

# Chapter 1

## Ocean Governance for Sustainability Transformation



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**Abstract** This introductory chapter focuses on selected key events, features and policies of ocean governance that have had, or are likely to be needed in transforming how and why we govern the ocean sustainably. In doing so we outline examples of prominent historical events, important thematic areas of global development, policy instruments and the principles of governance processes that can transform the way society engages with the ocean. However, we acknowledge that such an overview cannot fully capture all issues, particularly how each is differentiated at regional and local levels. Accordingly, we introduce globally relevant issues and general principles, which will require further inquiry to fully unpack at the relevant levels and scales for engaged students, researchers, policy-makers and practitioners. Thus, we provide an overview of these topics from a multi- and inter-disciplinary perspective, supported by up-to-date literature. This is followed by a brief explanation of how the chapters in the book are organized into three parts, and how each chapter contributes to the book's content, including a final chapter that outlines the takeaway points for students, researchers and policy-makers in pursuing ocean governance for sustainability transformation.

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## 1.1 Focal Areas, Policies and Processes for Sustainable Ocean Governance

Human relationships with our oceans date back millennia. They have shaped the rise of civilizations, provided food and story, and seeded a diversity of coastal cultures and engagement practices around the world. However, they have also been a source of conflict, oppression and turmoil. Human-ocean stories are not new, but the magnitude of changes now incurred from these relationships are. Historical human interactions were once limited to near shore areas, however, technological advances now enable remote access and previously unimaginable exploitation opportunities for minerals, energy, shipping, food and political power (Jouffray et al. 2020). Looking back on our human-ocean past, we can see a plurality of governance narratives that have emerged, yet most remain relevant in the ocean governance debates of today. Some societies approached stewardship and use as synonymous activities, forming an embedded cultural ethic and respect for both the bounty and mystery of oceans. Others saw oceans as a source of social and economic power. If the oceans could be controlled, navigated and utilized, gains could be made and power over others could be leveraged. Such symbolic power has been tightly coupled with the promise of material gains, whether by facilitating transport to new territories or by harnessing resources deep below. Oceans have further offered opportunity of undiscovered potential. Often they signify hope, such as embedded in the Agenda 2030 of the UN or the Blue Economy discourses in Europe or parts of Africa. Like no other ecosystem on earth, the oceans have consistently fueled narratives of endless potential for human flourishing – a new life across them, adventure, power, discovery, food, spirituality and wealth.

Viewing governance as a system of systems, with connectivity across multiple levels and scales, is critical for understanding how transformative changes in governing manifest. Ocean governance is no different. Governance comprises not only the policies and politics of state-level decision making, but the processes, coordination and collaboration with and throughout civil society. Knowledge sharing, learning, deliberation and communication are increasingly put forth as important features of modern processes of governing that include equality, justice and sustainability as desired outcomes. Ultimately, governance aims to consciously transform our human-ocean interactions toward sustainability, however, transformation is also an emergent property of current social, economic and political systems. There is no single lever, key actor, politician or policy that will cause cascading effects toward desired goals. Rather transformation emerges in response to the amalgamation of incentives, tradeoffs, aggregate actions and largely unforeseeable current events in everyday life.

Governance is always situated in a context, where the material and non-material nature of what is being governed, by whom and for whom, dictates how governance activities will function and what they can achieve. From this perspective, ocean governance faces challenges of being seen, often far from shore or below the surface, negotiated out of sight in the spaces where the activities and actors doing the

direct interactions occur. Ocean governance is challenged by the need to embrace and acknowledge its often invisibility, to foster transformative change processes as an opportunity for building constructive collaborations and pursuing moral actions. More broadly, peripheral domestic and international politics undoubtedly shape ocean issues, positioning them in a matrix of agendas, motivations and challenges for achieving change towards sustainable practices that are not necessarily tied to environmental realities or local social and economic needs. Thus, rethinking and reshaping ocean governance towards a governance of the ocean and its resources in a more sustainable manner than before indeed requires trans-regional and cross-scalar ‘transformational alliances’, coined by Dirk Messner (2015), and actor networks.

The ocean provides a unique context to explore how human-nature narratives are being constructed and discourses shaped, guiding actors in their decision-making, in forming cognitive, policy-making and –implementing structures. We physically see the ocean as an endless surface, which leaves no traces of past events in its ever-shifting and elastic fluidity. We know boats have crossed, animals have splashed and food has been harvested, yet on its surface we see little evidence. We are forced to remember and imagine, until we can rediscover, interpret and (re-)govern. The ocean is constant in its fluidity, similar to our discourses about it, changing and evolving to shape our experiences with it. Importantly, discourses of the ocean that portray them as vast expanses with limitless resources have been some of the most powerful in history. Yet, this discourse is being steadily reformed and retold. Perhaps most importantly, ocean governance discourses are shifting towards sustainability transformation.

Sustainability transformation is understood as the urgent and intentional change in the composition, structure and/or condition of human-environmental relationships with our oceans, to ensure human well-being, social justice and environmental stewardship (Patterson et al. 2017; Bennett et al. 2019; UN 2019). Intentional and concerted governance engagement is needed to achieve such transformations, importantly, the setting of goals and agendas for action. The Sustainable Development Goals (SDGs) have incorporated ‘Life Below Water’ (SDG 14), which has provided multilateral momentum for mobilizing ocean stewardship awareness and activities. More broadly, the Global Sustainable Development Report (2019), produced by an independent group of scientists appointed by the United Nations, suggests six transformational fields for sustainable development and four transformational levers to actualize them. These can be envisioned to frame ocean sustainability transformations, linked to specific themes and activities (Table 1.1).

