

# Theorizing Ocean Governance: A Framework combining Governance, Science, and Law

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**Abstract:** Ocean governance is emerging as a field of study drawing on and combining different themes and disciplines, traversing three distinct knowledge domains: governance, science, and law. Assumptions of these three knowledge domains and their relationships underly approaches to ocean governance, yet these assumptions are rarely discussed. This study attempts to contribute to such discussion by theory building: by explicating, discussing, and refining a governance perspective, which systematizes governance into three basic components: structures and processes; ideals and standards; and substance or merits. Then, the study investigates the relevance of science and law, respectively, to each of these components of governance. On this basis, the study offers some lessons concerning key topics of ocean governance: governance-science-law interfaces; cross-sectoral, holistic, and integrated approaches; science-based decisions-making; adaptation; the ecosystem approach; and ocean governance as an emerging field of study.

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## 1. Introduction

Governance, scientific, and legal perspectives are closely related in ocean governance and these relationships are high on the ocean governance agenda. The 2022 Kunming-Montreal Global Biodiversity Framework sets out that “[I]mplementation of the framework requires transformative, innovative and transdisciplinary education, formal and informal, at all levels, including science-policy interface studies.”<sup>1</sup> The United Nations Decade of Ocean Science for Sustainable Development (2021-2030) envisions to “bridge science, policy, and societal dialogue”<sup>2</sup> and states that “[a]daptation strategies and science-informed policy responses to global change are urgently needed.”<sup>3</sup> Both the 2023 High Seas Treaty and the UN Law of the Sea Convention (UNCLOS) refer to the use of the best available science and the best scientific evidence.<sup>4</sup>

Ocean governance is an emerging field of study traversing traditional disciplines and thematic interfaces in its own ways. Scholarship on ocean governance frequently refer to components of governance (such as coordination,<sup>5</sup> adaptation,<sup>6</sup> and management processes<sup>7</sup>); to science as basis for governance (such as in science-based approaches or science-based decision-making<sup>8</sup>); and to the necessity of law (such as in need for implementation in legal instruments or for not jeopardizing the rule of law).<sup>9</sup> Assumptions and presuppositions of governance, science, and law underly approaches to ocean governance, yet these are

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<sup>1</sup> UN/CBD/COP/15/L25, "Kunming-Montreal Global Biodiversity Framework," (2022).

<sup>2</sup> UNESCO-IOC, *The Science We Need for the Ocean We Want*, Intergovernmental Oceanographic Commission (Paris, France, 2020).

<sup>3</sup> "United Nations Decade of Ocean Science for Sustainable Development (2021-2030)," <https://en.unesco.org/ocean-decade>, 2021.

<sup>4</sup> High Seas Treaty reference to be updated: [https://www.un.org/bbni/sites/www.un.org.bbni/files/draft\\_agreement\\_advanced\\_unedited\\_for\\_posting\\_v1.pdf](https://www.un.org/bbni/sites/www.un.org.bbni/files/draft_agreement_advanced_unedited_for_posting_v1.pdf). "United Nations Convention on the Law of the Sea of 10 December 1982, 1833 U.N.T.S. 3, (UNCLOS).", art 119.

<sup>5</sup> Anthony Charles, "People, oceans and scale: governance, livelihoods and climate change adaptation in marine social-ecological systems," *Current Opinion in Environmental Sustainability* 4, no. 3 (2012/07/01/ 2012), <https://doi.org/https://doi.org/10.1016/j.cosust.2012.05.011>, p. 352; Karen N. Scott, "Integrated Oceans Management: A New Frontier in Marine Environmental Protection," in *Oxford Handbook of the Law of the Sea*, ed. Donald R. Rothwell et al. (Oxford: Oxford University Press, 2015), p. 467.

<sup>6</sup> Considered as the “single most important weapon in our armoury,” by Catarina Santos et al., "Integrating climate change in ocean planning," *Nature Sustainability* 3 (2020), <https://doi.org/10.1038/s41893-020-0513-x>, p. 9.

<sup>7</sup> Charles Ehler, Jacek Zaucha, and Kira Gee, "Maritime/Marine Spatial Planning at the Interface of Research and Practice," in *Maritime Spatial Planning: past, present, future*, ed. Jacek Zaucha and Kira Gee (Cham, UK: Palgrave Macmillan, 2019), p. 1; Michael Gilek, Fred Saunders, and Igné Stalmokaitė, "The Ecosystem Approach and Sustainable Development in Baltic Sea Marine Spatial Planning: The Social Pillar, a ‘Slow Train Coming’," in *The Ecosystem Approach in Ocean Planning and Governance*, ed. David Langlet and Rosemary Rayfuse (Leiden, Boston: BRILL, 2018), p. 162; Jan-Gunnar Winther et al., "Integrated ocean management for a sustainable ocean economy," *Nature Ecology & Evolution* 4 (2020), <https://doi.org/10.1038/s41559-020-1259-6>; Riku Varjopuro, "Evaluation of Marine Spatial Planning: Valuing the Process, Knowing the Impacts," in *Maritime Spatial Planning: past, present, future*, ed. Jacek Zaucha and Kira Gee (Cham: Palgrave Macmillan, 2019).

<sup>8</sup> Pradeep Singh and Aline Jaeckel, "Future Prospects of Marine Environmental Governance," in *Handbook on Marine Environment Protection : Science, Impacts and Sustainable Management*, ed. Markus Salomon and Till Markus (Cham, UK: Palgrave Macmillan, 2018), p. 630.

<sup>9</sup> For example, Erika Allen Wolters et al., "What is the best available science? A comparison of marine scientists, managers, and interest groups in the United States," *Ocean & coastal management* 122 (2016), <https://doi.org/10.1016/j.ocecoaman.2016.01.011>, p. 98: “the only way to create sustainable marine policies is to have a formal regulatory instrument in place,” referring to Ruckelhaus et al. (2008)

rarely discussed or theorized in the context of ocean governance.<sup>10</sup> The lack of theorizing leave open questions such as ways of approaching governance and its components; how these components combine in a framework; the various ways in which science can inform governance; and how law relates to governance. This study discusses these questions.

This study approaches ocean governance as an area of practiced governance and as a set of thematic (theoretical) perspectives reflecting a field of study. As an area of practiced governance, “ocean governance” is evident, for example, in national and international policy initiatives, such as in national marine governance plans and policies,<sup>11</sup> the high-level multinational panel for a sustainable ocean economy,<sup>12</sup> and the UN Ocean Conferences.<sup>13</sup> Naming these and similar practices as “ocean governance” may reflect a recent trend. Yet, some of these practices, such as the management of maritime activities and marine resources, are as old as nations states and beyond. Other practices may rather reflect emerging ways of interaction, such as some national cross-sectoral policies (e.g., marine spatial plans), some international networks and panels (e.g., The High-level Panel for a Sustainable Ocean Economy), and some conferences (e.g., Our Ocean conferences).

Ocean governance issues are extensively covered in scholarly literature. The literature on ocean governance is published in journals,<sup>14</sup> books,<sup>15</sup> and reports.<sup>16</sup> The literature discussing ocean governance

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<sup>10</sup> Barbara Cosens et al., "Governing complexity: Integrating science, governance, and law to manage accelerating in the commons," *Proceedings of the National Academy of Sciences - PNAS* 118, no. 36 (2021), <https://doi.org/10.1073/pnas.2102798118>. conclude that “response to modern rapid drivers of change (such as climate change) requires research (...) and understanding of governance, law, and science as integrated knowledge systems.” These authors hold that systems theory is crucial to a deeper understanding, while this study argues for the necessity of multiple different perspectives.

<sup>11</sup> For example, as per [http://msp.ioc-unesco.org/world-applications/status\\_of\\_msp/](http://msp.ioc-unesco.org/world-applications/status_of_msp/), 30 countries worldwide have completed a marine spatial plan, and many more are developing such plans.

<sup>12</sup> <https://www.oceanpanel.org/>

<sup>13</sup> <https://www.un.org/en/conferences/ocean2022>

<sup>14</sup> Such as Marine Policy, Ocean and Coastal Management, *Frontiers in Marine Science*, *ICES journal of Marine Science*, *Ocean Development and International Law*, the *International Journal of Marine and Coastal Law*, *Maritime Studies*, *Ocean Yearbook*, *Oceanography*, *Tourism in Marine Environments*, *Western Indian Ocean Journal of Marine Science*, *Marine Biology Research*, and *African Journal of Marine Science*.

<sup>15</sup> A few example of book titles are *Routledge Handbook of Marine Governance and Global Environmental Change*; *Research Handbook on Climate Change, Oceans and Coasts*; *Handbook on Marine Environment Protection: Science, Impacts and Sustainable Management*; *Regime Interaction in Ocean Governance*; *The Ecosystem approach in ocean planning and governance : perspectives from Europe and beyond*; *Comparative ocean governance : place-based protections in an era of climate change*; *Sustainable ocean resource governance : deep sea mining, marine energy and submarine cables*; *Climate Change and Ocean Governance: Politics and Policy for Threatened Seas*; *Law, Science, and Ocean Management*; *Marine Ecology: processes, systems, and impacts*.

<sup>16</sup> Several reports produced outside of traditional publishing and distribution channels, so-called grey literature, discuss ocean governance issues. Three examples of such kind of reports that stand out in being authored by hundreds of scientists in renowned panels include H.-O. Pörtner et al., *IPCC 2019: Summary for Policymakers. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (IPCC special report)*, available at <https://www.ipcc.ch/srocc/> IPCC (Geneva, Switzerland, 2019).; Renison Ruwa et al., *The Second World Ocean Assessment - World Ocean Assessment II*, available at <https://www.un.org/regularprocess/woa2launch> (2021)., and S. Díaz et al., *IPBES 2019: Summary for policymakers of the global assessment report on biodiversity and ecosystem services (summary for policy makers). IPBES Plenary at its seventh session (IPBES 7, Paris, 2019)*, IPBES (Bonn, Germany: Zenodo, 2019).

issues frequently draw on multiple thematic and disciplinary perspectives.<sup>17</sup> These include governance perspectives such as (marine or ocean) governance, management, policy, or planning. Further, the thematic and disciplinary perspectives include natural scientific or ecosystem scientific perspectives such as marine science, marine ecology, marine biology, and oceanography. Furthermore, the thematic and disciplinary perspectives include legal scientific perspectives including the law of the sea and environmental law. The thematic perspectives therefore capture the three knowledge domains of governance, science, and law.<sup>18</sup>

The vastness and multiform of the literature discussing ocean governance entail that this study has and will occasionally attribute to this scholarship that which is “often” or “frequently” addressed there. Exceptions exist and should be expected. The approach of this study will reveal how much of what is associated with “ocean governance” is generic to any or most kind of governance. Nonetheless, the approach has a marine focus in the examples provided and in the literature it relates to. Although the approach sometimes refers to generic governance, the study is written from a global north perspective and may not reflect realities and contexts elsewhere.

The method of this study is theorizing, which entails exploring, discussing, and systematizing. Relevant for legal discourse and beyond, Twining states how theorizing

has several functions or ‘jobs’: constructing total pictures (synthesising); clarification and construction of individual concepts and conceptual frameworks; (...) and so on –wherever thinking at a relatively general level contributes to understanding.<sup>19</sup>

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<sup>17</sup> Similarly, Ehler, Zaucha, and Gee, “Maritime/Marine Spatial Planning at the Interface of Research and Practice.”, p. 2. “The imperative for employing a multidisciplinary approach stems from the nature of marine space as a multi-dimensional concept requiring insight from many scientific disciplines and types of knowledge.”

<sup>18</sup> The way in which the three knowledge domains are intertwined in the literature on ocean governance issues could further be illustrated by key words searches of three key journals, reflecting different thematic approaches to ocean governance, namely Marine Policy, the ICES Journal of Marine Science, and Ocean Development and International Law. Using the searching tool of each of the journals’ websites, Marine Policy had 1166 articles using all three terms “governance”, “science”, and “law”; 2444 using “governance”; 5899 articles using “management”; 4157 using “science”; 352 using “science-based”; and 3924 using “law”. The ICES Journal of Marine Science had no articles combining the three terms of “governance,” “science,” and “law,” but 2294 articles using the term “governance”; 5183 using the term “management”; and 1263 articles using the term “law”. The Ocean Development and International Law journal had 501 articles using all three terms “governance”, “science”, and “law;” 888 articles using the term “governance”; 785 articles using “management”; 620 articles using “science”; and 509 articles using “science-based”. These results indicate that while each journal may focus on either governance, science, or law, it is challenging to discuss ocean governance issues without stepping into the other domains.

