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Editorial: New frontiers of marine governance in the ocean decade

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Editorial on the Research Topic

New frontiers of marine governance in the ocean decade

The ocean is threatened by various human stressors, from global warming to pollution, overfishing, and biodiversity loss, impacting marine socio-ecological systems. A key challenge, as recognized by the United Nations (UN) Decade of Ocean Science for Sustainable Development, is how to balance an increasing appetite for Blue Growth — and the related intensification of ocean use by renewable offshore energies, fisheries, aquaculture, tourism, blue biotechnology, shipping or deep seabed mining — with the targets of the UN 2030 Agenda for Sustainable Development and the Kunming-Montreal Global Biodiversity Framework (KMGBF). Both establish a new framework, calling for 30% of coastal and marine areas to be effectively conserved and managed by 2030. This Research Topic addresses some of the challenges raised by such a framework, providing insights into new ocean governance approaches and tools. These approaches range from adaptive management of marine protected areas (MPAs) to international instruments for biodiversity protection in Areas Beyond National Jurisdiction (ABNJ) to new carbon dioxide removal technics.

This Research Topic begins with an article by [Marques et al.](#), who review governance settings in a comparative analysis of the national ocean strategies of five different Atlantic nations—France, Ireland, Portugal, Spain, and the United Kingdom (UK). In the European Union (EU), the challenge of balancing Blue Growth with marine biodiversity conservation was addressed through its Integrated Maritime Policy (IMP), which is characterized by regional approaches, particularly in the Atlantic. The authors highlight that key priorities of the analyzed ocean strategies pertain to climate change mitigation and adaptation and nature conservation (in line with the EU Green Deal), together with investigation, development, and innovation. The ocean strategies of France and Portugal are the only ones that are aligned with the UN Sustainable Development Goals (SDGs) and the Atlantic Action Plan and that follow the guidelines of the EU IMP. The suggestion to create a regional working group as a way forward for a better alignment among national ocean strategies of Atlantic basin countries ([Marques et al.](#)) represents a new pathway for a regional scale governance discussion.

The article by [Troya et al.](#) reviews the evolution of marine governance in the case of Ireland in response to EU policy requirements related to a sustainable Blue Economy. With the introduction of its National Marine Planning Framework and the Maritime Area Planning Act (2021), Ireland intended to reform the consent regime for key Blue Economy sectors such as offshore renewable energy (ORE). The exclusion of aquaculture from the new consent regime could hinder the full integration of the sector into a broader marine spatial planning (MSP) framework, potentially mitigating compliance with environmental goals established by EU Directives. By identifying policy and legal gaps related to aquaculture integration and aquaculture licensing cases, the authors highlight that the legal framework underpinning MSP in Ireland may hinder the achievement of sustainability across all marine sectors ([Troya et al.](#)). Their paper provides a sharp vision of the needs and challenges of Ireland's current governance picture.

[Boemare](#) focuses on the interconnectedness of anthropogenic infrastructure, such as offshore wind farms (OWFs), and the marine environment, seeing OWFs as places for recreating relations with marine life. The rise of ORE as a structural component of the energy transition is also a call for a new Blue Deal, particularly in what concerns OWFs. ORE represents a climate-friendly process to produce electricity and an opportunity for shifting paradigms. Wind turbines are perceived as more than physical artifacts but also a location for engaging economic activities and marine life. A potentially useful advance places the idea of interconnectedness at the core of research, focusing on creating interspecific assemblages around offshore wind turbines that increase biological diversity, thereby expanding benefits for humans ([Boemare](#)). This vision represents an interesting approach aligned with the concerns of co-allocation/multiple use of ocean space.

Taking an entirely different and more critical perspective, [Khan et al.](#) raise the question of what Brexit means for the relations among China, the UK, and the EU, focusing on port governance and shipping within the context of China's Maritime Silk Road initiative (MSR). Shipping intensity is increasing, now accounting for 80% of world trade. China is one of the largest countries conducting its trade through shipping, but the EU and the UK are also key players. Brexit will likely change this situation, as a new division of port governance between the EU and the UK may impact maritime trade. This is particularly relevant considering China's and the UK's interests in the Indian Ocean, as well as new trade routes that open China to the Indian Ocean *via* the Arabian Sea ([Khan et al.](#)).