Furthermore, the United Nations has initiated the UN Decade of Ocean Science for Sustainable Development (<https://www.oceandecade.org/>), taking place between 2021 and 2030. The Ocean Decade is aimed at achieving seven broadly defined outcomes (Box 1.1), and provides a global platform for networking, cooperation and other actions on related to ocean science and practice. The puzzle of governing often disparate activities is nonetheless an interconnected system of systems, both multi-level and multi-scale, where partnerships linking public and private goals and activities around all of the SDGs, through knowledge co-creation processes, will

**Table 1.1** The Global Sustainable Development Report (2019) produced by an independent group of scientist appointed by the United Nations suggests six transformational fields to focus sustainable development on, and four transformational levers to actualize them (left). A non-exhaustive list of fields and levers specific to ocean and coastal governance are highlighted for each (right)

Global Sustainable Development Report		Examples within ocean governance
Transformational fields	Human well-being and capabilities	Supporting small-scale & traditional blue livelihoods
	Sustainable and just economies	Inclusive property rights and tenure recognition
	Food systems and nutrition patterns	Enabling fisheries and aquaculture transformation
	Energy decarbonization & universal access	Offshore renewables while ending fossil fuel extraction
	Urban and peri-urban development	Just access to coastal spaces while adapting to sea level rise
	Global environmental commons	Conserving high seas and seafloor ecosystems
Transformational levers	Governance	Transparency, inclusion & deliberation in multi-use spaces
	Economy and finance	Ending fisheries subsidies and ocean resource grabbing
	Individual and collective action	Changing plastic use norms and mobilizing political action
	Science and technology	Satellite vessel tracking for monitoring and enforcement

**Box 1.1: The Seven Desired Outcomes from the UN Decade of Ocean Science for Sustainable Development (<https://www.oceandecade.org/vision-mission/>)**

1. **A clean ocean** where sources of pollution are identified and reduced or removed.
2. **A healthy and resilient ocean** where marine ecosystems are understood, protected, restored and managed.
3. **A productive ocean** supporting sustainable food supply and a sustainable ocean economy.
4. **A predicted ocean** where society understands and can respond to changing ocean conditions.
5. **A safe ocean** where life and livelihoods are protected from ocean-related hazards.
6. **An accessible ocean** with open and equitable access to data, information and technology and innovation.
7. **An inspiring and engaging ocean** where society understands and values the ocean in relation to human wellbeing and sustainable development.

play a key role in solving challenges and finding joint solutions. Such solutions cannot leave out local actors, smallholders, least developed groups, indigenous communities or historical stewards. Inclusion, participation and incorporating diversity needs to be better prioritized in deliberation and decision-making processes to deliver outcomes that better serve humanities wide range of people and interests, rather than an elite few. This includes the science community in rethinking who creates knowledge, how it is created (e.g., through which processes, and with what purpose and interests) and how knowledge from scientific communities is used as a tool with power for decision-making and practical change.

Today, human-ocean interactions are indeed rapidly transforming. Some as conscious efforts for sustainable change, others as self-emergent responses to the incentives of markets, capitalization and politics. In turn, societies are tasked with balancing new ocean-based development opportunities with environmental stewardship and social sustainability goals, and thus engaging with governance in a pluralistic and place-based manor (Allison et al. 2020). Engaging with a diverse range of governance activities – research, practice, policy – can provide the tools societies need to transformation our interactions with the oceans towards desired sustainability goals. This is no easy challenge. Social, economic and environmental issues are complexly intertwined, and the amalgamation of institutions, people, places that encompass ocean governance are co-shaped and often contested processes that require focused attention and societal investment to make successful.

Governing the ocean is arguably the collective responsibility of humanity (Allison et al. 2020). Who governs, who participates in governing, who is allowed to have a stake in the process and for what purpose, is where the contention, trade-offs and political interests interact to make governing a complex and pluralistic pursuit. Ocean governance practices that adopt principles of sustainability are no different (Gissi et al. 2022). Governance broadly refers to the social processes that guide human behavior, inclusive of all stakeholders, and is thus a composite societal process of laws, norms, rule systems, institutions, discourses, power dynamics and organizational hierarchies that intermix to shape our behavior, decision making and practical actions (Davidson and Frickel 2004; Lemos and Agrawal 2006; Partelow et al. 2020a).

However, ocean governance has not evolved independently, as noted by Steinberg (1996), “ocean governance systems are influenced by three elements that, in turn, influence each other: the organization of land-based society, the dominant uses of the sea by land-based society, and the physical characteristics of the sea as experienced by users.” Models and approaches to land-based environmental governance have historically shaped aquatic ones, although they often do not fit biophysical characteristics of ocean fluidity or the types of social-economic interactions that characterize ocean-based human activities. For example, in Chile, aquaculture property rights models that have mirrored the success of terrestrial farming and small-scale capture fisheries tenure rights face challenges of being immovable and fixed under constantly changing environmental and economic conditions which require adaptation for aquaculture (Tecklin 2016).