<sup>19</sup> William Twining, “Jurisprudence: A Personal View,” *Jurist in Context: A Memoir* (Cambridge: Cambridge University Press, 2019), on p. 5. By introducing Twining, this paper owes it to specify some inherent assumptions articulated by Twining that it does not challenge, but rather to some extent rely on “a. that law consists of two principal kinds of ordering: municipal state law and public international law (classically conceived as ordering the relations between states) (‘the Westphalian duo’); b. that nation-states, societies, and legal systems are very largely closed, self-contained entities that can be studied in isolation; (...) d. that modern state law is primarily rational-bureaucratic and instrumental, performing certain functions and serving as a means for achieving particular social ends; e. that law is best understood through ‘top-down’ perspectives of rulers, officials, legislators and elites with the points of view of users, consumers, victims and other subjects being at best marginal (...)” on p. 251. This paper argues for pluralistic views, leaving research space to explore, for example, both deep assumptions and sub-surface

Similarly, this study, essentially, thinks about ocean governance at a relatively general level, by constructing and synthesizing, or conceptualizing, a perspective on governance that systematizes and divides governance into three basic sub-sets or components: structures and processes; ideals and standards; and substance or merits.<sup>20</sup> Dividing governance into these components provides a basis for clarification and refinement of governance and its components, and for discussing and nuancing the relationships of these components with science and law. While the approach could seem (too) categorical or rational, the rationality aimed for by the approach of this study is, as per Kooiman, that which is “methodical and precise, as tidy and orderly, above all in thought, (...) an approach that “separates all separable issues and deals with them one at a time (...) to avoid muddling up issues.”<sup>21</sup> Separating separable components of governance and dealing with them one at the time to avoid muddling up issues is a key driver of this study.

The study further clarifies and explicates assumptions and perceptions of governance, science, and law illustrated by practical ocean governance examples, aimed to facilitate reflection of implicit perceptions and assumptions of governance and its relationships with science and law. The study further aims to provide for improved argumentation in the use and combination of governance components. Moreover, the exploratory approach to the substance or merit of ocean governance aims to pave the way for a discussion and further development of this topic. These aims and ambitions show the potential significance of the study in advancing the scholarship of ocean governance.

Having identified different governance perspectives (section 2) and separated the separable components of governance (section 3), the paper clarifies and refines the relationships between governance and science (section 4), by discussing the relevance of science to governance structures and processes (section 4.1), to the substance of governance (section 4.2), and to the ideals and standards of governance (section 4.3). Further, the paper refines the relationship between governance and law (section 5), by discussing the relevance of law to governance structures and processes (section 5.1), to ideals and standards to governance (section 5.2), and to the substance of governance (section 5.3).

As evident, the governance approach dominates the paper. Thus, the roles and relevance of “science” and “law” is determined by their relevance for the governance perspective in an ocean governance context. Science and law certainly have roles and relevance beyond the undertaken approach. The law-science interface could immediately appear out-of-scope of this study. However, the study will show how law is embedded in and key to governance and will investigate the governance-science interface. Thus, the law-science interface is covered indirectly by the approach.

## 2. Governance Perspectives

### 2.1 Different perspectives on governance

Multiple perspectives on, approaches to, and definitions of governance exist. Arguably common to all of them are that governance is inclusive or rich with variables concerning collective human (social)

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assumptions, both ‘top-down’ perspectives, ‘bottom-up’ perspectives and other perspectives diverging from vertical logics.

<sup>20</sup> Studies focusing on “realities” of ocean governance are rarer Peter J. S. Jones, L. M. Lieberknecht, and W. Qiu, “Marine spatial planning in reality: Introduction to case studies and discussion of findings,” *Marine Policy* 71 (2016), <https://doi.org/10.1016/j.marpol.2016.04.026>. p.263.

<sup>21</sup> Jan Kooiman, *Governing as Governance* (London: London: SAGE Publications, 2003)., p. 173.

interaction or action. This section aims to explain some different approaches to governance and to explain the chosen approach. Further, this section aims to illustrate why different approaches to governance are associated with different theoretical approaches and take researchers to different areas of investigation.

Kooiman's classic work on governance defines governing as

the totality of interactions, in which public as well as private actors participate, aimed at solving societal problems or creating societal opportunities; attending to the institutions as contexts for the governing interactions, and establishing a normative foundation for all those activities.<sup>22</sup>

While this is Kooiman's definition of governing, he sees governance as the theoretical conceptions of governing. This paper refers to both as governance. Kooiman distinguishes between the elements of governance (governing images, instrumentation, and action), modes of governance (self-governance, co-governance, and hierarchical governance), and orders of governance (problems and opportunities, institutions, and meta).

Many other scholars use similar definitions as Kooiman's of governing yet use the term governance. For example, Young describes "governance," at its most general level, as

a social function centered on efforts to steer or guide the actions of human groups – from small local associations to international society – toward the achievement of desired ends.<sup>23</sup>

A more multifaceted definition is Biermann et al. who define governance as the

purposeful and authoritative steering of societal processes by political actors. Governance thus includes traditional activities by governance actors, such as laws, policies, and regulations; planning practices, rule systems, and procedures at subnational levels; and certain actions by nongovernmental actors, such as standards set by civil society networks or public-private partnerships, as long as these activities include a claim to authority, have some legitimacy, and are designed to steer behaviour. While there are some debates in the literature regarding the exact boundaries of what counts as governance, there is general agreement that authority and steering are its two core components.<sup>24</sup>

Governance approaches have blossomed over the last couple of decades. As evident in the title of this paper from 2005: "Whatever Happened to Public Administration? Governance, Governance Everywhere,"<sup>25</sup> governance has developed as a replacement and supplement to public administration or

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<sup>22</sup> Kooiman, *Governing as Governance*.

<sup>23</sup> Oran R Young, *On environmental governance: Sustainability, efficiency, and equity* (Routledge, 2016)., p. 3. Similar definition in Oran Young, "Conceptualization: Goal Setting as a Strategy for Earth System Governance," in *Governing through goals : sustainable development goals as governance innovation*, ed. Norichika Kanie and Frank Biermann (Cambridge, Massachusetts: MIT Press, 2017)., p. 31.

<sup>24</sup> Frank Biermann et al., "Global Goal Setting for Improving National Governance and Policy," in *Governing through Goals*, ed. Frank Biermann and Norichika Kanie, Sustainable Development Goals as Governance Innovation (The MIT Press, 2017)., p. 75.

<sup>25</sup> Charles, "People, oceans and scale: governance, livelihoods and climate change adaptation in marine social-ecological systems.", p. 352, similarly considers governance a "a multi-level matter." For a richer description of governance, where governance of an organization (such as a state) does not qualify for the term but rather is termed "public administration" or "public management", see H. George Frederickson, "Whatever Happened to Public

public management. The paper of this title approaches governance in a wide sense, entailing, for example, that governance of an organization (such as a state) does not qualify as governance, but rather as “public administration” or “public management.” In contrast, some scholars have a more state-centric view of governance, referring to “a larger system surrounding lawmakers and the other processes a State undertakes to wield power and authority, such as political and economic processes and policy.”<sup>26</sup>

The expansion of actors and factors captured by widespread uses of the governance terms is reflected in a paper of Klijn and Koppenjan from 2020. They state that

[i]n the past couple of decades we have seen a shift from governments governing from the center towards more horizontal ways of governing, in which they interact and collaborate with other parties.<sup>27</sup>

Klijn and Koppenjan further explain how “the governance revolution” has expanded on the number of actors, more collaborative forms of participation, the complexity of interactions, and the autonomous role of public organizations. Armstrong and Kilpatrick similarly refer to this expansion as the “governance turn,” “governance,” “new modes of governance,” or “new governance.”<sup>28</sup>

In the broadest of terms, “governance” embraces the complexity of human (or ecosystem) (inter)action. In comparison, approaches to management (such as public management or resource management) are comparably less inclusive or simpler, as in referring to the steering only by public actors (public management) or to the administration only of one or more resources (resource management). Inherent in management approaches could be a limited set of roles, including managing subjects or a hierarchy. In comparison, the governance frame, capturing interaction and multiple actors at multiple levels, involves a broader range of actors that may have dissimilar roles in different relations. Nonetheless, either term may be defined for a given purpose and given a content as seen fit.

Resorting to definitions is one way of approaching governance. Another one is to approach governance as an umbrella concept which encompasses, some key components or themes, such as the actors,

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Administration? Governance, Governance Everywhere,” in *The Oxford handbook of public management* (Oxford: Oxford University Press, 2005).

<sup>26</sup> Katie Woolaston, *Ecological Vulnerability: The Law and Governance of Human–Wildlife Relationships* (Cambridge University Press, 2022), p. 10. Woolaston further specify how “[g]overnance refers to individual actions (such as law-making), but also the nature of interactions between the State and other social actors such as corporations, individuals and other political actors.” Francis Fukuyama, “What Is Governance?,” *Governance* 26, no. 3 (2013), <https://doi.org/https://doi.org/10.1111/gove.12035>, <https://onlinelibrary.wiley.com/doi/abs/10.1111/gove.12035>, p. 350, similarly focuses on government, defining governance as: “as a government’s ability to make and enforce rules, and to deliver services.”

<sup>27</sup> Erik Hans Klijn and Joop Koppenjan, “Debate: Strategic planning after the governance revolution,” *Public Money & Management* 40, no. 4 (2020/05/18 2020), <https://doi.org/10.1080/09540962.2020.1715097>, <https://doi.org/10.1080/09540962.2020.1715097>, p. 260 (references omitted).

<sup>28</sup> Kenneth Kilpatrick Armstrong, Claire, “Law, Governance, or New Governance - The Changing Open Method of Coordination Narrowing the Gap: Law and New Approaches to Governance in the European Union,” *Colum. J. Eur. L.* 13 (2006).



institutions, principles, and interactions of Kooiman and Bavinck,<sup>29</sup> or the actors; tools or instruments; modes, attributes; and architecture of Armstrong and Kilpatrick.<sup>30</sup>

Yet another way is to approach governance as a system, which could attract a systems-theoretical approach. The “adaptive governance” frame is closely related to system-theoretical perspectives.<sup>31</sup> System-theoretical perspectives include different schools of thought. Some focus on socio-ecological systems, closely related to resilience thinking. Others focus on socio-technical regimes that have emerged from evolutionary economics, science/technology and society studies, and innovations research.<sup>32</sup> Some combine these to socio-ecological-technological-systems.<sup>33</sup> All these systems perspectives are premised on interpretations of complexity theory.<sup>34</sup>

From a system-theoretical perspective, adaptive governance is, for example, defined as “governance that allows emergence of collective action capable of facilitating adaptation to change and surprise as well as the capacity itself to evolve.”<sup>35</sup> Further, “adaptive governance focuses on increasing cross-scale interactions and social networks among stakeholders within the governance system.”<sup>36</sup> Adaptive governance promotes the “adaptive capacity at the macro-scale of social-ecological system,” as per this vocabulary.<sup>37</sup> Some key attributes of complex systems relevant to governance are self-organization, emergence, networks, feedback, non-linearity and tipping points, and uncertainty.<sup>38</sup> These definitions and attributes reflect how system theorists often focus on the dynamism of a system, making it useful for, for example, macro studies at systems level of the dynamism of systems.

Nonetheless, while system theorists may focus on the dynamism of and certain attributes of a system, this focus is a matter of perspective. Static components are equally present in a system, depending on the perception of a system and the focus of investigation. Even system theorists hold that any system can be defined by its structure and processes.<sup>39</sup> Therefore, (formal or informal) processes and structures may be viewed as static components of governance systems in certain respects.

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<sup>29</sup> Jan Kooiman and Maarten Bavinck, "The Governance Perspective," in *Fish for Life: Interactive Governance for Fisheries*, ed. Jan Kooiman et al. (Amsterdam University Press, 2005), pp. 15-17.

<sup>30</sup> Armstrong, "Law, Governance, or New Governance - The Changing Open Method of Coordination Narrowing the Gap: Law and New Approaches to Governance in the European Union.", p. 652-655. The listed themes are those that these authors conceptualize as “new governance,” which includes the theme “new governance as not-old governance.”

<sup>31</sup> J. B. Ruhl, Barbara Cosens, and Niko Soininen, "Resilience of Legal Systems: Toward Adaptive Governance," in *Multisystemic Resilience* (New York: Oxford University Press, 2021), p. 521.

<sup>32</sup> Tanya Brodie Rudolph et al., "A transition to sustainable ocean governance," *Nature Communications* 11, no. 1 (2020/07/17 2020), <https://doi.org/10.1038/s41467-020-17410-2>, <https://doi.org/10.1038/s41467-020-17410-2>.

<sup>33</sup> Cosens et al., "Governing complexity: Integrating science, governance, and law to manage accelerating in the commons."

<sup>34</sup> Brodie Rudolph et al., "A transition to sustainable ocean governance.", p. 3; Cosens et al., "Governing complexity: Integrating science, governance, and law to manage accelerating in the commons.", p. 3.

<sup>35</sup> Ruhl, Cosens, and Soininen, "Resilience of Legal Systems: Toward Adaptive Governance.", p. 522 (referring to Cosens 2018). More references (and perhaps definitions) need to be included.

<sup>36</sup> Ruhl, Cosens, and Soininen, "Resilience of Legal Systems: Toward Adaptive Governance.", p. 522.

<sup>37</sup> Ruhl, Cosens, and Soininen, "Resilience of Legal Systems: Toward Adaptive Governance.", p. 523.