While a global transition to clean energy advances gradually, and the need for ocean-based actions for climate change adaptation and mitigation is increasingly recognized, scientists and policymakers are starting to look toward carbon dioxide removal (CDR) methods as potential solutions. In this context, [Loomis et al.](#) emphasize the need for a code of conduct related to ocean CDR research, and they propose fifteen critical components for such a code of conduct. Attention has increasingly focused on ocean CDR techniques, which enhance or restore marine systems to sequester carbon. Ocean CDR research may, however, impose risks to the environment and human welfare. A code of conduct that establishes principles for responsible research, fairness, and equity is needed, as

there are no domestic regulations to ensure the safety and efficacy of this research ([Loomis et al.](#)).

Based on examples of good governance and adaptive management at the Great Barrier Reef (GBR) Marine Park, [Day](#) presents and discusses nine governance principles that can be applied to MPAs globally. The decades of experience at the GBR Marine Park include intergovernmental arrangements that enable federal and state governments to cooperate effectively across adjoining marine jurisdictions. In addition, applying multiple layers of management helps lead to an effective integrated approach, considered the most appropriate approach for managing large MPAs. The nine governance principles identified can be extrapolated to other MPAs, with the acceptance that there will be variations in how principles will be applied to different spatial scales and contexts ([Day](#)).

When considering governance frameworks for marine conservation, the levels of restriction of human use lie at the heart of the debate about MPAs' effectiveness. Based on an analysis of MPAs' regulations from thirty-one different countries, [Andradi-Brown et al.](#) found that partially protected MPAs can offer effective and equitable pathways for biodiversity conservation if tailored to the local context. Rather than focusing primarily on fully protected areas for achieving new global MPA targets, the authors recommend that countries use a blend of locally-appropriate protection levels – from fully to partially protected areas to achieve positive biodiversity outcomes ([Andradi-Brown et al.](#)). This shift in MPA management goals may serve as the basis for new discussions on restriction-level options.

[Tomás and Sanabria](#) contribute further insights into MPA effectiveness in conserving specific groups and species, such as marine mammals. The authors conclude that area-based protection measures can be effective for diverse types of marine mammals and that adaptive management, being context-specific, is more effective than the precautionary principle ([Tomás and Sanabria](#)). This conclusion further backs up the findings by [Andradi-Brown et al.](#) (2023), providing new insights into conservation strategies' effectiveness.

MPA effectiveness is closely connected to financing, as insufficient funding leads to "paper park" situations. [Casimiro et al.](#) argue that ecotourism development and community participation are paramount in achieving sustainable development in MPAs because they increase funding sources. Yet, there is a knowledge gap regarding the enhancement of natural capital through ecotourism, and governance models of MPAs might not be ready to promote ecotourism fully. There is a need for new advances and improvements in marine governance ([Casimiro et al.](#)). With the continuously growing numbers of eco-tourists worldwide, this is a call worthy of attention.

A key marine conservation challenge pertains to the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction. [Santos et al.](#) argue that the new treaty on biodiversity beyond national jurisdiction (BBNJ) will likely dramatically transform environmental stewardship on the High Seas, making it essential that the BBNJ treaty is supported vigorously. The authors highlight that such support can strengthen multilateral institutions and boost international cooperation

towards common environmental goals, enhance the health of shared marine ecosystems and resources, and drive truly sustainable ocean-based economic growth. The treaty further provides an opportunity to engage equity as a critical principle to tackle global ocean inequalities meaningfully (Santos et al.).

Finally, the tension between Blue Growth and marine conservation requires exploring new frontiers in marine governance. A key challenge is the need for a transdisciplinary approach considering the complexity of global maritime and marine systems. Based on an analysis of ocean development-financed projects in Fiji and the Solomon Islands, Hills and Maharaj highlight this need by acknowledging the “indivisibility” of the UN SDGs, arguing that enhanced integration of ocean governance supports this transformation. Nevertheless, for regions highly dependent on development finance, a powerful leverage point would be the design of development investments in place, moving from “business-as-usual” to transdisciplinary and transformational approaches. Expanding ocean-based knowledge may not be sufficient to ensure transdisciplinary and transformational outcomes; this has implications for filling the financing gap in the UN Ocean Decade and shaping significant investments by development partners in the ocean (Hills and Maharaj).

Viewed through a scientific lens, this Research Topic provides space and voice to a myriad of management visions and challenges. Our hope for a broader scope of analysis led to a collection of transdisciplinary articles covering different geographic realities and ocean sustainability-related topics. The diversity and complexity of the topics and analyses included in this Research Topic further mirror the variety and complexity of marine social-ecological

systems, ocean-related challenges, and potential solutions requiring innovative approaches to governance.

Author contributions

JG: Lead writing. HC: co-writing, revision and editing. MB: co-writing, revision and editing. CS, co-writing, revision and editing. JT, co-writing, revision and editing. All authors contributed to the article and approved the submitted version.

Conflict of interest

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