In parallel, many international organizations including the World Bank, OECD and FAO are advocating for and driving Blue Economy agendas, framing ocean-based development activities as the new horizon for twenty-first century social-economic prosperity. The term ‘Blue Economy’ emerged from discussions on the ‘Green Economy’ during the 2012 UN Conference on Sustainable Development (Rio+20). Since then, major international organizations have launched sustained Blue Economy efforts such as the World Bank’s PROBLUE Blue Economy program, the FAO’s Blue Growth Initiative, the OECD’s ‘Ocean Economy in 2030’ report, the Global Ocean Alliance’s 30-by-30 campaign, and the World Economic Forum’s Sustainable Blue Economy theme supporting the Virtual Ocean Dialogues. Both critiques and praise have been raised in response to Blue Economy framings. Critics have raised concerns that such agendas aim to extend capital intensive investments with growth based economic framings into the sea without learning the lessons from the decades of similar approaches applied on land which have led to environmental degradation and the erosion of culturally rich and small-scale livelihood practices under the promise of technological solutions, scalability and efficiency within the political economy discourse of globalism (Golden et al. 2017; Voyer et al. 2018; Farmery et al. 2021). Further neoliberalizing the oceans risks prioritizing the decision-making and interests of those with power in it, often over the silent or silenced ocean-dependent majority whose livelihoods and wellbeing are more directly linked to ocean health (Bennett et al. 2021). On the other side, Blue Economy agendas bring light to the long ignored sustainability issues of oceans and coasts, and can be seen as an opportunity to more appropriately steward ocean-based economic development activities for advancing societies, while recognizing small-holder dependencies and vulnerability, in line with contextually rooted but globally recognized sustainability ambitions. Across this spectrum of critique and optimism are many nuanced positions and arguments, such as which governance strategies at the national level and below can most effectively adapt economic development strategies to local challenges within existing institutional frameworks (Voyer et al. 2021).

Societal organization remains a key practical and scholarly question for governance. How should we organize our activities in a joint way, to ensure goal development and implementation in a timely matter, while also including the necessary diversity of stakeholders and effective deliberation on key issues? Procedural justice, equality and developing capacities for co-production and participation will be central to successful ocean governance efforts, as they are elsewhere in sustainable development processes. This is easier said than done, and the right approach is likely to differ across contexts. Investments into capacity building for representation and self-organization is needed at all levels and in all sectors, particularly for vulnerable small-holder groups. Thematic specialists, facilitators, technical experts and group representatives of resources users, resource stewards, governments, civil society groups, industry and academia need to be incentivized to pursue constructive engagement opportunities and be supported in doing so.

Beyond procedural and capacity issues, specific governing models and institutions require nuanced attention. Many ocean governance issues involve property

rights, such as the rights to access, use, manage and exclude others from activities in specific areas. Ocean rights are three dimensional, where rights in the vertical water column, or on the sea floor, are equally important and as differentiated as two dimensional surface space. However, the ocean is humanity's least privatized environmental entity (Schlüter et al. 2020), and the allocation of further property rights need to consider sustainability issues such as the distributive and procedural justice dynamics as well as spillover or path dependency implications (Partelow et al. 2019). Much of the ocean is a commons, for humanities shared use, where no jurisdiction of any single government applies, and only voluntary international conventions have acted as a guide for use and stewardship. The United Nations Convention on the Law of the Sea (UNCLOS), implemented in 1982, provided the first international legal framework establishing ocean property rights for individual countries in their offshore waters. The UNCLOS Exclusive Economic Zones enable countries to manage and exploit resources up to 200 nautical miles off their shore, or until another EEZ is met, Beyond these Exclusive Economic Zones for individual states, the ocean remains common property upheld by voluntary agreements of use and stewardship. In many instances, rights are synonymous with power. Common property arrangements on our shores and seas involve power sharing, but also require collective action to organize sharing in fair and responsible ways. Private property concentrates rights, and thus concentrates power, but also internalizes costs and can motivate quick action for either use or protection. Focused efforts are needed to ensure that if and when rights are allocated, they are done so in recognitional, distributional and procedurally just ways.

One of the major challenges with pursuing transformative governance and sustainability agendas is acknowledging the potential risks. Blythe et al. (2018) examine how the discourse supporting transformation as apolitical or inevitable has potential to generate significant and counterproductive risks. In other words, fostering social, political and economic change can be very difficult and come with unforeseen costs (Table 1.2). Although the outlined risks are not specific to ocean governance, they can be easily applied. Transformations in ocean governance can risk shifting the burden of change to vulnerable groups, despite the origins or problems coming from more powerful actors in wealthier politically and economically dominant countries. For example, due to historically high carbon emissions in the United States and Europe leading to increased ocean acidification, local low-income fishers may be forced or crowded out of coastal spaces where conservation areas are established with Global North support to protect resilient varieties of coral or sea-grass to increased acidification and warming sea surface temperatures, without offering fishers an alternative livelihood opportunity or compensation. Transformation can also be used to justify business as usual, often expressed in critiques of Blue Economy agendas that seem to extend unsustainable growth-based neoliberal logic into the oceans masked in sustainability terminology. Furthermore, social science has shown for decades the need for differentiating social context in economic and political decision-making to avoid implementing initiatives and policies that don't consider local practices, culture and history. This has been supported in natural resource governance literature, that panacea solutions fail to deliver

**Table 1.2** Five latent risks associated with the shift from descriptive to prescriptive engagements with the concept of transformations to sustainability, taken from Blythe et al. (2018)

Sustainability transformation risk	Examples within ocean governance
<b>Risk 1:</b> Transformation Discourse Risks Shifting the Burden of Response onto Vulnerable Parties	Resettling informal coastal settlements for elite real-estate developments. Aquaculture increases seafood prices, reducing access to essential nutrients for poor.
<b>Risk 2:</b> Transformation Discourse May Be Used to Justify Business-As-Usual	Blue Economy framings draw investments that require growth and returns for elites, reinforcing capitalistic market incentives that crowd-out just and equitable resource use and development ambitions.
<b>Risk 3:</b> Transformation Discourse Pays Insufficient Attention to Social Differentiation	Governance uses generic policies to solve context specific problems such as coastal protected area spatial planning, use rules and rights. What works for diverse people and cultures is likely to substantially vary.
<b>Risk 4:</b> Transformation Discourse Can Exclude the Possibility of Non-Transformation or Resistance	Risks emerge when transformation is framed as inevitable, positive or singular in its directionality. Such as establishing more conservation areas which may fail to recognize that coupling stewardship and use may be optimal or that more time may be needed to shift society in just ways.
<b>Risk 5:</b> Insufficient Treatment of Power and Politics Threatens the Legitimacy of Transformation Discourse	Efforts to shift local plastic use and pollution behavioral norms fail to consider structural economic incentives and industry lobbying. In contrast, policies for reduction through legislation fail to consider equally harmful alternatives available to producers, or consumer preferences shaped by marketing and contrasting political views.