<sup>38</sup> Cosens et al., "Governing complexity: Integrating science, governance, and law to manage accelerating in the commons.", p. 4.

<sup>39</sup> Ruhl, Cosens, and Soininen, "Resilience of Legal Systems: Toward Adaptive Governance.", p. 512.

Governance approaches may overlap with policy perspectives. While the legal scholar may take “policy” to mean those policies that are non-legally binding white papers and governmental plans and strategies,<sup>40</sup> the social scientist may perceive policies as capturing both such policies and law<sup>41</sup> and “policy” as the research stream that in a wider sense concerns politics.<sup>42</sup>

## 2.2 The governance perspective of this study

The question is now how and why governance is conceptualized for the purpose of this theoretical framework. The chosen perspective encompasses governance as structures and processes, ideals and standards, and merit or substance. It could be conceptualized as a system, yet the chosen perspective deviates from system-theory, for example, in the attributes or components in focus and in complementing the structures and processes with the additional components of ideals and standards and substance or merit. The aim has been to develop a framework that encompasses those governance components often referred to in the ocean governance literature, such as coordination, participatory processes, science-based decision-making, adaptivity, and the ecosystem approach.<sup>43</sup>

The approach in this paper is framed as governance, unlike adaptive governance, yet it deals with responsiveness and adaptation as one of the process phases of governance. Compared with Kooiman’s approach, it only captures one governance mode (hierarchical) and one governance order (problems and opportunities or substance). The approach is nonetheless deemed a governance perspective and not a management perspective.<sup>44</sup>

The chosen governance perspective could be critiqued for being too categorical, simple, or relying on a mechanical worldview. Yet, as per Kooiman,

[g]overning has in some way to be rational: based upon verifiable facts and data, logical choice of instruments, and defensible action routes. Doubts will always remain, because governing facts or data are no more than observations that have passed through many filters of social-political communication. (...) Rationality in governing thus means the acceptance of certain degrees of uncertainties, the realisation of partial knowledge and provisional insights, and learning by doing.<sup>45</sup>

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<sup>40</sup> Woolaston, *Ecological Vulnerability: The Law and Governance of Human–Wildlife Relationships.*, p. 11.

<sup>41</sup> Carol Lee Bacchi, *Analysing policy : what's the problem represented to be?* (Frenchs Forest, N.S.W: Pearson Australia, 2009).

<sup>42</sup> Amitai Etzioni, *Policy research*, vol. vol. 26, International studies in sociology and social anthropology, (Leiden: Brill, 1978). A list of examples of journals on public policy research: <https://guides.library.ubc.ca/publicpolicy/journals>

<sup>43</sup> Searches in a sample of three journals covering ocean governance issues (Marine Policy, ICES Journal of Marine Science, and Ocean Development and International law) in each of the journals’ searching tools return 1525, 1315, and 467 hits, respectively, on “coordination”; 921, 37, and 589 hits on “participatory process;” 352, 138, and 508 hits on “science-based;” 2455, 2985, and 234 hits on “adaptivity OR adaptive;” 3109, 3147, and 244 hits on the “ecosystem approach.” Searches conducted on January 9 and February 2, 2023. Readers may note that while these searches indicate a pattern, these key words are not only used in the context or meaning that this study attaches to them. As per David Langlet and Rosemary Rayfuse, “The Ecosystem Approach in Ocean Planning and Governance: An Introduction,” in *The Ecosystem Approach in Ocean Planning and Governance*, ed. David Langlet and Rosemary Rayfuse, Perspectives from Europe and Beyond (Leiden: BRILL, 2019)., the ecosystem approach “has come to feature particularly strongly in the context of marine management,” p. 2.

<sup>44</sup> Frederickson, “Whatever Happened to Public Administration? Governance, Governance Everywhere.”

<sup>45</sup> Kooiman, *Governing as Governance.*, p. 172.

Thus, this paper aims to balance the focus on rationality with awareness of and by highlighting the partial knowledge, simplicity, limitations, and risks of uncertainty inherent in any approach. The chosen governance approach is in certain aspects close to the legal context, as section 5 will explain in detail. The chosen governance perspective is set out in section 3. However, before the perspective is unpacked, section 2.3 explains a premise of the approach.

### 2.3 Explicating a premise of the perspective: governance demands partitioning

Dividing governance into basic sub-sets reflects a premise or assumption inherent in the approach: that governance demands division and partition. This has implications for research on governance, as reflected in how governance is categorized and divided as per sections 3.1 to 3.3. Further, partition of governance reflects current governance realities, where governance takes place in and across multiple institutions and organizations (such as states, sub-state units, and regional organizations, forming one or several structures) based on multiple legal and policy instruments. Imagining global governance without partition into units is demanding. For a simplistic example at the extreme end, conducting global referendums on big and small issues or holding global elections are at best challenging. A global parliament is equally challenging. Likely, in any imagined governance system, one would want to partition the governance structure into levels, such as global, regional, or local levels, reflecting how different issues are appropriately governed at diverse levels. Further, within each of these levels, one would likely want to distribute and delegate different topical issues (taxation, education, criminal prosecution, food management, energy management) between multiple divisions, leaders, or units, to avoid that each and one has too many obligations or requires too diverse kinds of expertise. In these examples, from the perspective of food management or energy management, each of these topical issues could be governed holistically or integrated. For example, agriculture, mariculture, and fisheries are all dealt with in integration in the food management division. Yet, from the perspective of the fisheries sector, while it belongs to the food management division, reporting requirements is demanded by the taxation division, recruitment is handled by the education division, prosecution of illegal fisheries is dealt with by prosecution management, and cross-division coordination is needed to facilitate the distribution of marine areas in space and time with the demands of offshore energy installations and cables. Thus, one could argue that fisheries management is dealt with in fragmentation.

This example reflects a reality of any partition of governance: while from the perspective that explains the current partition or division of governance structures, such as from a food management perspective in the aforementioned example, the approach is holistic or integrated. From another perspective, such as that of fisheries, the perspective is fragmented. Another example may be provided. In a structure divided by activity type or sector, a sectorally divided structure, the approach could be holistic or integrated from the sectoral point of view, such as in governing the life cycle of fisheries. From a perspective that does not reflect such a division, such as managing the multi-use of fisheries and other marine sectors or managing the climate gas emissions stemming from all kinds of marine activities, the governance structure is “fragmented” across multiple (sectoral) divisions. No partition or division would account for all the different perspectives that governance demands. Thus, some topics or perspectives will always be governed across other divisions, topics or perspectives or be governed in a “fragmented” way.

Partition of governance into units reflect current governance realities as per the existence of institutional or organizational units (the 200 or so states, the regional and international organizations made by these, and the sub-states under each state). The partitioning of governance, as illustrated in these institutional

examples, is equally a reality for governance instruments (policies and regulations). Multiple different governance instruments exist at global, regional, national, or local level. One international or national governance instrument could hardly address all issues, and delegation of power to sub-national units or regional organizations is preferably dealt with in individual instruments.

While partition of governance may be necessary, how-to partition is more complicated. For a simplified example, a state may distribute its mandate over ocean governance issues to a ministry of trade and industry, a ministry of the environment, a ministry of oceans, or partitioned between two or more of these, reflecting for example, how ocean governance is perceived as the management of maritime industries, as the protection and preservation of the marine environment, or both or something else.

Moreover, inherent limitations exist in each partition. For instance, the regulations that divide ocean areas into maritime zones of coastal states<sup>46</sup> may be a suitable way to distribute some (non-straddling) marine resources but may not be suitable for distributing straddling species or for protection of those larger ecosystems into which they are embedded. Another example, sectoral division of activities and management by a state, such as separating fisheries management from offshore petroleum production, may be suitable for the level of detail and expertise expected in allocation of licenses to fishers and petroleum companies respectively, yet may be less suitable for coordinating fisheries and offshore petroleum activities in time and space.

In documents and textual expressions, such as in a research paper or in a policy, plural alternative, cross-cutting, diverging, or conflicting perspectives can be envisioned to accommodate for the limits inherent in each partitioning or perspective. In institutional and organizational realities, plural ways of partitioning may conflict with concerns for structural integration and lean institutions and organizations.

A typical example of how scholars problematize partition in ocean governance is by framing fragmentation as a problem. One example is “while current management is largely fragmented, with most sectors managed by individual laws, agencies, or regulatory regimes, there are calls for integrated, cross-sectoral management approaches to achieve EBM [ecosystem-based management]”.<sup>47</sup> This example clearly challenges the current partition of national instruments and organizational units. Yet, it does not discuss how it imagines partition to be redesigned (one cross-sectoral management regime, one cross-sectoral agency, and a cross-sectoral law?) and how to accommodate for those purposes substantiating the current design and for those limitations inherent in the alternative perspective. Combining laws, agencies and regulatory regimes may have advantages or be appropriate for some purposes, but may be less appropriate for others, such as those which the partition is based on. In the previous example, the allocation of fisheries licenses and licenses for offshore petroleum production are not necessarily appropriately co-managed in an agency or regime or combined in a common law. Moreover, national sectoral management agencies or regimes are structurally integrated, i.e., under common leadership, whether by a minister, government, or head of state. Thus, one cross-sectoral level in any event exists.

While discussing partition relevant to ocean governance and even ecosystem governance, the question emerges why we have (and if we need) “ocean governance” or “ecosystem governance.” Are these useful

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<sup>46</sup> Including "United Nations Convention on the Law of the Sea of 10 December 1982, 1833 *U.N.T.S.* 3, (UNCLOS)."

<sup>47</sup> Dane H. Klinger et al., "The mechanics of blue growth: Management of oceanic natural resource use with multiple, interacting sectors," *Marine Policy* 87 (2018), <https://doi.org/https://doi.org/10.1016/j.marpol.2017.09.025>, <http://www.sciencedirect.com/science/article/pii/S0308597X17305869>, p. 356 (references omitted).

ways of partitioning governance? Often, it is human interference, activities, or behavior that needs to be governed or drive the need for governance, which these two terms do not convey very well, at least in a semantic sense. Ultimately, it depends on how we define ocean governance and ecosystem governance and the purpose of that term or concept, including what we leave out when we deem something as, for example, ocean governance. If, for example, responding to the main threats to the global marine ecosystems is the purpose,<sup>48</sup> the threat posed by overfishing could perhaps be appropriately dealt with as fisheries management (assuming it captures the drivers of overfishing). The increasing demand for marine space may, for example, be appropriately dealt with as marine space management, capturing those activities demanding marine space, the governing agents of these activities, or the human behavior driving the need for those activities. The threats of climate change and long-range transported pollution, which primarily stem from land-based activities,<sup>49</sup> may be more appropriately dealt with as “ocean and terrestrial” governance. As all three problems stem from human activities, addressing them as human governance may sometimes be more appropriate than ecosystem or ocean governance. Nonetheless, ocean governance and ecosystem governance may be appropriate for some purposes, yet not for all, and arguably, any choice of concept should be substantiated in order to clarify the purpose and, thus, the limitations inherent in any approach.

Finally, an inevitable consequence of partition will be introduced –interconnectedness. No institution or organization (whether a state, regional organization, or sub-state unit) exists in a vacuum, but in a structure or “family” of parent units, sibling units, grandchildren unit and beyond, as well as units with competing or conflicting purposes whether within or outside the same “family” structure. The same applies to governance instruments (policies and regulations): they exist in a context of intertextuality, meaning they relate to other texts,<sup>50</sup> whether in a hierarchy of texts or a pool of similar or different texts, competing for attention. The multiplicity of governance instruments relevant to ocean governance means that analyzing all of them is hard. Interconnectedness or intertextuality implies that analysis of some or a few does not account for the full picture (whether a hierarchy or pool). Therefore, any selection (such as focusing on a marine spatial plan) should be explicit and justified. Similarly, any calls to interconnect or integrate policies, regulations, or institutions and organizations should be explicit and justified, perhaps preferably, explaining how a more interconnected way of organizing or regulating leads to a more desirable result or outcome (unlike letting integration be the preferred outcome).

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<sup>48</sup> WOA1 identifies seven main pressures to the global marine environment: (1) climate change (including ocean acidification); (2) fishing and harvesting; (3) marine pollution; (4) increased demand for marine space; (5) underwater noise; (6) interfering structures; and (7) non-native species (as spread by shipping, aquaculture, and marine debris).<sup>48</sup> This taxonomy of the main pressures is roughly similar to what the IPBES report names the five direct drivers in the global marine environment: (1) fisheries and other harvesting of marine organisms; (2) change in area use on land and at sea, including development of infrastructure and aquaculture in the coastal zone; (3) climate change; (4) pollution and waste; and (5) invasive and alien species.<sup>48</sup> WOA1 does not rank the main pressures, as the IPBES report does. The second direct driver (change of area use) of the IPBES report includes the sixth pressure of WOA1 (interfering structures), and the fourth IPBES direct driver (pollution) includes the fifth pressure of WOA1 (noise). Thus, these two sets of main pressures or direct drivers are roughly similar.

<sup>49</sup>

<sup>50</sup> Kristina Boréus and Göran Bergström, *Analyzing text and discourse : eight approaches for the social sciences* (London: SAGE, 2017), p. 223.

