build on this work by taking a new, broader path, engaging all relevant parties and stakeholders in managing the Southern Ocean and addressing a wide range of interests in an integrated way through climate-smart MSP. By being multisectoral and multi-objective, MSP offers a vehicle for a more structured consideration of long-term conservation and sustainable use within a given area. MSP goes beyond MPA planning and integrates all other existing and emergent human uses. Indeed, MSP has been developed and implemented within exclusive economic zones (areas of the sea in which states have exclusive rights over marine resources) in over 100 countries to address conflicts among ocean uses, and between uses and the environment (4, 6). It entails creating a shared vision, and maintaining a “living process” that is continuous and iterative (requiring effective monitoring and evaluation) and optimizes ocean health to continue benefiting people. Results of MSP implementation are not yet evaluated widely but will be produced as plans are revised and adapted. Thus, we envision that comprehensive climate-smart MSP (4, 5) in the Southern Ocean can succeed by (i) broadening the range of interests to be addressed to include supporting sustainable ocean use explicitly; (ii) fostering dialogue across sectors through expert facilitation; and (iii) enabling shared science and knowledge to better respond to the common threat that climate change poses to all stakeholders, thereby bringing benefits to the region and the planet (see the box and fig. S1).

Further, climate-smart MSP has considerable potential to support the implementation of the BBNJ Agreement. Although

the potential benefits of MSP in ABNJ have long been recognized (12), no cooperative mechanisms existed previously to allow the implementation of MSP in international waters (4). The new BBNJ Agreement brings a legal framework for enhanced cooperation, a mandate to adopt area-based management tools, and enabling provisions for the Conference of Parties to conduct regional strategic environmental assessments to ensure a robust and inclusive science basis (3). At the same time, the Agreement's focus on the need to “protect, preserve, restore and maintain biological diversity and ecosystems,...to...strengthen resilience to stressors, including those related to climate change” (1) will require MSP that fully integrates climate change.

Climate-smart MSP will also support the achievement of global commitments such as the Convention on Biological Diversity's Global Biodiversity Framework (including Target 1 on integrated spatial planning and management), the UN Sustainable Development Goals, and the UNCLOS mandate to cooperate for the protection and preservation of the marine environment. Despite global consensus that innovative ocean management is needed for rapidly changing ecosystems and acknowledgment that MSP can facilitate dynamic ocean management, effective MSP requires cross-boundary efforts because both biota and impacts transcend boundaries. The Southern Ocean is thus the ideal place to trial climate-smart MSP and related management, with its cooperative framework and extensive knowledge about species dynamics. It will then serve as a model for the integration of climate change into comprehensive MSP within and beyond national jurisdictions.

CLIMATE-SMART PATHWAYS FOR THE SOUTHERN OCEAN

At the upcoming May ATCM, Parties to the Antarctic Treaty could agree to develop climate-smart MSP in the Southern Ocean. Further, they could determine which body is best placed to facilitate the planning process, with a plan to work collaboratively with CCAMLR, the Scientific Committee on Antarctic Research (SCAR), the International Association of Antarctica Tour Operators (IAATO), the Council of Managers of National Antarctic Programs (COMNAP), and across the ATS. On the basis of experience in developing and implementing sustainable MSP within national jurisdictions globally, and the articulation of pathways for climate-smart MSP (5), we recommend four points to be considered by Parties through the establishment of dedicated working groups that could work intersessionally across the ATS.

Diversify data and knowledge types

First, MSP must integrate information on climate-related impacts, risks, and opportunities across disciplines, scales, and knowledge types. Climate-smart MSP builds on analyzing current and future conditions in the area to be managed and the wider seascape. It requires understanding how climate-related drivers affect biophysical features and how people use ecosystems in a changing environment. At the upcoming ATCM, a range of information types could be identified and prioritized to develop the foundation for climate-smart MSP action. This includes identifying (i) the distribution of key ecosystem processes, species, and habitats—e.g., Antarctic krill, macro-predators, sea ice shelves, carbon sinks; (ii) key human uses and activities—e.g., commercial fisheries, tourism, marine scientific research, shipping routes; and (iii) underlying spatial conflicts, compatibilities, and opportunities. To be effective in a changing environment, MSP in the Southern Ocean could work toward identifying areas most prone to variation, with expected ecological, social, economic, and political consequences of such change. Species distribution modeling, for instance, can inform Antarctic MSP (13), with the support of qualitative information when quantitative models cannot capture the underlying complexity or data-heavy analyses cannot be developed (5).