sustainable outcomes when they do not allow for tailored approaches and local implementation, often by failing to include local stakeholder inputs who have useful and practical non-scientific knowledge (Brock and Carpenter 2007; Ostrom et al. 2007). Transformation can also crowd-out possibilities of non-fundamentally transformative changes as valid solutions, or the emergence of resistance for unforeseen reasons in different stakeholder groups, perhaps due to historical mistrust or lack of inclusion. Finally, the role of power in politics can threaten legitimacy and acceptability at all levels of governance.

## 1.2 Key Events in the History of Ocean Governance

For millennia, countless events have shaped the human relationship with our oceans. There is a rich history of triumph, societal expansion and cultural development, but also of oppression and struggle. Here we focus on some of the key events dating back to the early twentieth century, to highlight a limited but influential set of key government actions and policies, scientific advancements, and society and environment activities that have influenced current perspectives and trajectories (Table 1.3).



**Table 1.3** Selective ocean governance related events in (1) governance and policy, and (2) science and society

Years	Governance and policy	Science and society
1900–1950	German naval blockade (1939–1945) United Nations (1945) International Whaling Commission (1946)	Northwest Passage (1906) Titanic sinks (1912) Panama Canal (1914) Acoustic sea floor exploration (1914) Meteor maps seafloor <sup>a</sup> (1925) Bathysphere invented (1934) Aqua-Lung SCUBA diving (1943) WWII Naval advances (1939–1945)
1950s	UNCLOS I <sup>b</sup> (1956) Antarctic Treaty by 12 nations (1959)	The Sea Around Us (Carson, 1951)
1960s	UNCLOS II (1960) Intergovernmental Oceanographic Commission of UNESCO (IOC) (1960)	Silent Spring (Carson, 1962) Santa Barbara oil spill (1969)
1970s	UNEP Regional Seas Program <sup>c</sup> (1974) OSPAR: Oslo & Paris Conventions <sup>d</sup> (1972) HELCOM: The Baltic Marine Environment Protection Commission founded (1974)	First Earth Day (1970) NOAA established <sup>e</sup> (1970) Blue Marble photo from Apollo 17 (1972) International Decade of Ocean Exploration (IDOE) (1971–1980) Greenpeace first anti-whaling campaign (1975)
1980s	Abidjan Convention <sup>f</sup> (1981) UNEP COBSEA (1981) <sup>g</sup> UNCLOS III adopted along with International Seabed Authority (1982) Nairobi Convention <sup>h</sup> (1985) Moratorium on whaling (1986) Basel Convention <sup>i</sup> (1989)	Our Common Future <sup>j</sup> (1987) Exxon Valdez oil spill – Alaska (1989)
1990s	Rio Earth Summit <sup>k</sup> (1992) UNCLOS comes into force (1994) Marine Stewardship Council (1996)	Argo project <sup>l</sup> (1990) Atlantic cod fishery collapse (1992) First UN State of World Fisheries and Aquaculture report (1994) Fishing Down Marine Food Webs (Pauly et al. 1998) <sup>m</sup> Oceana founded <sup>n</sup> (1999)
2000s	EU Marine Strategy Framework Directive (2008) USA Ocean Policy Task Force (2009) UK Marine and Coastal Access Act (2009)	The Blue Planet series (2001) Indian Ocean earthquake & tsunami <sup>o</sup> (2004) Hurricane Katrina, USA <sup>p</sup> (2005) 5 Gyres Institute <sup>q</sup> (2009)

(continued)

**Table 1.3** (continued)

Years	Governance and policy	Science and society
2010s–present	Aquaculture Stewardship Council (2010) Blue Economy from Rio+20 (2012) Global Partnership on Marine Litter <sup>a</sup> (2012) FAO Small scale fisheries guidelines (2014) UN SDG 14 ‘Life below Water’ (2015) COBSEA Strategic Directions (2018–2022) <sup>b</sup> African Union Blue Economy report <sup>c</sup> (2019) ASEAN Blue Economy declaration <sup>d</sup> (2021) EU Blue Economy strategy report <sup>e</sup> (2021) UN Decade of Ocean Science for Sustainable Development (2021–2030) International Seabed Authority has issued 31 deep sea mining contracts <sup>w</sup> (2022)	Census of Marine Life (2010) Fukushima nuclear disaster (2011) Solo Dive in Mariana Trench (2012) Blackfish documentary (2013) Global Fishing Watch <sup>x</sup> (2016) Seabed 2030 project <sup>y</sup> (2017) Global coral bleaching (2016–2017) UN State of the World Fisheries and Aquaculture <sup>z</sup> (2020)

<sup>a</sup>[https://en.wikipedia.org/wiki/German\\_survey\\_ship\\_Meteor](https://en.wikipedia.org/wiki/German_survey_ship_Meteor)

<sup>b</sup>First United Nations Conference on the Law of the Sea

<sup>c</sup><https://www.unep.org/explore-topics/oceans-seas/what-we-do/regional-seas-programme>

<sup>d</sup><https://www.ospar.org/convention>

<sup>e</sup><https://www.noaa.gov/>

<sup>f</sup>Cooperation for the Marine and Coastal Environment of the Atlantic Coast of West, Central and Southern Africa