Next, governance will now be categorized in three: structures and processes; ideals and standards; and substance or merits of governance. Overlaps exist between these categories, yet clear differences can also be identified as will be shown.

### 3. Components of a Governance Perspective

#### 3.1 Structures and processes of governance<sup>51</sup>

This section elaborates how governance takes place within a structure within which (time-bound) management processes take place. The governance structure captures institutions and organizational units, where governance is conducted, including actors such as politicians, bureaucrats, or stakeholders. Public or international and regional institutions and organizational entities often have a mandate delegated to them by one or more states. For non-governmental institutions and organizations, the specific mandate of each of them would be recorded in statutes or other foundational documents. Each mandate of a state, sub-state unit, an organization, or other unit is limited and, accordingly, a partition. One example is the Australian Maritime Safety Authority, which is "Australia's national agency responsible for maritime safety, protection of the marine environment, and maritime aviation search and rescue,"<sup>52</sup> which is under the minister for infrastructure, transport, and regional development of the Australian government. Another example is the Arctic Council, an intergovernmental forum of eight Arctic member states, participants, and observers, which provide a means for promoting cooperation, coordination, and interaction, overseeing six working groups, and disseminating information.<sup>53</sup>

Inherent in any governance structure partitioned into units (such as the nation state of Australia or its authorities or ministries, or the Arctic Council and its working groups) would be a risk of fragmentation, bad coordination, or a lack of interaction. This inherent risk exists both within the structure to which it belongs and in relation to other units with similar or overlapping mandates.

Ways of preventing fragmentation structurally includes facilitating consultation, coordination, cooperation, or structural integration between the units, which reflects various ways of enhancing structural integration.<sup>54</sup> The Australian Maritime Safety Authority may need to cooperate on marine environmental matters with the ministry of agriculture, water and the environment and coordinate safety matters with maritime safety authorities of other nations while consulting the International Maritime Organization. The Arctic Council formalized its cooperation with OSPAR in 2017 by making OSPAR an observer to the Arctic Council, which is one way of preventing fragmentation structurally.<sup>55</sup> Organizing a structure hierarchically provides for another way of preventing fragmentation structurally, under common instruction or leadership. For instance, in a nation state, all sectoral governance units are

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<sup>51</sup> This sub-section is inspired by my PhD dissertation Lena Schøning, "A Critical Assessment of the Contribution of Integrated Ocean Management to Protection of the Marine Environment" (PhD UiT The Arctic University of Norway, 2021).

<sup>52</sup> <https://www.amsa.gov.au/about/who-we-are#collapseArea177>

<sup>53</sup> Article 1 of the Ottawa Declaration chrome-extension://efaidnbmnnnibpcjpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Ffoaarchive.arctic-council.org%2Fbitstream%2Fhandle%2F11374%2F85%2FEDOCS-1752-v2-ACMMCA00\_Ottawa\_1996\_Founding\_Declaration.PDF%3Fsequence%3D5%26isAllowed%3Dy&clen=248290

<sup>54</sup> Schøning, "A Critical Assessment of the Contribution of Integrated Ocean Management to Protection of the Marine Environment.", pp. 7 and 74.

<sup>55</sup> <https://www.ospar.org/about/international-cooperation/the-arctic-council>

organized hierarchically under the head of state or government, entailing that it is a cross-sectoral authority that may approach matters in a cross-sectoral way, for example, based on instructional authority.

Fragmentation remains an inherent risk of any governance structure, reflecting how institutions and organizations, and associated mandates, are multiple units or partitions of the greater governance whole. Fragmentation may therefore be framed as appropriate for some purposes and less appropriate for others. Thus, the extent to which fragmentation is a problem arguably demands justification as it depends on the purpose of partition.

Governance processes or management processes (these terms are used interchangeably) are the time-bound actions that take place within or across these governance structures. Under the heading "Process management: an example of a travelling idea," Quist and Hellström, in 2012, described how

[o]ne travelling idea about how organizations should be led and organized, and one that has spread across sectoral as well as national borders in recent decades, is "Process Management" (PM). PM has been described as one of the past two decades' key management ideas, not only rapidly gaining ground in industry and the private service sector but also significantly involved in the ongoing transformation of public-sector bodies into what are sometimes called "post-bureaucratic" organizations.<sup>56</sup>

Whereas management processes are as old as management, they have received a stronger focus in recent decades, as this citation shows. The management processes may be divided into phases. A simplified account of the phases includes the following: knowledge gathering and analysis; policy and decision-making with regard to objectives and priorities, tools and strategies; implementation and monitoring; evaluation and adaptation.<sup>57</sup> Individual management processes could be cyclic and iterative, such as that of adopting a policy, depending on whether the topic is a recurring topic, such as maritime safety, or a new or reframed one, such as blue growth or marine plastic pollution. As opposed to policies, regulations such as statutory acts or treaties would be adopted by an individual management process that is normally not cyclic or iterative in the sense that acts and treaties are commonly not up for regular revision. However, such regulations may provide for other management processes, whether by mandating authority to make decisions, such as to protect marine areas or to give licenses to pollute or emit, or to

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<sup>56</sup> Johan Quist and Andreas Hellström, "Process Management as a Contagious Idea: A Contribution to Røvik's Virus-Inspired Theory," *International Journal of Public Administration* 35, no. 13 (2012/11/01 2012), <https://doi.org/10.1080/01900692.2012.686034>, <https://doi.org/10.1080/01900692.2012.686034>, p. 902 (references omitted).

<sup>57</sup> For a simplified but essentially similar explanation of the management process for organizations, see Stuart Winby and Christopher G. Worley, "Management processes for agility, speed, and innovation," *Organizational Dynamics* 43, no. 3 (2014), <https://doi.org/10.1016/j.orgdyn.2014.08.009>. For corporate management processes, see, for example, Richard Lynch, *Corporate strategy*, 2nd ed. (Harlow: Financial Times, 2000), p. 26. For similar but more extensive representations of management processes for marine spatial planning, see Vanessa Stelzenmüller et al., "Monitoring and evaluation of spatially managed areas: A generic framework for implementation of ecosystem based marine management and its application," *Marine Policy* 37 (2013), <https://doi.org/https://doi.org/10.1016/j.marpol.2012.04.012>, <http://www.sciencedirect.com/science/article/pii/S0308597X12000735>. See also the Monitoring and Evaluation of Spatially Managed Marine Areas project, which addresses management processes relevant to marine spatial planning, including an evaluation framework: [www.mesmacentralexchange.eu/analyses.html](http://www.mesmacentralexchange.eu/analyses.html).

issue detailed regulations, guidelines, or recommendations. An individual management process co-exists with multiple other processes, and one may envision that management processes concerning related topics could be combined or integrated, insofar as procedural requirements and institutional diversity allows it.

For the purpose of a brief account of the phases, the management process will be treated as individual and linear, starting with the knowledge gathering and analysis phase. On the one hand, the knowledge gathering and analysis phase, in providing for collection of facts and knowledge (that section 4 spells out in more detail) and ensuring that considerations come before decisions and may be perceived as wide or open. On the other hand, the knowledge and facts gathered represents, whether implicitly or explicitly, a selection of knowledge and a focus of analyses, which frames and may strongly influence the subsequent policies and decisions. Policies and laws not only react to problems, but create, frames, and define problems, which sets premises for the voices heard and the responses considered.<sup>58</sup> In ocean governance, policies and regulation (and associated decisions) could be pursuing many and complex societal objectives and problems concurrently, especially if the mandate is broad such as may be the case of integrated marine management plans or marine spatial plans. The selection of knowledge and choice of foci in such instruments would be complicated both to make, to justify, and to foresee the consequences of for the remaining process.

If a policy or regulation (or associated decision) has a more focused purpose, such as preparing for a new statutory act on sustainable seabed mining, implicit choices could still be envisioned in the initial phase. Does the knowledge gathering and analysis phase leave open whether to facilitate seabed mining or to pursue other alternatives such as to search for alternative minerals elsewhere, expanding existing mines, or banning seabed mining, or is this principal decision implicit as the process is initiated? For whom will the act bring benefits and for whom disadvantages? In any event, the process may be imagined going back and forth from the next phase, the policy and decision-making phase, to be reframed and provide for new selections of knowledge and demanding new analyses, when implied choices realize.

The next phase is the policy and decision-making phase. It is where a maritime policy or regulation of fisheries is adopted, or decisions such as the emission permit or licensing or restriction of activities in a marine space is decided. These adoptions and decisions pursue or prioritize certain societal objectives and may make use of certain tools or strategies to pursue them, thus deselecting other objectives and strategies. The more complex the objectives and priorities, the more is demanded of selection and choices of focus, which is preferably explicated in a transparent manner. Section 2.4 on the substance of governance instruments will elaborate on ways of designing and evaluating substance of governance instruments.

The subsequent phase is the implementation and monitoring phase, and I will first look into the implementation part. Implementation could refer to when the policy or regulation on paper is put to practice administratively. A newly adopted policy or regulation may require measures to be initiated, decisions to be made, financial allocations, further regulations to be made or revised, licenses or permits to be issued, or new connections or ideas to be accounted for. One often implicit assumption of implementation is that it is uniformly carried out by different implementors assuming the policy,

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<sup>58</sup> Carol Bacchi and Susan Goodwin, "Making and Unmaking "problems"," in *Poststructural Policy Analysis: A Guide to Practice*, ed. Carol Bacchi and Susan Goodwin (New York: Palgrave Macmillan US, 2016).



regulation, or decision to be implemented is clear, unambiguous, non-contradictory, and not asking the impossible.<sup>59</sup> Where a policy or regulation is more ambiguous, thus leaving open more choices or providing a wide margin of appreciation to those instigating the measures, decision, revising regulations, or operationalizing ideas, the implementation becomes more complex.<sup>60</sup> Røvik differentiates between the implementation and translation theories, where implementation theory reflects the dominant hierarchal top-down doctrine where ideas to be implemented are understood as fixed, physical phenomena that are implemented as technical rational instalments and those implementing are viewed as passive receivers.<sup>61</sup>

Translation theory, as per Røvik, provides an “alternative doctrine for implementation.”<sup>62</sup> Translation theory involves a more or less deliberate transformation of practices and/or ideas that happens when various actors try to transfer and implement them.<sup>63</sup> Thus, from the perspective of translation theory, the policy or regulation is transformed or changed in the course of the translation or implementation. Further, as per Røvik, the translation is highly dependent on the actors responsible for the translation, how well they know the origin of the ideas and the contexts (arenas) these ideas are translated into.<sup>64</sup> Often, more than one translator is involved, meaning that more translations could combine to chains of translations.<sup>65</sup> Translation theory has had little focus in legal scholarship as a perspective of operationalizing law, yet it could be similarly applicable to legal norms or concepts that leave space for discretion of authority or interpretations, such as the ecosystem approach.<sup>66</sup> As implementation or translation takes place in a governance institution or organization, the context of that structure, such as the culture and capacity, as well as parallel processes and other influences, may facilitate or hinder the implementation or translation.<sup>67</sup>

The next process phase is monitoring, which means to observe and check the progress or quality of something over a period of time or keep something under systematic review. The “something” or object

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<sup>59</sup> These three criteria are some of those suggested by Brunée and Toope to identify interactional law, as per Jutta Brunnee and Stephen J. Toope, *Legitimacy and Legality in International Law: An Interactional Account*, Cambridge Studies in International and Comparative Law, (Cambridge: Cambridge University Press, 2010). <https://www.cambridge.org/core/books/legitimacy-and-legality-in-international-law/962A7B6AECA594DCECCBACC2F96B7F12>., p. 6.

<sup>60</sup> Gunnar Sander, T. Norges arktiske universitet Norges fiskerihøgskole Ui, and T. Norges arktiske universitet Ui, "Implementation of ecosystem-based ocean management" (UiT The Arctic University of Norway, Faculty of Biosciences, Fisheries and Economics, The Norwegian College of Fishery Science, 2018)., p. 33.

<sup>61</sup> Kjell Arne Røvik, "Translasjon - en alternativ doktrine for implementering," in *Reformideer i norsk skole : spredning, oversettelse og implementering*, ed. Kjell Arne Røvik, Tor Vidar Eilertsen, and Eli Moksnes Furu (Oslo: Cappelen Damm akademisk, 2014)., p. 411. In addition to the implementation theory (and the translation theory) is the professional theory, a “bottom-up” doctrine, focusing on the implementors as dominant to implementation unlike the politicians imposing ideas. This paper does not look further into the professional theory. Røvik explains this theory on p. 112.

<sup>62</sup> Røvik, "Translasjon - en alternativ doktrine for implementering."

<sup>63</sup> Røvik, "Translasjon - en alternativ doktrine for implementering.", p. 411.

<sup>64</sup> Røvik, "Translasjon - en alternativ doktrine for implementering.", p. 411.

<sup>65</sup> Røvik, "Translasjon - en alternativ doktrine for implementering."