Forward-looking gaze

Second, MSP based on this aforementioned knowledge must be future-facing. Exercises that explore and describe plausible alternative futures (7, 10) can be used to anticipate challenges (e.g., new conflicts among human uses or emerging cumulative pressures) and opportunities (e.g., new areas to be protected). The involvement of all stakeholders in MSP scenario-building and visioning exercises is key. Parties to the Antarctic Treaty could develop a process to establish involvement with all relevant stakeholders (e.g., CCAMLR, SCAR, IAATO, COMNAP, nongovernmental organizations, fishers, tourism companies, scientists) to co-develop climate-smart MSP based on a collective vision and as part of the framework for governing the Southern Ocean. Although the ATS has faced political tensions (including geopolitical tensions among Parties, different national agendas on climate change, and competing economic interests), environmental management initiatives have continued to advance, and science has been central to collaborative decision-making. There is thus a positive ability to overcome geopolitical challenges. Collaboratively explor-

ing likely scenarios with stakeholders (14) under climate-smart MSP could encourage creative thinking in addressing problems and identifying solutions. This further allows the co-development of capacities of stakeholder groups, ensuring that benefits deriving from ocean use are distributed in a just and equitable way. Further resources must be established to ensure funding and capacity for climate scenario visioning that

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can be used to stress-test ocean plans, assessing their robustness and adequacy to respond to change in the Southern Ocean.

Dynamic in nature

Third, MSP in international waters must be flexible and dynamic. Enabling dynamic area-based management tools in ABNJ (15) is fundamental to effective and sustainable management. Ocean plans have traditionally focused on designing “static” latitude-longitude “boxes” without the flexibility to follow dynamic ocean processes. With climate change, the places where we need to “draw the lines” will change over time. At the upcoming May meeting, Parties could establish a working group to lead considerations around the dynamic approach that aligns with the management and information needs in the Southern Ocean. Mobile management areas can be adapted to a changing ocean. Dynamic MSP in the Southern Ocean can serve as a testbed for wider application of MSP throughout ABNJ, even without explicitly mentioning dynamic management in the BBNJ Agreement (1). To enable the capacity of Parties and relevant stakeholders to be forward-looking and dynamic, a Southern Ocean data network is needed to coordinate data management for climate-smart MSP through data sharing agreements following the Antarctic Treaty (Article III).

Centralize ocean health

Finally, MSP in the Southern Ocean must put ocean health at the heart of climate solutions. Climate adaptation and mitigation actions can be supported through MSP through multiple means, from nature-based approaches to area-based management of industrial activities. Identifying and protecting climate refugia and vital ecosystem processes will support ecological resilience to climate change and other stressors (9).

CCAMLR has already begun this work. We thus recommend that Parties support the continued prioritization of the protection of habitats with the greatest potential to serve as climate refugia and provide climate mitigation and adaptation solutions. At the same time, regulations in more heavily used areas should ensure ecological sustainability. Parties, together with CCAMLR, SCAR, IAATO, and COMNAP, have the opportunity to create additional climate policies and procedures that could be put into place to bolster ocean health and ecosystem resilience to climate change.

Although it will not be easy, bringing climate-smart governance to ABNJ now is an opportunity not to be missed. Climate-smart and dynamic MSP in the Southern Ocean can guide decisions on how marine resources can be used sustainably even as the world changes, providing a model for international waters everywhere. ■

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SUPPLEMENTARY MATERIALS

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