<sup>g</sup><https://www.unep.org/cobsea/>

<sup>h</sup><https://www.nairobi-convention.org/>

<sup>i</sup><http://www.basel.int/TheConvention/Overview/tabid/1271/Default.aspx>

<sup>j</sup><https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>

<sup>k</sup><https://www.un.org/en/conferences/environment/rio1992>

<sup>l</sup><https://argo.ucsd.edu/>

<sup>m</sup><https://www.science.org/doi/10.1126/science.279.5352.860>

<sup>n</sup><https://oceana.org/>

<sup>o</sup>[https://en.wikipedia.org/wiki/2004\\_Indian\\_Ocean\\_earthquake\\_and\\_tsunami](https://en.wikipedia.org/wiki/2004_Indian_Ocean_earthquake_and_tsunami)

<sup>p</sup>[https://en.wikipedia.org/wiki/Hurricane\\_Katrina](https://en.wikipedia.org/wiki/Hurricane_Katrina)

<sup>q</sup><https://www.5gyres.org/>

<sup>r</sup><https://www.gpmarinelitter.org/>

<sup>s</sup>Satellite tracking of human activity at sea (<https://globalfishingwatch.org/>)

<sup>t</sup><https://www.unep.org/cobsea/resources/policy-and-strategy/cobsea-strategic-directions-2018-2022>

<sup>u</sup>[https://www.au-ibar.org/sites/default/files/2020-10/sd\\_20200313\\_africa\\_blue\\_economy\\_strategy\\_en.pdf](https://www.au-ibar.org/sites/default/files/2020-10/sd_20200313_africa_blue_economy_strategy_en.pdf)

<sup>v</sup><https://asean.org/wp-content/uploads/2021/10/4.-ASEAN-Leaders-Declaration-on-the-Blue-Economy-Final.pdf>

<sup>w</sup><https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0240&from=EN>

<sup>x</sup><https://www.isa.org/jm/deep-seabed-minerals-contractors>

<sup>y</sup>100% of the ocean floor mapped by 2030 (<https://seabed2030.org/>)

<sup>z</sup><https://www.fao.org/documents/card/en/c/ca9229en/>

Early twentieth century exploration included the first navigation of the northwest passage, an arctic sea route shortening the distance from the Atlantic to the Pacific Ocean with access to Asia. Today, Arctic sea routes remain contested spaces with receding summer sea ice due to climate change easing access. The ability to establish rights and norms for navigating the Arctic and dealing with the competition and

resource exploitation remain a contested multi-lateral issue. Early scientific achievements include acoustic seafloor exploration and bathymetry science, which allowed early expeditions to map large areas of the ocean with more accuracy. Entering a phase of global turmoil, World War II showed the power that control over the sea can have on politics and the economy, largely shaping outcomes with substantial naval technology advances displayed in both the North Atlantic and Pacific. Following the war period, the newly formed United Nations established various conventions, including the Convention on the Law of the Sea (UNCLOS) which first met in Geneva in 1956. Subsequent UNCLOS conventions lasted until consensus was reached in 1982, coming into force in 1994. The UNCLOS convention enabled various state level provisions shaping our current ocean governance landscape including the 12 nautical mile territorial zone and 200 nautical mile Exclusive Economic Zone (EEZ).

Starting in the 1950s and 60s, public awareness of environmental issues began to grow, catalyzed by influential events and books such as *The Sea Around Us* (1951) and *Silent Spring* (1962) by Rachel Carson. The 1972 'Blue Marble' photo taken from the space ship Apollo 17 provided one of the first public and simple pieces of evidence that the oceans both dominate life on our planet, but also have limits, and that our political borders dissolve at the level of planetary stewardship. The 1969 Santa Barbara and 1989 Exxon Valdez oil spills awakened public awareness to the risks of carelessly exploiting our oceans, risking the public goods oceans provide for human health, recreation and food. Greenpeace, one of the most well-known environmental NGOs, was founded in the early 1970s in a first attempt to raise awareness and stop US nuclear weapon tests off the coast of Alaska, an area considered at the time to be out of sight and out of mind. The 1992 collapse of the northwest Atlantic cod fishery showed us the ocean has material limits, leading to recognition that social, economic and political turmoil are coupled to environmental health. The fishery's collapse sparked changes in how scientists, fishers and politicians interact to govern fisheries today.

In the 1980s and 1990s, awareness and public policy increased on specific topical and regional issues. HELCOM spurred Nordic cooperation in the Baltic Sea, while the Abidjan (1981) and Nairobi (1985) Conventions mobilized management activities among countries along the Eastern and Western African coastlines respectively. The United Nations Conference on Environment and Development, also known as the Rio Earth Summit, took place in 1992 and catalyzed international actions and the formation of many conventions for environmental protection and action today such as the Convention on Biological Diversity (CBD) and Framework Convention on Climate Change (UNFCCC). The summit further spurred the formation of non-governmental organizations (NGO) focused on environmental issues (Partelow et al. 2020b). One the key global data collection and monitoring efforts in our oceans, the United Nations State of World Fisheries and Aquaculture report (FAO 2020), was first published in 1994. The report series and its data continue to provide much of national, regional and global seafood production and development data for scientists and policymakers despite challenges with maintaining accuracy and consistency in reporting across highly diverse political and economic contexts.