<sup>66</sup> Lena Schøning, "A methodology to evaluate the ecosystem approach in laws and policies," Iva Parlov and Endalew Lijalem Enyew eds. *NCLoS blog, Norwegian Centre for the Law of the Sea*, 2022.

<sup>67</sup> One example of a study using a different translation theory to marine spatial planning is Daniela Pedroza Páez et al., "Understanding translation: Co-production of knowledge in marine spatial planning," *Ocean & Coastal Management* 190 (2020/06/01/ 2020), <https://doi.org/https://doi.org/10.1016/j.ocecoaman.2020.105163>, <https://www.sciencedirect.com/science/article/pii/S0964569120300739>.

of monitoring could refer to monitoring the implementation or translation (such as the progress or quality), monitoring the output of these actions (for example, setting up marine protected areas), or, at least ideally, monitoring the outcome or achievement (such as any change measurable). In ocean governance, depending on the purpose of each policy or regulation, the outcome or achievements is sometimes specific, such as that of reducing certain emissions, reducing pressures on a local marine ecosystem by setting up marine protected areas, or facilitating activities such as emerging offshore renewable energy production or seabed mining. Other policies and regulations could have more ambiguous purposes such as striving for good status of the marine ecosystems while facilitating for increasing maritime activities. As any marine ecosystem is under multiple influences, locally, regionally, and globally, it will often be challenging if not impossible to monitor the outcome if the purpose is not specific. Often, one would be left with identifying reference points representing what the policy or decision intends to achieve (such as environmental indicators) or representing any major driver to that achievement that one depends on (such as necessary technological development whether for CO2 sequestration and storage, to reduce environmental effects of shipping, or the degree and predictions of a green shift). The status of marine ecosystems is often one important reference point in ocean governance. Combined with historical status reports, it may indicate if the overall trend is improving or not, thus providing one input to whether current measures to reduce negative influences on marine ecosystems are satisfactory or should be intensified.<sup>68</sup>

The final phase is the evaluation and adaptation phase. The results of the monitoring phase is one input to the subsequent evaluation and adaptation phase. Evaluation could be envisioned as evaluation of implementation or translation, such as individual decisions (such as industrial permits, emission permits, or establishments of marine protected areas) or their output; evaluation of a policy or regulation in light of new knowledge on such as updates of status of marine ecosystem or influences on them; evaluation in light of new ideas or connections such as blue growth or planetary ecosystem processes; evaluation of one or more governance instruments or evaluation of an institution or a societal need or objective or reference point (such as ecological status or CO2-levels), independent of individual governance instruments. Any responses (or adaptation) desired in respect to such evaluation depend on the set of knowledge inputs and influences, similar to that to be gathered in the knowledge gathering and analysis phase, which section 4 will unpack.

Engaging stakeholders to achieve broad participation of management processes is an ideal that section 3.2 will discuss. In the context of process phases, it can be noted that participation can be envisioned in different process phases. If influence by participation is a preference, involving stakeholders in the knowledge gathering and analysis phase, where the remaining process is framed, is arguably the phase that has most bearing and influence on the remaining process. Another important phase, determining whether the process remains a paper exercise or leads to desired change, is the implementation phase.

Despite that this presentation of governance structures and governance processes has drawn on examples from ocean governance, it remains to emphasize that the aforementioned structural risks and management process phases are no different if the matter is terrestrial or marine, if the matter concerns

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<sup>68</sup> The global trend is negative as per Lorna Inniss et al., *The First Global Integrated Marine Assessment - World Ocean Assessment I*, available at <https://www.un.org/regularprocess/content/first-world-ocean-assessment>, United Nations (2016); Díaz et al., *IPBES 2019: Summary for policymakers of the global assessment report on biodiversity and ecosystem services (summary for policy makers)*. IPBES Plenary at its seventh session (IPBES 7, Paris, 2019).

facilitating defense interests, or managing taxation or education. Further, the processes and structural risks are no different if the governance unit is an organization, a state, a public entity, or a private company.<sup>69</sup> Certainly, these inherent structural risks and processes of generic governance are also relevant to ocean governance.

The question emerges if these structural risks or management process and process phases have particular relevance for ocean governance. Scholarship in ocean governance focusing on management processes is vast<sup>70</sup> (noting, however, that scholars approach, specify, or delimit governance differently).<sup>71</sup> For example, in a paper on marine spatial planning, Kelly et al. explain that

an ecosystem approach which incorporates monitoring and evaluation as well as adaptation as part of its framework can promote understanding, provide data to scientists, inform policy making and help to make effective management decisions.<sup>72</sup>

Thus, Kelly et al. refer to phases of the aforementioned generic management process to substantiate the ecosystem approach. Further, research and management initiatives on ocean governance often emphasize only some of the structural risks and process phases, such as adaptivity<sup>73</sup> or (sectoral) coordination,<sup>74</sup> without discussing why that specific structural risk or process phase is emphasized at the expense of others, whether it poses a specific problem in ocean governance, or what the limits of such an

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<sup>69</sup> Quist and Hellström, "Process Management as a Contagious Idea: A Contribution to Røvik's Virus-Inspired Theory.", p. 902.

<sup>70</sup> Ehler, Zaucha, and Gee, "Maritime/Marine Spatial Planning at the Interface of Research and Practice.", p. 1; Gilek, Saunders, and Stalmokaitė, "The Ecosystem Approach and Sustainable Development in Baltic Sea Marine Spatial Planning: The Social Pillar, a 'Slow Train Coming'." p. 162; Winther et al., "Integrated ocean management for a sustainable ocean economy."; Varjopuro, "Evaluation of Marine Spatial Planning: Valuing the Process, Knowing the Impacts."; Gunnar Sander, "Against all odds? Implementing a policy for ecosystem-based management of the Barents Sea," *Ocean & Coastal Management* 157 (2018/05/01/ 2018), <https://doi.org/https://doi.org/10.1016/j.ocecoaman.2018.01.020>, <http://www.sciencedirect.com/science/article/pii/S0964569117308608>.; Fred P. Saunders, Michael Gilek, and Ralph Tafon, "Adding People to the Sea: Conceptualizing Social Sustainability in Maritime Spatial Planning," in *Maritime Spatial Planning: past, present, future*, ed. Jacek Zaucha and Kira Gee (Cham, UK: Palgrave Macmillan, 2019), p. 190-193.; Christina Kelly et al., "Investigating options on how to address cumulative impacts in marine spatial planning," *Ocean & Coastal Management* 102 (2014), <https://doi.org/https://doi.org/10.1016/j.ocecoaman.2014.09.019>, <http://www.sciencedirect.com/science/article/pii/S0964569114003007>. Confirming that studies focusing on "realities" of ocean management are rare, see Jones, Lieberknecht, and Qiu, "Marine spatial planning in reality: Introduction to case studies and discussion of findings.", p. 263.

<sup>71</sup> For example, a different than realistic ontological position could provide one explanation of a focus on the production and consumption process of documents, unlike their content, style, or structure. Lise Justesen and Nanna Mik-Meyer, *Qualitative research methods in organisation studies* (Copenhagen: Hans Reitzels Forl., 2012), p. 121-122.

<sup>72</sup> Kelly et al., "Investigating options on how to address cumulative impacts in marine spatial planning.", p. 144, references omitted.

<sup>73</sup> Considered by some as the "single most important weapon in our armoury." Santos et al., "Integrating climate change in ocean planning.", p. 9. *Double-check this reference, problems with access.*

<sup>74</sup> For example, Charles, "People, oceans and scale: governance, livelihoods and climate change adaptation in marine social-ecological systems.", p. 352 and Scott, "Integrated Oceans Management: A New Frontier in Marine Environmental Protection."p. 467.

argument are (e.g., what the limits to adaptation and coordination are). The question of any particular relevance to ocean governance of these aspects generic to governance arguably remains open.

### 3.2 Ideals and standards to governance

This section elaborates how governance is inspired by ideals and standards. These ideals and standards include that governance should be participatory, integrated, ecosystem-based (or based on an ecosystem approach), science-based, and based on a rule of law. Ocean governance policy initiatives and scholarships frequently refer to these ideals and standards to governance.<sup>75</sup>

These ideals and standards involve, amongst other things, ways of describing governance structures and processes. They emphasize certain ways of organizing structures or processes. For governance to be participatory, it may involve a participatory process that is open to the public and transparent or a participatory structure may be under the leadership of a parliament or democratically elected leaders. For governance to be integrated, it could combine governance processes, or it could be organized in a top-down structure. The example illustrates how some ways of describing governance structures and processes come with negative or positive connotations, such as top-down governance unlike integrated governance. Nonetheless, top-down instruction can be justified as a way of ensuring integration (or coherence), such as governance organized under one leader (or a group of leaders) that sets common premises, for example, how governance should be conducted. The example further illustrates how some ideals and standards are ideas of the time (typically participation), often contrasting previous ones. To complement previous perceptions of top-down (and state-focused) management, new perspectives of participation, network and bottom-up governance have emerged.

Some ideals and standards could typically be highlighted by a certain group taking a special interest in them. Such as legal scholars highlighting the need for rule of law or marine scientists highlighting the need for science-based marine management. While, certainly, there are multiple good reasons for governance based on rule-of-law and science, an additional reason relevant for these groups is that it emphasizes the relevance of their work.

Unquestionably, the ideals and standards of governance bring enriching perspectives by highlighting certain values or arguments. They are often framed as universally relevant. However, arguably, relevant counterarguments exist to any of them. Participation in governance processes is time-consuming and risks that interest groups emphasize their own interests on the account of collective interests. Integration for some purpose (such as sectoral activities' overlap in time and space) means less integration from another perspective (such as sectoral integration). Science-based management risks undermining relevant interests which are not made evident by scientific means (as section 4.2 will explain in more detail). Coherence for some purpose means less coherence from another perspective (as section 2.3 has explained). Predictability (one aspect of rule-of-law as section 5.2 will explain) may cement existing privileges at the account of humans or ecosystems with less privileges. Despite the fact that these ideals

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<sup>75</sup> Searches in a sample of three journals covering ocean governance issues (Marine Policy, ICES Journal of Marine Science, and Ocean Development and International law) in each of the journals' searching tools return, respectively, 921, 37, and 589 hits on "participatory process;" 352, 138, and 508 hits on "science-based;" 3109, 3147, and 244 hits on the "ecosystem approach;" 2370, 3606, and 431 hits on "integrate;" and 2325, 7, and 796 hits on "rule of law." Searches conducted on January 9 and February 2 and 3, 2023. Readers may note that while these searches indicate a pattern, these key words are not only used in the context or meaning that this study attaches to them.

and standards often are presented as universal or a necessity, the relevance of such ideals and standards to any governance issue or research question arguably demands justification. Such as why is a particular ideal or standard emphasized at the account of others, what are the counterarguments, and why is a particular ideal or standard relevant to a specific research question or governance issue.

Three ideals and standards will be dealt with in more detail going forward. The ideal or standard of science-based decision-making will be discussed in section 4.2. The ideal or standard of rule-of-law will be elaborated in section 5.2. Finally, the ecosystem approach will be analyzed in section 6.4, aligned with the structures and processes and ideals and standards of governance, to investigate any substance or merit of the ecosystem approach. The latter analysis illustrates how some interpretations of some of these ideals and standards overlap with the next governance category of substance and merit, to the extent that they mean to impact on the merit beyond processes and structures.

The examples of ideals and standards used in this section are frequently referred to in ocean governance policy initiatives and literature on ocean governance.<sup>76</sup> They could even be regarded as characteristics for ocean governance. Nevertheless, these ideals and standards are not just relevant to ocean governance. Participation, integration, science, and the rule of law are ideals relevant to any kind of governance. Further, the ecosystem approach is arguably relevant to any governance that interferes with terrestrial or ocean ecosystem. Thus, while these ideals and standards are typical to ocean governance, they are further relevant to other kinds of governance.

### 3.3 Substance of governance instruments (policies and regulations)

This section interrogates what ocean governance is when structures and processes as per section 2.2 and ideals and standards as per section 2.3 are kept outside. This section discusses ocean governance, unlike generic governance. This reflects the assumption that the governance structures and processes of section 2.2 and ideals and standards of section 2.3 are generic to governance or at least applicable beyond ocean governance. Accordingly, that which separates ocean governance from other types of governance is the substance.

Now imagine looking beyond a perfect management process in a perfect governance structure complying with the highest of ideals and standards: what is the substance or the merits of ocean governance? How is it possible to identify, design, or evaluate? Multiple ways of approaching substantive issues of governance could be envisioned, such as approaching the societal objectives or priorities it pursues (addressing ocean warming such as by mitigating climate change) and the strategies and instruments (policies and regulation to that end) it chooses; or the institutional implementation or translation of those strategies (how reduction of GHG emissions is pursued for instance by an Aquacultural Directorate); or the output (GHG emission reduction) or outcome (represented by CO<sub>2</sub> levels in the atmosphere or related ocean temperatures) of governance. Now one may even ask if mitigating climate change is a matter of

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<sup>76</sup> Searches in a sample of three journals covering ocean governance issues (Marine Policy, ICES Journal of Marine Science, and Ocean Development and International law) in each of the journals' searching tools return, respectively, 921, 37, and 589 hits on "participatory process;" 352, 138, and 508 hits on "science-based;" 3109, 3147, and 244 hits on the "ecosystem approach;" 2370, 3606, and 431 hits on "integrate;" and 2325, 7, and 796 hits on "rule of law." Searches conducted on January 9 and February 2 and 3, 2023. Readers may note that while these searches indicate a pattern, these key words are not only used in the context or meaning that this study attaches to them.

ocean governance. Although the matter is a useful example of various substantive approaches to governance, it ultimately depends on how one defines ocean governance, which will be further explained.

