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Information paper

Beyond static spatial management: scientific and legal considerations for dynamic management in the high seas

*Guillermo Ortuño Crespo**, Joanna Mossop, Daniel Dunn, Kristina Gjerde, Elliott Hazen, Gabriel Reygondeau, Robin Warner & Patrick Halpin

The way we manage our ocean is changing. Scientists have long been aware that the ocean is a dynamic space involving complex interactions between species and their fluid environment. As human activities intensify and diversify, marine conservation and management mechanisms must evolve to deal with cumulative impacts across ecological, spatial and temporal scales. Area-based management is an essential component of good ocean governance. There is evidence that adjusting the spatial and temporal scales of area-based management tools (ABMTs) to match the distribution of the features they are targeting can improve their efficiency. The new biodiversity beyond national jurisdiction (BBNJ) instrument should consider the temporal dimension of ABMTs and enable such variable ABMTs in the high seas that can respond to changing environmental conditions.

The ocean is dynamic across a range of temporal scales. First, the ocean is dynamic at contemporary scales, where species move in response to ephemeral changes in oceanography, such as thermal fronts, eddies or diurnal biophysical changes. Such changes can occur across hours, days or even months. Dynamic ocean management is a management approach that relies on fine-scale ocean monitoring to enable rapid responses to shifting distributions of biological resources, such as dynamically directing fishing effort away from areas where bycatch species may be located. Second, ocean species shift in annual cycles: the Sargasso Sea is a prime example of an oceanic ecosystem with strong seasonality. Matching the seasonality of human activities to these temporal shifts can improve the sustainability of such activities by accounting for predictable areas of wanted or unwanted overlap. For example, seasonal closures to protect spawning activity can greatly improve fisheries management. Third, ocean conditions can oscillate across many years. What occurs in one year may not necessarily be replicated in other years if the region experiences a shift in climatic cycle. This is particularly true in the context of climate oscillations (such as El Niño Southern Oscillation (ENSO) events) that can change the biophysical properties of the ocean and restructure entire biological communities. Fourth, climate change is driving, and will continue to drive, changes to ocean conditions and communities at decadal scales. Marine resources are redistributing in the face of climate change-induced thermal changes, deoxygenation and ocean acidification and this will accelerate over the coming century. This may mean that, over time, static ABMTs established to protect a particular sedentary species or static ecosystem may no longer represent the spatial distribution of that species or ecosystem.

Our understanding of ocean variability over different time scales offers managers the opportunity to adopt responsive or dynamic measures that respond to such variability. As we become more efficient and capable at predicting variability in the ocean, this will allow more sophisticated ABMTs that can adjust their spatial and temporal coverage to more precisely achieve their conservation and sustainable use goals.

It is vital that the ILBI enables the development and use of flexible ABMTs in areas beyond national jurisdiction to meet evolving conditions. ABMTs could be defined as “spatially explicit management measures to achieve one or more objectives of the agreement”. It will be necessary for the spatial extent of the ABMT to be clear at any one time – but it may be that the ABMT can vary the ecological and temporal scales of action if appropriate.

Ensuring that the new instrument leads to the development of ABMTs that appropriately match both the spatial and temporal scales of the species, process or ecosystem that it is intended to protect is fundamental to safeguarding the long-term health and productivity of BBNJ. While complex, scientific and technological advances mean that incorporating dynamism into ABMTs in ABNJ is both logistically and scientifically feasible. Dynamic ABMTs can improve the efficiency of sectors such as fisheries and ensure that the ABMTs that are established under a new treaty can respond to the fast-changing conditions of the global ocean. By enabling ABMTs to more explicitly account for the temporally dynamic nature of the ocean across a range of spatial scales, States can provide an important complement to more traditional MPAs and other ABMTs to safeguard BBNJ across the challenges of a changing ocean, while improving the efficiency of various maritime sectors and industries.

* *Corresponding author. Email: gortunocrespo@gmail.com