The 2000s saw many societal events that further catalyzed societies dynamic relationship with the ocean, coastline and the need for disaster risk reduction investments and planning. The Indian Ocean earthquake and tsunami in December 2004 devastated parts of low lying coastal Indonesia, Thailand, Sri Lanka, India and the Maldives, among other areas. The event triggered substantial humanitarian efforts in the immediate aftermath, spurred ongoing debates on coastal security and warning systems, and raised critique on the role of foreign aid in enabling long-term recovery and resilience. Hurricane Katrina in 2005 flooded substantial sections of the city of New Orleans, USA and surrounding areas, raising awareness to coastal hazards, government response and the impacts of climate change. Furthermore, the large earthquake off the coast of Japan in March 2011, and subsequent tsunami, led to the meltdown of the Fukushima Daiichi nuclear power plant, contaminating the surrounding coastal area, raising debates regarding nuclear security and coastal protection worldwide. Later, in 2016 and 2017, subsequent ocean warming periods led to widespread global coral bleaching events, raising awareness of the impacts climate change is having on marine biodiversity and its dependent economy.

More recent events indicate the rising political awareness, along with regional and international efforts to mobilize action for ocean management, protection and science. The Food and Agricultural Organization of the United Nations (FAO) Small Scale Fisheries Guidelines were released in 2014, recognizing the importance of small-scale livelihoods in protection and management. The United Nations Agenda 2030, announced in 2015, included the 17 Sustainable Development Goals (SDG), with SDG 14 focused on 'Life Below Water' with the aim to conserve and sustainably use the oceans, seas and marine resources for sustainable development. In economic and political spheres, declarations and strategic reports for the Blue Economy were released by the African Union (2019), ASEAN (2021) and the European Commission (2021). Looking forward, the UN Decade of Ocean Science for Sustainable Development started in 2021, with the intent to mobilize and coordinate global action and activities surrounding our oceans over the next decade and beyond.

### 1.3 Key Themes of Ocean Governance

Many themes and topics are emerging as critically important for our oceans, for engagement at all levels, and for achieving the ambitions outlined in SDG 14. Below we highlight a select few that have been, remain or have emerged as influential in ongoing ocean governance arenas. Most notably, fisheries have been a central focus of ocean governance efforts over the last half century. Nonetheless, many fisheries globally remain overexploited and under-recognized in their contributions to food and livelihood security (Pauly and Zeller 2016). This is not the sole responsibility of fishers, but often of politics on the multilateral and regional levels regarding state subsidies and industry interests. It is not unusual that fishery contracts have been bundled into development aid and economic trade agreements that put fishing rights in negotiation with multilateral financial reform and the privatization of public

service provision, for example, in countries in West Africa (Gagern and Bergh 2013; Gegout 2016; Hornidge and Keijzer 2021). Numerous governance strategies have been suggested and advocated to reform the policies and practices of industrial fishing, such as those suggested in Box 1.2. Importantly, Hornidge and Keijzer make the necessary distinction between small and large scale fisheries. Small scale fisheries account for roughly 50% of the global catch, but roughly 90% of the sectors employment, and tend to be rooted in community-based practices that support local culture, food security and livelihoods (FAO 2020). However, this doesn't mean small-scale fisheries do not face substantial sustainability issues and governance challenges themselves, although they are often overlooked in policy making and economic development arenas (Smith and Basurto 2019).

Private sector supported initiatives are leading numerous ocean governance activities. Global Fishing Watch, an international nonprofit organization founded by Oceana, Skytruth and Google, is revolutionizing the potential for ocean governance through data driven analytics that utilize automatic identification system (AIS) technology to track the movement of boats with satellites worldwide (<https://globalfishingwatch.org/>). This global data has revealed previously unobservable observations and patterns on transshipment (Boerder et al. 2018), distant water fishing (Tickler et al. 2018b), vessel identification strategies and regional movement patterns (Taconet et al. 2019), forced labor issues (McDonald et al. 2021), and the outsized role of wealthy nations in global industrial fishing (Mccauley et al. 2018). Furthermore, science and industry partnerships are now emerging to tackle the practices and incentives for ocean stewardship through cooperative open-dialogue and transdisciplinary scientific engagement, such as the Seafood Business for Ocean Stewardship (SeaBOS) initiative (Österblom et al. 2017), bringing together some of the largest seafood producing companies to develop sustainability commitments (<https://seabos.org/>). However, these activities need further adoption and scaling, as the industrial fishing industry remains plagued by its environmental impacts and human-rights abuses in the form of modern day slavery (Tickler et al. 2018a) and human trafficking (Mileski et al. 2020).

### **Box 1.2: Action Items for Fisheries Reform in International Cooperation and Development (Hornidge/Keijzer 2021)**

1. Eliminate subsidies for industrial fisheries.
2. A ban on all high-sea fishing activities.
3. Institutional strengthening and capacity development of regional fisheries management.
4. Special support for small-scale and coastal fisheries in developing and middle-income countries.
5. Targeted development of local fish-processing industries and (trans-) regional marketing, including gender-sensitive job creation measures, social and environmental standards, capacity development and training.
6. Promoting cross-sector cooperation and coordination in ocean-based branches of the economy.

Following rapidly behind capture fisheries is aquaculture, where South and Southeast Asian countries, led by China, India, Indonesia and Vietnam, have undergone blue food agricultural revolutions, demonstrating that the world can farm seafood at scale. This has not been done with overly advanced technology and high capital investments in the ocean, but rather through low tech rural development in inland and coastal brackish ponds, quietly demonstrating that the often utopic visions of Blue Economy aquaculture expansion for high value and high trophic level species in the open sea overlook the need for small-scale livelihood and food security in shaping agriculture transformation rather than technology (Edwards et al. 2019). However, aquaculture is expanding in many forms globally, and has been the fastest growing food production sector globally for the last two decades, now producing more tonnage of farmed products than capture fisheries (FAO 2020). Similar to capture fisheries, much of aquaculture is small-scale, and its emergence as a sustainable means of seafood production will require specific policy attention and regulation to curb environmental impacts while bolstering livelihood opportunities, food access and safety through supply chain innovations and transformation (Belton et al. 2020). Aquaculture is a newly emerging sector, and although it is highly reliant on environmental commons such as water quality, water quantity, feed sourcing and nutrients, it is likely that a regulatory landscape already exists to govern those commons in other competing sectors, where institution building will likely require cross-sector collaboration and adaptation (Partelow et al. 2021).