This section focuses on the fundamental substantive design of governance instruments, including policies (white papers, plans, strategies, or programs) and regulation such as statutory acts or regional or international treaties. As per Kooiman,

The systemic nature of state or public governance is mainly due to the use of two major instruments, laws and policies. For almost any subject, on almost every level of public involvement in societal affairs, laws, policies or combinations of the two, are standard governance practices.<sup>77</sup>

Thus, Kooiman regards policies and regulations as standard governance practices. In the final part, this section comments on how the fundamental design may provide flexibility for some subsequent adjustments (adaptation relevant to governance instruments).<sup>78</sup> It should, however, be noted that the extent to which regulations and policies are able to facilitate the desired outcome depends on many factors beyond their design or content, including power, capacity, institutional culture and purpose, and conflicting regulation and policies. The undertaken approach to substance could be located in the management process phase of policy and decision-making with regard to objectives and priorities, tools and strategies.

Plural approaches could be envisioned to the fundamental substantive design of governance instruments relevant to ocean governance. The design of these instruments may be approached, for example, by mapping their geographically delimited area of application (where); which existing or emerging activities interfering with marine ecosystems are facilitated or restricted, or how to protect and preserve marine ecosystems, areas or, components thereof and what to regulate in that respect (what and how); the relevant actors and demands to those actors (who); or the purpose of the governance instrument, such as contributing to one or more societal objectives or a more specific desirable outcome (why). Each of these approaches will be explained in brief as follows, including some inherent premises or priorities vested in these. The approaches may also reflect different understandings of what ocean governance captures: whether the management of marine spaces, of maritime activities or activities interfering with marine ecosystems, of coastal communities and other ocean actors, or protection (and sustainable use) of marine ecosystems.

The first approach is the spatial one that targets a geographically limited area such as an ocean area or a coastal area covering land and sea areas. However, areas are not governed as such, but rather humans whose activities and behavior result in certain profits or benefits yet impact on or interferes with the ecosystems of these areas. Nonetheless, the partition underlying governance instruments often involves dividing areas into geographically delimited units. The delimitation could be determined by administrative reasons, such as parallel to some administrative border, an example of which is the Svalbard Environmental Act of Norway that applies to the territory and territorial waters of Svalbard. Or the

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<sup>77</sup> Kooiman, *Governing as Governance*, p. 123.

<sup>78</sup> SAPEA Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty* (Berlin: SAPEA, 2019), on p. 59, classify design and evaluating strategies as one key function of science for policymaking.

delimitation could be determined by the logic of a socially defined “natural” system,<sup>79</sup> such as the integrated ocean management plan for the Beaufort Sea of Canada.<sup>80</sup> While the Beaufort Sea is a naturally connected entity, it is also connected with the surrounding area, and the larger and ultimately global natural system.

The second approach targets the “what and how” in ocean governance, which naturally depends on what one perceives as ocean governance. Subject to the focus of this section on policies and regulations, some perceive ocean governance as those policies and regulations that label themselves marine policies, maritime regulation, ocean management policies and beyond. Others perceive ocean governance as the management of maritime activities, which roughly speaking are those activities that depend on ocean space or marine resources. Yet others perceive ocean governance as the management of marine ecosystems. Since one does not govern ecosystems, but the humans embedded in them, at least in theory, one could imagine the governance of marine ecosystems to equal the governance of those activities that interferes with marine ecosystems. Yet, as most (maritime or land-based) activities do interfere with marine ecosystems (such as inducing some pollution, waste, or GHG emissions), a selection or delimitation of these activities is often required. The selection could reflect, for example, those with most (or least) negative effects, those that contributes to the main threats, (such as climate change), those that induce local pressures, or those that comply with a defined frame for or limit of (sustainable) use.

The third approach targets the relevant actors and demands to those actors (who). The demands to and design of actors is therefore one approach to the substance of ocean governance. Actors relevant to ocean governance span from coastal communities; to “ocean managers” – or other definition of public administrators, regulators, or leaders; and further to those economic actors of maritime businesses that operate in an ocean area. A coastal community may consist of many voices and may convey its own economic interests, the interests of its local ecosystems or local area, or global stewardship. The public administrators, regulators, or leaders relevant to ocean governance may be those that have a formal mandate over marine ecosystems or humans and activities interfering with these ecosystems. Institutionally, the “ocean managers” may be under specific interests of, such as that of a ministry (such as of trade and industry or of the environment) or further sub-unit. For example, the (offshore) Petroleum Directorate of Norway’s “main goal is to contribute to greatest possible values for the society from the oil and gas industry through effective and responsible resource management.”<sup>81</sup> The extent to which institutional goals impact on policymaking and decision-making by leaders and caseworkers depend on, amongst other factors, the culture of each institution. The third group of actors are the economic actors, who predominantly would be private companies. Economic objectives and profitability are the important

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<sup>79</sup> David Langlet, "Scale, space and delimitation in marine legal governance – Perspectives from the Baltic Sea," *Marine Policy* 98 (2018), <https://doi.org/10.1016/j.marpol.2018.09.027>, p. 279.

<sup>80</sup> <https://www.beaufortseapartnership.ca/integrated-ocean-management/integrated-oceans-management-plan/>

<sup>81</sup> <https://www.npd.no/om-oss/>, author’s translation from Norwegian.

concerns of private companies.<sup>82</sup> Although some companies may prioritize a broader set of objectives,<sup>83</sup> the social norms of shareholder primacy and profitability dominance arguably may shape the decisions and priorities made by these actors.<sup>84</sup>

The fourth substantive approach targets the purpose or societal objective of a governance instrument. Some typical objectives relevant to ocean governance instruments are the sustainable use of a marine resource or a marine area; the protection or preservation of marine ecosystems, areas, or ecosystem components such as species; economic value-creation or strengthening and development of maritime industries; and employment and settlement in coastal communities. The objectives could often be combined, which may mean they are competing or conflicting, the extent to which would demand further analysis. However, in ocean governance, the different objectives are often competing or conflicting, such as in facilitating emerging ocean industries or protecting ocean areas against increased use and activities (noting how increased use of marine space is one of the main threats to the global marine environment as per two recent global assessments<sup>85</sup>). As Bacchi and others have shown, societal objectives or problems are created through their representation: policies (and scholarly literature) produce certain “problems,”<sup>86</sup> which represent some assumptions and values and excludes others. Alternative conceptions of objectives of ocean governance could revolve around those that are less represented by the current discourses: ocean or nature,<sup>87</sup> women, local communities, future generation, multi-species equality. Alternative objectives reflecting different assumptions and values could be nature-centered co-existence; the sustainable use by all marine species; protection against human activities; development of local coastal communities’ industries; blue justice;<sup>88</sup> or blue communities.<sup>89</sup>

Moreover, beyond the stated objectives of any governance instrument, prioritization of objectives could be equally evident in the partition underlying a governance instrument, the purpose and partition of the

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<sup>82</sup> Beate Sjøfjell, "Towards a Sustainable Development: Internalising Externalities in Norwegian Company Law," *International and Comparative Corporate Law Journal* 6, no. 1 (November 21, 2010 2010), <https://doi.org/https://ssrn.com/abstract=1712796>. For example, relevant to private companies, Sjøfjell explains: "The vast impact that the operations of companies today, on an aggregated level, have on the global economy, on society in general and on the biosphere and the atmosphere, means that a critical analysis of the purpose of companies and regulatory framework within which they operate is crucial to a deeper understanding of the correlation between society and (the environmental dimension of) sustainable development," p. 4.

<sup>83</sup> Find ref newer Sjøfjell. Beate Sjøfjell, "Redefining Agency Theory to Internalize Environmental Product Externalities," in *Preventing Environmental Damage from Products: An Analysis of the Policy and Regulatory Framework in Europe*, ed. Carl Dalhammar, Eléonore Maitre-Ekern, and Hans Christian Bugge (Cambridge: Cambridge University Press, 2018). (*I need to doublecheck this and the next reference*)

<sup>84</sup> Sjøfjell, "Redefining Agency Theory to Internalize Environmental Product Externalities."

<sup>85</sup> Patricio Bernal et al., "Chapter 54. Overall Assessment of Human Impacts on the Oceans," in *The First Global Integrated Marine Assessment - World Ocean Assessment I*, ed. Lorna Inniss et al. (United Nations General Assembly, 2016).; Díaz et al., *IPBES 2019: Summary for policymakers of the global assessment report on biodiversity and ecosystem services (summary for policy makers)*. *IPBES Plenary at its seventh session (IPBES 7, Paris, 2019)*.

<sup>86</sup> Bacchi and Goodwin, "Making and Unmaking “problems”."

<sup>87</sup> Margherita Paola Poto and Margherita Paola Poto, *Environmental law and governance : the helicoidal pathway of participation : a study of a nature-based model inspired by the Arctic, the Ocean, and Indigenous Views* (Torino: Giappichelli, 2022).

<sup>88</sup> Nathan James Bennett et al., "Blue growth and blue justice: Ten risks and solutions for the ocean economy," *Marine policy* 125 (2021), <https://doi.org/10.1016/j.marpol.2020.104387>.

<sup>89</sup> Lisa M. Campbell et al., "From Blue Economy to Blue Communities: reorienting aquaculture expansion for community wellbeing," *Marine policy* 124 (2021), <https://doi.org/10.1016/j.marpol.2020.104361>.



governance structure and institutional entity responsible for the implementation or translation of the governance instrument, or the purpose vested in the actors licensed to act under it. Combination of objectives stated in governance instruments could be appropriate for some purposes, such as framing of the governance instrument. For analytical purposes, such as whether or the extent to which a governance instrument as per its design contributes to these objectives or desired outcomes, development or identification of elaborate evaluative approaches or criteria may be necessary. For example, aligning the stated objectives (or aspect thereof) with the inherent limitations of the spatial approach; with the approach to and delimited object of management (such as selected activities); or the objectives of actors and mandates of managers.

To identify, design, or evaluate whether or how a governance instrument meets these substantive aspects depends both on (the interpretation/translation or specification of) the substantive aspect and the governance instruments at hand. For example, specifying the substantive aspects (such as increase or decrease of negative effects on ecosystem integrity or extent to which certain qualified risks/threats are minimized) in a manner that could be aligned with the approaches of one or more governance instruments. Thus, different instruments may require different specifications of substantive aspects. If the governance instruments are too unspecific for such exercise, it may demand the substantive aspects to be aligned with how the instruments are practiced or translated (as in empirical case studies), or the output or outcome of governance.

The final question of this section is how the fundamental design of a governance instrument may provide flexibility for some subsequent adjustments (adaptation). What space there is for adaptation reflects which changes can and cannot be made without changing the partition and its fundamental design, as reflected in governance instruments and structures. As per Platjouw and Soininen, referring to governance instruments, “[a]daptivity may be built into the legal design of aquaculture or fisheries regulation, adaptivity may be fostered through iterative planning and licensing systems, and also the law-making process itself may be adaptive.”<sup>90</sup> However, as far as partition and design of governance instruments reflect institutional or organizational realities, suggested changes must take account of the institutional or organizational partitioning. Certainly, partition and design of institutions and organizations may also be changed, and sometimes it is appropriate.

Adaptation within the existing partition and governance instrument design is comparably easier. At the outset, adaptation can be envisioned in response to different inputs or influences. Governance is under continuous influence by changing political priorities and trends, real-world changes, changes of perceptions of the world, and changes of ideals. Thus, one could imagine that governance instruments could either adapt to or persist against streams of or individual influences,<sup>91</sup> to which science provides some of the inputs or influences, in various ways, as the next section will discuss.

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<sup>90</sup> Froukje Maria Platjouw and Niko Soininen, "Reconciling the rule of law with adaptive regulation of marine ecosystems – Challenges and opportunities for the Arctic and beyond," *Marine policy* 110 (2019), <https://doi.org/10.1016/j.marpol.2019.103726>, p. 3.

<sup>91</sup> Michael D. Cohen, James G. March, and Johan P. Olsen, "A Garbage Can Model of Organizational Choice," *Administrative Science Quarterly* 17, no. 1 (1972), <https://doi.org/10.2307/2392088>.

## 4. Science from a Governance Perspective

The question for this section is how science is relevant to structures and processes; ideals and standards; and substance of governance instruments. This question demands, initially, an introduction of the term “science” in the context of this paper. Investigating science from the governance perspective of this study entails approaching science as influence on or input to governance, thus approaching it as data, findings, input, or knowledge produced, unlike as a discipline or beyond. Some take the term “science” to embrace only the natural sciences, while others also include humanities and social sciences (similar to the meaning of “research”). In the field of study of ocean governance, “science” is often coupled with marine to form “marine science,” likely referring to the natural science. This paper will use the term in different meanings as specified yet focusing on marine science and science in an ocean governance context.

