



# An ocean of surprises – Trends in human use, unexpected dynamics and governance challenges in areas beyond national jurisdiction



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## ABSTRACT

The expanse of ocean which makes up all marine areas beyond national jurisdiction has been characterized as the last frontier of exploitation on the planet, a figurative final “Wild West”. Existing users of areas beyond national jurisdiction, with the exception of fisheries, currently have a limited footprint there as a consequence, in part, of substantial hurdles in technological development that need to be overcome before many resources can be extracted at a commercially viable scale. However, we argue surprise shifts perpetuated by both established and emerging users could lead to an expansion in actors taking opportunities to chase lucrative resources that they are currently constrained from exploiting. Rapid development could also lead to a “crowded ocean” due to the multiplication of users which could present a problem given the current lack of a unified institutional framework for governance connecting the different user groups. Here, we have collated trends in human use of areas beyond national jurisdiction and offer a framework for, and examples of, unexpected dynamics relevant to living and non-living marine resources. Such an approach is necessary in order to begin to mobilize an adequate governance response to changing conditions and uses of areas beyond national jurisdiction. This governance response must be able to govern established or potential users, be flexible and adaptive in response to unexpected and unpredictable dynamics and be able to transform in the face of unpredictable future uses of this vast area. Here we present a set of institutional design principles as a first tentative step in this direction.

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## 1. Introduction

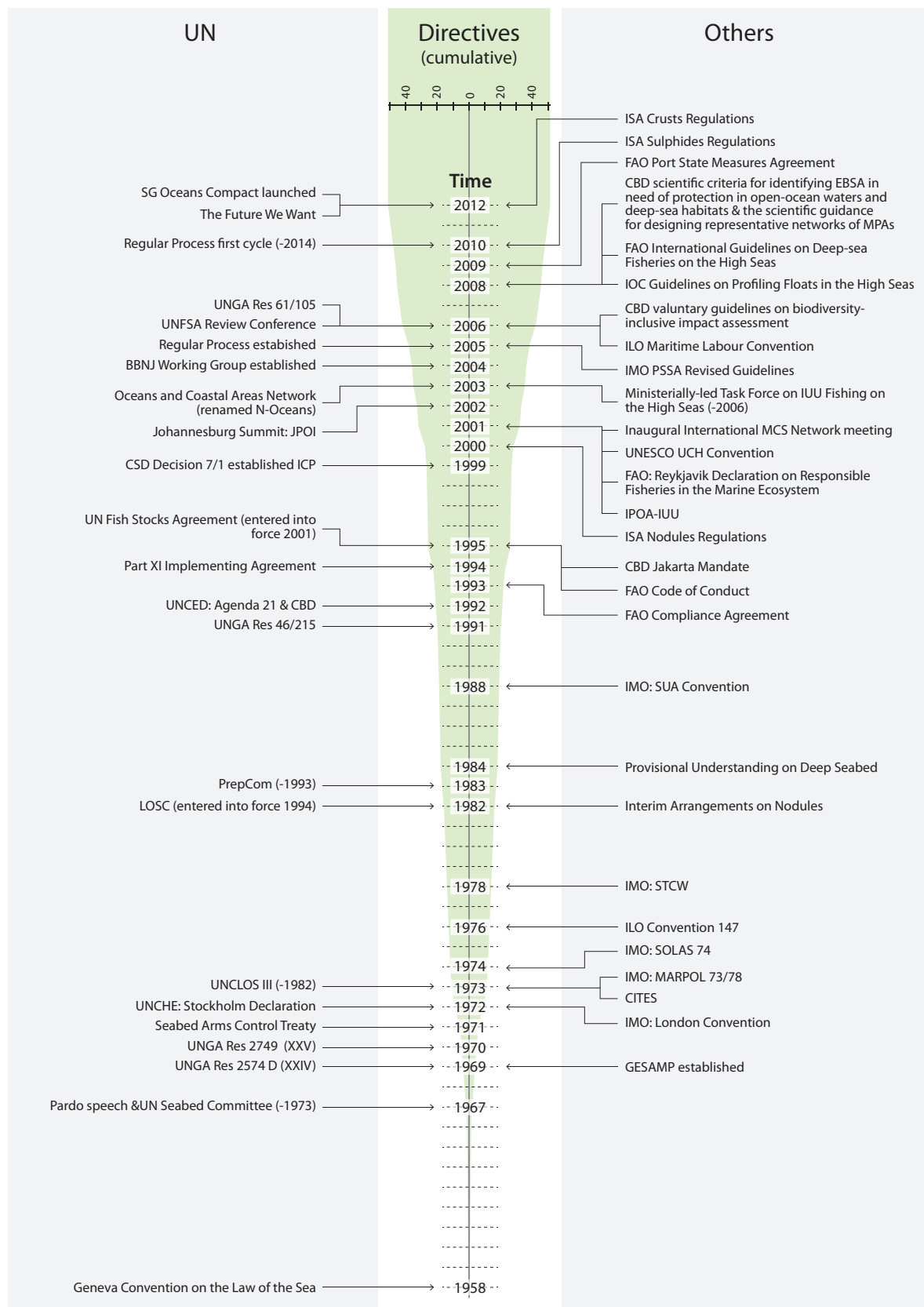
Human ingenuity and demand for raw materials is continuously leading to innovations that have increased our ability to access natural resources. Technological innovation and changing markets can consequently modify how humans interact with their environment, potentially with negative effects for both ecosystems and human well-being (Olsson and Galaz, 2012). While the effects of such dynamics are evident in terrestrial and coastal ecosystems (Rockström et al., 2009), it was long thought that the open-ocean

and deep-seas were too distant and vast to be affected in a similar manner (as formulated in “The Freedom of the Seas”; Grotius, 1609). However, evidence of the expansion of long line fisheries (Myers and Worm, 2006), effects of deep-sea fishing (Clark, 2001), and ocean acidification as a result of anthropogenic climate change (Orr et al., 2005), among many other factors, has led to concerns that such areas may be highly impacted by human activities (Halpern et al., 2008). This has, in turn, led to calls for conservation and the use of the precautionary approach to address the threats facing these areas beyond national jurisdiction (Barbier et al., 2014; Norse et al., 2012; Van Dover et al., 2011).

Since the 1950s, the international community has made steady progress in developing legal and governance instruments to address the increasing number of stressors on areas beyond national jurisdiction (Fig. 1). Most notably, the Law of the Sea

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**Fig. 1.** Timeline of significant legal and governance developments relevant to the “High Seas”, the “Area” and “Areas Beyond National Jurisdiction” from 1950 to 2012.

Convention (UN LOSC, 1982) and its Implementing Agreements have established a general legal framework for activities in areas beyond national jurisdiction, which has been implemented at global and regional levels by sectoral regimes (Oude Elferink,

2012). Activities in areas beyond national jurisdiction are now subject to a complex and growing network of regulations.

To better contextualize governance challenges associated with future human use of areas beyond national jurisdiction, we here

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