Open marine space is increasingly viewed as a “commodity frontier”, something necessary to procure rights over (Campling 2012; Schlüter et al. 2020), but there have been parallel voices calling for a reconsideration of the intensification of humanity’s relation with the ocean (Hadjimichael 2018; Ertör and Hadjimichael 2020). Enclosure and territoriality is not a new feature of the ocean commons and still continue today (Constantinou and Hadjimichael 2021). For example, in the South China Sea, with implications for capture fisheries, fossil fuel and mineral extraction coupled with strategic political and economic interests in securing navigation, use and management rights (Manlosa et al. 2021a, b). The South China Sea example showcases how international legal frameworks are used and disputed to expand maritime claims for different geopolitical interests, and for retaining or acquiring fishing rights, or access to seabed resources. Governing oceanic commons has been approached through international cooperation in the Antarctic, where the Antarctic Treaty was signed in 1959 stipulating peaceful use of the region in the interest of fostering publically available science, with 54 parties in agreement to the treaty today. However, in the Arctic, the decreasing presence of summer sea ice due to climate change is making shipping passage through Arctic routes a realistic option for tourism and large container ships, but also for previously inaccessible natural resource exploitation interests that remain open to negotiation and are still contested.

Only what is known and cognitively grasped can be governed, leaving what is happening offshore and underwater less seen and at risk. We can now find examples of our ungoverned and hidden ocean past, leading to reinterpretations and the reframing of our human-ocean narratives (Table 1.3). Installations of wind farms in

the European North Sea are regularly challenged by the presence of thousands of illegally dumped barrels of explosive and corrosive World War II ammunitions. Off the coast of southern California, thousands of barrels of the agricultural pesticide DDT (Dichloro-diphenyl-trichloroethane) were illegally dumped in the 1950s and 1960s. DDT was banned in California in the 1970s in part due to the observation that nesting seabird eggs became inviable due to shell thinning, influenced by Carson's 1962 book *Silent Spring*. Making the out-of-sight ocean visible to the public and policy makers is challenging, for example, to govern seabed mining. Seabed mining is of increasing interest for the extraction of minerals and metals due to terrestrial depletion, and is occurring in both areas beyond national jurisdiction and on near-shore continental shelves (Wedding et al. 2015; Levin et al. 2020). Minerals such as copper, cobalt, nickel, zinc and lithium are needed for many electronic devices including electric vehicles and transportation as well as renewable energy generating devices desired for transitioning to low carbon economies (Levin et al. 2020). The International Seabed Authority established in tangent under UNCLOS, is in charge of regulating human activities on the seabed beyond the continental shelf, and has issued 31 contracts for mining. However, many questions and uncertainties exist regarding environmental impacts, scale of operations and legal ambiguities (Miller et al. 2018).

As seen above through aquaculture and seabed mining, ocean systems and ocean governance are not isolated, they interact strongly with land-based coastal systems and climate. Governing climate change mitigation and adaptation is synonymous with governing our oceans. The oceans not only absorb carbon, but also show the direct implications climate change with sea level rise and increasing storm intensity and frequency, threatening hundreds of millions of people globally. Entire countries such as Bangladesh, the Maldives and the Marshall Islands face existential threats in the loss of territory with future sea level rise projections. Climate justice is an ever-present issue, as those countries have been among the lowest contributors to global greenhouse emissions. The oceans are also a climate buffer because they absorb carbon dioxide from the atmosphere, most effectively when they have intact ecosystems. However, the side effect is increased ocean acidification through higher amounts of carbonic acid that reduce carbonate availability for calcifying organisms such as coral. The oceans also promise renewed efforts into oil and gas exploration, with billions of dollars invested yearly by the largest fossil fuel corporations to find new reserves under the sea floor. Many of these corporations still receive substantial financial subsidies and regulatory support from state governments (Rentschler and Bazilian 2017), while also making pledges for climate action.

The ocean can't be governed in isolation. Many of the negative impacts on our oceans originate with governance challenges on land. Fertilizers, pesticides, plastics and other hazardous materials, when mismanaged on land, end up in our waterways and eventually our oceans. Socially, there has been steady increases in the percentage of the global population living in coastal areas. Other economic, cultural and political issues such as drought, conflict, housing speculation or health trends can drive interest in coastal development or change demand for coastal resource use, for example in the demand for specific types of seafood. Nearly the entire

global fishery for sea cucumbers is driven by cultural interests and markets in China (Eriksson et al. 2015). In real estate, islands such as Cyprus and Malta, have extensively developed their coastline in recent years, in an attempt to increase real estate prices on picturesque coastlines to attract foreign investment, with criticized citizenship for sale schemes that ultimately crowd out coastal access and use for local residents.

## 1.4 Organization of the Book

The chapters in this book are organized into three parts. Chapters in each of the parts address a range of specific focal topics. As the book is an edited volume, the specific topics, analyses and insights are written and derived by a diverse group of scholars who specialize in each subject area. The catalyst for the book originates from the European Cooperation in Science and Technology (COST) Action on ‘Ocean Governance for Sustainability – challenges, options and the role of science’. The focus of the Ocean Governance COST Action was focused around six working groups, each with specific thematic topics: (1) Land-Sea Interactions, (2) Area-Based Management, (3) Seabed Resource Management, (4) Nutrition Security and Food Systems, (5) Ocean, Climate Change, and Acidification, and (6) Fisheries Governance. The focus of the chapters loosely represents these six thematic areas, but also link to topics beyond them with a global scope. Overall, while the book can certainly not address the full spectrum of ocean governance topics and issues, it provides a baseline of up-to-date multi- and inter-disciplinary literature that intends to foster pluralistic understanding and capacity to think about and engage with ocean governance in a way that enables critical thinking, systems thinking and sustainability analytical capacity about past, present and future ocean challenges and opportunities.