The relationship between science and governance is often referred to as the science-policy interface or interaction. As per the terminology of this study, “policy” refers to one type of governance instrument, unlike capturing all of governance. Therefore, the governance-science term will mainly be used, however, where science-policy interface is a more precise description of the relationship in terms of the terminology of this study, it will be referred to as such.

The governance-science relationship may be perceived or modelled in different ways. As these models may be more or less implicit and inherent in different approaches, for example based on ontological positions, it becomes important to explicate which model one assumes. At one end of a continuum, one model merit science as “offering disinterested, objective advice, while it falls to political actors to make judgements of value.”<sup>92</sup> This traditional, and as per Jasanoff<sup>93</sup>, realism notion of scientific knowledge “implies that truths about the natural world arise in an autonomous domain of science, cleanly separated from social influence and the uses of political power.”<sup>94</sup> At the other end of the continuum, one could model the science-governance relationship by meriting the role of scientists to “give advice but their input (...) is used selectively and/or strategically to legitimise political choices or depoliticize contentious issues”, such as “waiting for the facts” to defer a difficult decision.<sup>95</sup> Yet, as per Owens, neither of these models provide an adequate account of the science-policy interface.<sup>96</sup>

Both models should arguably be critically questioned. While some may consider natural scientific input as truth or “facts,” such as rising sea levels or warming oceans, presenting scientific findings on such issues

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<sup>92</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*, p. 54.

<sup>93</sup> Sheila Jasanoff, *The fifth branch : science advisers as policymakers* (Cambridge, Mass: Harvard University Press, 1990); Sheila Jasanoff, *States of Knowledge: The Co-Production of Science and the Social Order*, International library of sociology, (Abingdon, Oxon: Abingdon, Oxon: Routledge, 2004). *I need to study these sources more and improve the sentence this footnote relates to.*

<sup>94</sup> Donald F. Boesch, "The role of science in ocean governance," *Ecological economics* 31, no. 2 (1999), [https://doi.org/10.1016/S0921-8009\(99\)00078-6](https://doi.org/10.1016/S0921-8009(99)00078-6), p. 195.

<sup>95</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*, p. 54.

<sup>96</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*, p. 54.

will always involve elements of framing including selection and focus<sup>97</sup> (such as a chosen research question or verifying a selected hypothesis on the rising of sea levels unlike the variability of sea levels), presentations of relevance and impact (how widespread is ocean warming globally, who are or will be affected and how), and perhaps future predictions, aggregation with other studies, policy options or recommendations. While these elements would often increase the usefulness of a scientific study from a governance perspective, these elements are subject to the skills, assumptions, interpretations, and values of the informing scientists and to the standards of the scientific community. At the governance or policy end of the relationship, the to-be-informed politicians, bureaucrats, or stakeholders similarly have skills, assumptions, interpretations, and values about the natural environment, scientific knowledge, and the need to be informed, all of which will influence how she/he understands and considers the science as presented. This study aims to avoid the pitfalls of these models by keeping in mind how science is filtered at both the scientists' and the to-be-informed persons' ends.

To contextualize the filters of scientists and ocean actors, first a note on the practical forms of the governance-science relationship. The governance-science relationship could be envisioned taking different practical forms. One is the form of open and active discussion, such as in a workshop of politicians, bureaucrats, or stakeholders and scientists, such as on alternative ways of problem-framing how to address the eutrophication of the Baltic Sea. Another is the form of issuing a report in response to an inquiry (such as vulnerability of certain marine area) that rests on assumptions (asking for evidence of vulnerability unlike evidence of robustness) and demand a certain focus (not asking for the state of the larger environment to which it is intertwined). Other more passive forms of "interaction" include politicians, bureaucrats, or stakeholders attending a conference where scientists present assessments reports, or scientists publishing a chronicle, based on research findings following a scientific expedition, that is read by a head of state. Yet another, is in the form of scientists being appointed as part of a committee to suggest and prepare a policy or regulation on marine protected areas or to facilitate seabed mining. Notably, many of these interfaces or interactions will only reach some of the politicians that are decision-makers or some of the bureaucrats preparing the policy or regulation.

Science is created, developed, or produced for different purposes. Science could be described as "experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts" or, in shorter terms, as "original investigation to acquire new knowledge."<sup>98</sup> Science could be classified into basic science or applied science, where basic science "centers on knowledge creation within science itself (...) without any particular application or use in view."<sup>99</sup> Despite the fact that basic science has no particular application in view, when it is created, developed, or produced, it could certainly be relevant for governance. For example, knowledge on ocean

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<sup>97</sup> "It is essential to acknowledge (...) that human knowledge is always incomplete and selective, and thus contingent upon uncertain assumptions, assertions and predictions," Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*, p. 30.

<sup>98</sup> Robert J.W. Tijssen, "Discarding the 'basic science/applied science' dichotomy: A knowledge utilization triangle classification system of research journals," *Journal of the American Society for Information Science and Technology* 61, no. 9 (2010), <https://doi.org/https://doi.org/10.1002/asi.21366>, <https://onlinelibrary.wiley.com/doi/abs/10.1002/asi.21366>.

<sup>99</sup> Tijssen, "Discarding the 'basic science/applied science' dichotomy: A knowledge utilization triangle classification system of research journals."

acidification was, for example, developed as basic science.<sup>100</sup> Applied science, in contrast to basic science, is “directed primarily towards a specific practical aim or objective”<sup>101</sup> from the beginning. The practical aim or objective could be a business objective, such as exploring a marine resource for the purpose of producing food or medications, or a governance objective, such as assessing or monitoring the environmental status of a marine area. A key difference between basic research and applied research is the degree of freedom to frame or approach the research. For applied science, the framing of or approach to the research would be limited (to various degrees) by the announcement for funds or a mandate (reflecting the governance or other purpose). Basic science, in contrast, leaves more space for the scientists to frame and approach the research to be conducted.

Nevertheless, science is created, developed, or produced in different ways subject to various dimensions. The science creation, development, or production could be organized under the auspices of a permanent institution (whether a university or a research institute or body such as the International Arctic Science Committee<sup>102</sup>) or a temporary project organization. The monetary funding of science could be permanent or ad hoc. The research body could be independent (such as International Council for the Exploration of the Seas<sup>103</sup>) or embedded in an organization with a purpose going beyond research (such as the scientific working groups of the Arctic Council<sup>104</sup>). These and other institutional, organizational, and financial dimensions of science creation, development or production impact on the creation, development, and production of science, and, likely, also on the output.

On the background of these perspectives on science, how it is created, developed, or produced, how it is filtered, and the different forms which the governance-science interface or interaction may take, the question is now how the output of science (data, findings, and conclusions) is relevant to structures and processes; ideals and standards; and substance of governance instruments.

#### 4.1 Relevance of science to governance structures and processes

Partition of governance structures (instruments and institutions) may be substantiated in a number of ways, such as by administrative borders (states, municipalities, regions, or beyond), by topic (climate and pollution), or by activity type (shipping or aquaculture). Scientific and non-scientific input relevant to the logic and substantiation of different ways of partitioning governance structures include knowledge of these issues, problems of existing structures, and improved ways of restructuring or re-partitioning. The question emerges if and how (marine) scientific evidence could or should be used to problematize or justify alternative ways of structuring governance. Examples exist that scientific evidence such as ecological features or connections are used as arguments for certain structuring of governance, such as in the example of the integrated policy for the Beaufort Sea in Canada.<sup>105</sup> Another example is the EU (European Union) Horizon Europe research program that include a component to restore our oceans and

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<sup>100</sup> Ken Caldeira and Michael E. Wickett, "Anthropogenic carbon and ocean pH," *Nature* 425, no. 6956 (2003/09/01 2003), <https://doi.org/10.1038/425365a>, <https://doi.org/10.1038/425365a>.

<sup>101</sup> Tijssen, "Discarding the 'basic science/applied science' dichotomy: A knowledge utilization triangle classification system of research journals."

<sup>102</sup> <https://iasc.info/about>

<sup>103</sup> <https://www.ices.dk/about-ICES/Pages/default.aspx>

<sup>104</sup> <https://arctic-council.org/about/working-groups/>

<sup>105</sup> <https://www.beaufortseapartnership.ca/integrated-ocean-management/>

waters, relying on a report stating<sup>106</sup> that the “integrity of Europe's entire water system ... cannot be managed by dividing it into parts or administratively disconnecting fresh waters from the seas and the ocean.”<sup>107</sup> Similarly, it has been proposed that governance structures should reflect large marine ecosystems.<sup>108</sup>

These are arguments of, on one side, ecological connection, and, on the other side, disconnection from the greater area or land. The arguments reflect that ecologically speaking some areas or systems are more connected than others. Governance, however, is tightly connected to humans, and one could argue that the objects of governance (as well as political steering or regulation) are humans, human behavior, or human activities, unlike areas or ecosystems. As per this approach, the governing of an area or ecosystem could refer to the governing of humans or the human activities that are situated in that area or that interfere with or induce pressures on these water or marine ecosystems. Pressures inflicted on EU's ecologically connected water system (as well as any other marine ecosystems) include climate change, overfishing, and pollution.<sup>109</sup> Although the ecology of the water system reflects that these pressures should all be restricted, arguments for co-managing climate change, overfishing, and pollution would rather be, for example, that they need similar responses or expertise, stem from the same human activities or cause, or need careful adjustments to each other. Thus, while marine scientific knowledge provides input on significant impacts and areas where they impact, how to partition or structure governance to modify human behavior or activities to that end requires different lines of argumentation.

The next question is the relevance of science to management processes, starting with the knowledge gathering and analysis phase. As per section 2.2, this phase provides for framing and approach, whereby a collection and selection of knowledge. One fundamental influence of science on this phase (and beyond) involves how it contributes to enlightenment, as in fundamental understanding of the world.<sup>110</sup> Science is further relevant to orientation, which captures being informed about the state-of-the-art in a specific area and understanding of a challenge or problematic situation.<sup>111</sup> While enlightenment is, perhaps, more basic and general, and orientation more advanced and specific, these two functions depend on each other and

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<sup>106</sup> Pascal Lamy et al., *Proposed Mission: Mission Starfish 2030: Restore our Ocean and Waters*, Report of the Mission Board Healthy Oceans, Seas, Coastal and Inland Waters (2020)., p. 46.

<sup>107</sup> Lamy et al., *Proposed Mission: Mission Starfish 2030: Restore our Ocean and Waters.*, p. 44.

<sup>108</sup> Lawrence Juda Timothy Hennessey, "Governance Profiles and the Management of the Uses of Large Marine Ecosystems," *Ocean Development & International Law* 32, no. 1 (2001), <https://doi.org/10.1080/00908320150502195>.

<sup>109</sup> Díaz et al., *IPBES 2019: Summary for policymakers of the global assessment report on biodiversity and ecosystem services (summary for policy makers)*. *IPBES Plenary at its seventh session (IPBES 7, Paris, 2019)*.

<sup>110</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*.

<sup>111</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*.; Wolters et al., "What is the best available science? A comparison of marine scientists, managers, and interest groups in the United States.", on p. 103, describes the multiple roles of science and scientists for the natural resource and environmental policy process: “Levien argues there are multiple roles on how this can happen. First, scientists can provide background on the basic fundamentals of environmental problems, identifying known processes and those things that are uncertain. Second, scientists can then describe and identify management options for solutions to those problems. Finally, scientists can contribute to environmental problem solving by estimating the environmental and socioeconomic consequences of proposed solutions through time and across population groups.”

gradually overlap, thus they will be treated in combination going forward. Examples of enlightenment and orientation, relevant to ocean governance, include knowledge of human dependencies of ocean for protein, energy, and transportation; how humans have organized the exchanges of goods and services in economic systems; the existence of ecosystems, earth system processes, and planetary boundaries<sup>112</sup>; the main threats to the global marine environment<sup>113</sup>; and how states have defined and divided entitlements to ocean areas between themselves<sup>114</sup> which forms the basis for (re)distributing access to resources and marine spaces to private persons, economic entities, and local communities (under national law).