### 1.4.1 Part I – Knowledge Systems for Ocean Governance

How we as a society – as researchers, policy-makers, students, practitioners and citizens – know the ocean is essential for understanding our actions, perceptions and framings around it. Chapter 2 by Hornidge et al., (2022) examines how we ‘Know the ocean’, exploring patterns of science collaboration through a lens of epistemic inequalities. The synthetic overview brings together prior reviews and critical perspectives to examine differences in knowledge production trends across disciplines, genders and transregional networks in the context of the UN Agenda 2030 and the Decade of Ocean Science for Sustainable Development. Chapter 3, provided by Barragán Paladines et al., (2022), focuses on the history of fisheries governance in Latin America, with a specific focus on Ecuador, and to what extent politics, power and knowledge have deeply influenced policies and practices in the use and



management of marine and terrestrial resources and at managing fish and seafood. Chapter 4, by Finley (2022), provides a detailed historical narrative of Japanese contributions to ocean science and the construction of recruitment fisheries oceanography, the study of the effects of climate and ocean variability on fish abundance.

### ***1.4.2 Part II – Policy Foundations of Ocean Governance***

Many policies at the international, transregional and regional levels have shaped human interaction with the sea. In Chap. 5, Flannery (2022), examines how Marine Spatial Planning (MSP) has become one of the key components of marine governance, and outlines the scholarly debates critiquing the ability of MSP to transform unsustainable marine governance and management practices within the context of emerging Blue Economy and Green Deal policy ambitions. Chapter 6, from authors Singh and Araujo (2022), aim to reflect on the past, present and future of ocean governance within fisheries at sea, marine area-based management tools and international seabed mineral resources. The three case studies demonstrate how the law of the sea has evolved, particularly with respect to the challenge of protecting and preserving the marine environment through the sustainable use of marine resources. In Chap. 7 written by Calado et al., (2022), the authors review the diverse legal and regulatory frameworks for the marine environment in the North Atlantic and assess where differences between countries exist and at which governance level they are being created. In Chap. 8, Nakamura (2022) examines the past and future of international fisheries law, providing examples and analyses of how legal developments have been shaped and can adapt to new challenges such as climate change going forward. Chapter 9, from Lawlor and Depellegrin (2022), review the marine and coastal management systems in Ireland, Romania, Spain and France under the Marine Strategy Framework Directive committed to delivering Good Environmental Status. They assess their capacity to manage land sea interactions, and provide concrete recommendations to assist EU member states going forward.

### ***1.4.3 Part III – Thematic Analyses of Ocean Governance***

Ocean governance span a wide range of topics and contexts. In this part, numerous topics are explored in specific detail highlighting context specific problems, challenges and directions forward for good governance and sustainability transformation. Chapter 10, from Cretella and Scherer (2022), unpack the issues connected to seafood consumption in Ireland's coastal capital Dublin examining behavioral shifts in consumption towards more sustainable local seafood by rediscovering historical recipes and cultural heritage. In Chap. 11, van Tatenhove (2022) gives insight into marine governance challenges in the context of Arctic shipping. Drawing on theory of reflexive institutionalization, governance interactions related to three Arctic

shipping routes are examined including the Northwest Passage (NWP), the Northeast Passage and Northern Sea Route (NEP/NSR), and the Transpolar Sea Route (TSR). Chapter 12, by Wenting et al., (2022), draw on assemblage theory to examine ecological, legal and practical insights into seabed mining, drawing on interdisciplinary perspectives to connect the debates surrounding seabed mining issues. In Chap. 13, Salmi et al., (2022) draw on interactive governance theory to compare Finnish and Swedish small-scale fisheries governance challenges, concluding that the present governance system is incompatible and that new co-governance arrangements are needed to include small-scale fishers' interests, values and local knowledge. Chapter 14, by Spranz and Schlüter (2022), explores the behavioural and cultural reasons for the high consumption and pollution by plastic bags on Bali, Indonesia, identifying promising approaches that can effectively support local initiatives and awareness campaigns. In Chap. 15, from Simarmata et al., (2022), Indonesia is again examined exploring the two distinct and interrelated concepts supporting archipelagic thinking – 'Nusantara' and 'Tanah Air'. The role of each in shaping the island nation's development trajectories are critically explored under ambitions for continued Blue Economy expansion. Chapter 16 from Penca and Said (2022) explores the multi-scale contributions of small-scale fisheries by focusing on recently developments across the Mediterranean with impacts on the supply chain and the marketing of their products, concluding that such market interventions challenge the conception of small-scale fisheries as a non-innovative sector. In Chap. 17, Ertör and Ertör Akyazi (2022) examine small-scale fisher movements and food sovereignty issues, by exploring their local and global initiatives and role in food justice movements. To conclude the part, Chap. 18 by Bednaršek et al., (2022) analyze ocean acidification as a governance challenge for fisheries and aquaculture in the Mediterranean Sea, and produce depth-related pH and aragonite saturation state exposure maps overlaid with the existing aquaculture industry to demonstrate potential risk for farming fish in the future.

To conclude and in part summarize the book's key messages, we provide Afterword, a brief synthetic overview of the main lessons learned and practical take-away messages for each of the book's target audience groups: students, researchers, and policy-makers. This chapter, acting as an Afterword, aims to provide explicit points for each group to guide further study, research or policy-making agendas across ocean governance topics.

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