Problem-framing is another way in which (natural and social) science contributes to the knowledge gathering and analyses phase. As per the Science Advice for Policy by European Academics (SAPEA) group of experts that advice the European Commission, a main call to science is “to support policymaking by providing the best available knowledge in understanding a specific problem.”<sup>115</sup> Problem-framing as a scientific input could be envisioned as redefining or exploring the problem-framing of, for example, governance instruments, tools and strategies, or even objectives and priorities. Bardwell, similarly, explains from a cognitive psychology and conflict management perspective how

Problem-framing emphasizes focusing on the problem definition. Since how one defines a problem determines one’s understanding of and approach to that problem, being able to redefine or reframe a problem and to explore the ‘problem space’ can help broaden the range of alternatives and solutions examined.”<sup>116</sup>

Thus, exploring, mapping, and exposing problem definitions relied on in policies and regulations, framing and reframing the problem space is one way in which scientific expertise is relevant to the knowledge gathering and analysis phase. SAPEA explains the powerful impact of framing

A significant body of work on relations between science (broadly defined) and policy has identified the importance of frames and framing, through which particular problem definitions, knowledge claims and policy options are emphasised (considered to be ‘in the frame’) whilst others are effectively removed from consideration n (Entman, 1993; Vreese, 2005). At any one time, the dominant framing (of an environmental problem, for example) may be so familiar as to be tacit. (...) Just as framing helps to delimit what is ‘thinkable’, reframing can be a precursor for significant policy change.<sup>117</sup>

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<sup>112</sup> Johan Rockström, "Planetary Boundaries," *New Perspectives Quarterly* 27, no. 1 (2010),

<https://doi.org/10.1111/j.1540-5842.2010.01142.x>; Steffen Will et al., "Planetary boundaries: Guiding human development on a changing planet," *Science* 347, no. 6223 (2015), <https://doi.org/10.1126/science.1259855>.

<sup>113</sup> Bernal et al., "Chapter 54. Overall Assessment of Human Impacts on the Oceans."; Díaz et al., *IPBES 2019: Summary for policymakers of the global assessment report on biodiversity and ecosystem services (summary for policy makers)*. IPBES Plenary at its seventh session (IPBES 7, Paris, 2019).

<sup>114</sup> "United Nations Convention on the Law of the Sea of 10 December 1982, 1833 U.N.T.S. 3, (UNCLOS)."

<sup>115</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*, p. 21 and 12.

<sup>116</sup> Lisa V. Bardwell, "Problem-Framing: A perspective on environmental problem-solving," *Environmental Management (New York)* 15, no. 5 (1991), <https://doi.org/10.1007/bf02589620>, p. 603.

<sup>117</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*, p. 69-70.

Framing the environmental problems of the ocean is a key cross-disciplinary scientific topic to marine science. In general, framing or problem-framing is relevant both to the knowledge gathering and analysis phase and the subsequent policy and decision-making phase.

Another question is the relevance of scientific input (data, findings, conclusions) to the knowledge gathering and analysis phase. Scientific inputs do not exist in isolation. A number of other inputs and concerns beyond marine scientific input may concurrently compete for attention when gathering knowledge and analyzing ocean matters. These non-scientific and scientific inputs include concerns for employment, social distribution, economic prosperity, and perceptions of possibilities including that of re-election. A question (which may reflect a realist model of the governance-science interface) is if and how new scientific input could or should lead to new governance efforts or adaptation of existing governance. For example, should new scientific input on the increasingly negative effects of marine plastics on cetaceans or an increasing need for protein as feed or food lead to a change of policies or regulation? The input may point to numerous ocean and terrestrial policy and regulatory choices, invoking a number of other non-scientific and scientific concerns. Further, new scientific evidence may be already accounted for in current policies and regulations or may not be enough to change a predefined priority of different concerns. Moreover, new (or existing) scientific evidence may substantiate a number of different political positions. While at least some politicians would claim that current policies and regulations are science-informed, arguably, scientific evidence already exists to substantiate radical changes of priorities. For example, status assessments of the global marine environment keep reporting of the urgent need to take action to address the main threats to the marine environment, including overfishing, use of marine space, climate change, pollution and waste, and non-native species.<sup>118</sup> While the reduction of these threats is in focus of governments and beyond, currently, no status trends indicate that these threats are sufficiently reduced or mitigated or that the deteriorating trends are shifting. On the contrary, a recent IPCC report on global warming<sup>119</sup> was deemed “Code Red for humanity” by the UN Secretary-General, indicating the need for even stronger responses.<sup>120</sup>

Another ocean governance example is the research on (marine) plastic pollution that points to the need for circular economic models, within regulatory limits, to prevent the increasing amount of plastics accumulating in the ocean.<sup>121</sup> Are current policies and regulations informed of these scientific inputs? If not, are they science-informed? And how should or could they adapt to facilitate new economic models and economic regulation and which other concerns are invoked by the nature of the different policy responses? These examples illustrates how a claim or an assumption that governance should be based on or adapt to new scientific evidence or changes in the marine environment should be nuanced in multiple

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<sup>118</sup> Díaz et al., *IPBES 2019: Summary for policymakers of the global assessment report on biodiversity and ecosystem services (summary for policy makers)*. *IPBES Plenary at its seventh session (IPBES 7, Paris, 2019)*; Bernal et al., "Chapter 54. Overall Assessment of Human Impacts on the Oceans."

<sup>119</sup> V. Masson-Delmotte et al., *IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press (Cambridge, United Kingdom and New York, NY, USA, 2021).

<sup>120</sup> UN Secretary-General, "Secretary-General Calls Latest IPCC Climate Report 'Code Red for Humanity', Stressing 'Irrefutable' Evidence of Human Influence," news release, 2021.

<sup>121</sup> Sarah J. Morath, *Our plastic problem and how to solve it* (Cambridge: Cambridge University Press, 2022); Marilena Streit-Bianchi, Margarita Cimadevila, and Wolfgang Trettnak, *Mare Plasticum - The Plastic Sea : Combatting Plastic Pollution Through Science and Art*, 1st 2020. ed. (Cham: Springer International Publishing : Imprint: Springer, 2020).

ways by considering the complicatedness of competing and potentially conflicting scientific and non-scientific inputs relevant to policies and regulation, the multiple policy and regulatory alternatives that scientific evidence may give rise to, the demand for political anchoring or legitimacy of changes or adaptations to policies or regulations, and beyond. Instead of “science-based” or “evidence-based”, some scholars use the term “evidence-informed” to explicitly reflect the fact that multiple concerns are relevant to decisions (such as to adopt or change a governance instrument) in which (natural and social) science is “only one, and on many issues, not even the decisive one.”<sup>122</sup> In any event, use of science to inform decisions should also account for the reliability of the scientific advice, uncertainties, ambiguity, and limits of understanding,<sup>123</sup> as well as interpretations both on the side of the scientists and the politicians and bureaucrats. Arguably, the term “science-informed” unlike “science-based” decision-making may better reflect these nuances and how scientific input is one of many concerns.

Another (natural and social) scientific input to the policy and decision-making phase, as per SAPEA, is that of designing and evaluating strategies.<sup>124</sup> The goal for this input is to “co-design, evaluate and monitor strategies for reaching a common goal that all actors want to pursue.”<sup>125</sup> The scientific input as per this function is not neutral but directed towards predefined normative goals or values. Predefined normative goals or values relevant to ocean governance may typically be to protect marine ecosystems and to provide for sustainable use of ocean resources to meet human needs.<sup>126</sup> This advocacy science function entails that science has a specific function relevant to the management process phase that concerns designing and evaluating policy, tools and strategies with regard to objectives and priorities. This will be discussed in more detail in section 3.3 on the relevance of science to the substance of governance instruments.

The next question is the relevance of science to the implementation and monitoring phase. The (social) science literature on implementation and translation theory is certainly relevant to an administrative (institutional or organizational) focus of implementation, including how and when implementation or translation is completed. Monitoring may capture the monitoring of implementation (or translation), of

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<sup>122</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*, p. 23.

<sup>123</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*.

<sup>124</sup> As per Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*, another main function is “integration” or, as per Wolters et al., “What is the best available science? A comparison of marine scientists, managers, and interest groups in the United States.”, on p. 97: “collaboration and integration among managers and scientists.” The author finds that this function is essentially a mix of the other functions (in response to a mix of governance aspects). Therefore, it is not pursued in this paper.

<sup>125</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*, p. 59.

<sup>126</sup> The societal goals or values of social distribution and social justice have been less frequently highlighted in ocean governance literature, yet gaining focus, such as in Gilek, Saunders, and Stalmokaitė, “The Ecosystem Approach and Sustainable Development in Baltic Sea Marine Spatial Planning: The Social Pillar, a ‘Slow Train Coming’.”; Henriette Grimm et al., “Integration of the social dimension into marine spatial planning – Theoretical aspects and recommendations,” *Ocean & Coastal Management* 173 (2019/05/01/ 2019), <https://doi.org/https://doi.org/10.1016/j.ocecoaman.2019.02.013>, <http://www.sciencedirect.com/science/article/pii/S0964569118307439>; Fred Saunders et al., “Theorizing Social Sustainability and Justice in Marine Spatial Planning: Democracy, Diversity, and Equity,” *Sustainability (Basel, Switzerland)* 12, no. 6 (2020), <https://doi.org/10.3390/su12062560>.



output, of outcome, or of any reference points related to the outcome, such as statuses of the marine ecosystems. Depending on the purpose or objectives of any policy or regulation, the preferred outcome could either be a satisfactory ecological status, prosperous economic activities, a combination of these (such as in “protection and sustainable use”), or something else. The marine sciences are relevant to the monitoring of one of these potential reference points, the ecological statuses. The results of any monitoring could be used as input to the subsequent evaluation and adaptation phase.

Since the evaluation and adaptation phase is similar to the knowledge gathering and analysis phase, this phase is equally subject to the continuous influence by real-world changes, changing political priorities and trends, changes of perceptions of the world, and changes of ideals, to which the scientific input only provides part of the input. To summarize, the relevance of science, in the midst of these streams of influences, is in one way limited in being one of multiple inputs, and in other ways broad in providing input to enlightenment, orientation, and values; to problem-framing; and as input to design and evaluation of a range of different policy options.

#### 4.2 Relevance of science to the ideals and standards of governance

This section asks how science is relevant to the ideals and standards of governance. Section 3.1 has set out how governance is rather science-informed than science-based. Further, it has shown how science may support multiple different political positions, including that one could argue that current policies and regulations are not science-informed. At an overall level, it is hard to argue against how governance is to some extent science-informed. The capacity of governance to be science-informed may, if not alone, contribute to governance being perceived as meeting many of the ideals and standards relevant to ocean governance (and governance in general), such as to be good, responsive, and legitimate. Further, science-informed governance could justify that governance processes are participatory, to the extent that scientists participate in them.

Ideals and standards, frequently referred to in ocean governance, which directly signals the relevance of science to governance includes the ideal of “best available scientific evidence.” It could either be interpreted as a general standard to governance, reflecting how governance should be science-informed (or science-based).<sup>127</sup> Other times, the ideal is used in particular contexts, for example, the demand to states, as per UNCLOS, to take certain measures for the conservation of living resources of the high seas, on the “best scientific evidence available to the States concerned.”<sup>128</sup> The questions remain whether it is possible to identify “best available” evidence in a particular situation; the extent to which all scientific evidence supports the same option; and the extent to which other inputs (such as competing concerns) are relevant. Moreover, in ocean governance, where marine ecosystems, their governance, and trying to meet the complex objectives of protecting and sustainably using the marine environment all are complex, scientific evidence may support multiple options and other non-scientific concerns can hardly be overlooked. Facing these questions and such complexity, the question emerges if the standard of “best available evidence” is a useful governance focus. Boesch explains

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<sup>127</sup> Wolters et al., “What is the best available science? A comparison of marine scientists, managers, and interest groups in the United States.”

<sup>128</sup> “United Nations Convention on the Law of the Sea of 10 December 1982, 1833 *U.N.T.S.* 3, (UNCLOS).”, art 119.

“Rather than the ‘best’ possible science for policy, we must ask how to achieve the level of certainty needed for real-time political decisions, given that much knowledge about the environment will continue indefinitely to elude the firm grasp of science.”<sup>129</sup>

Thus, providing yet another reason for not asking for best available scientific evidence, one could focus on the appropriateness and level of certainty of, for example, reference points (section 2.2) such as status trends of marine ecosystems or other governance reference points reflecting ecological realities.

Another standard that is frequently referred to in ocean governance and beyond, which directly signals the relevance of science to governance, is the precautionary approach. The precautionary approach or principle comes in multiple versions and includes several aspects. One aspect, regarded by Sands et al. as the core of the principle,<sup>130</sup> is expressed in Principle 15 of the Rio Declaration that dates back to 1992. It states that

[w]here there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.<sup>131</sup>

This principle states how lack of full scientific certainty should not preclude certain measures. Yet, as the previous sections have shown, while some uncertainty is characteristic to science, multiple governance options may emerge in response to, for example, scientific inputs about the marine environment. The relevance of the uncertain scientific input may be considered differently depending on how the to-be-informed bureaucrat, politician, parliament, or head of state understands scientific uncertainty. Further, scientific uncertainty reflects, amongst others, how “human knowledge is always incomplete and selective, and thus contingent upon uncertain assumptions, assertions, and prediction.”<sup>132</sup>

Moreover, in a situation where full scientific certainty can be established, for example, as the case is with climate change (“very high confidence” as per an IPCC report)<sup>133</sup>, this full scientific certainty is, arguably, not yet reflected in (sufficient) cost-effective measures, as CO<sub>2</sub>-levels and environmental degradation keep increasing. Does this entail, as per the precautionary principle, that measures are postponed or that they are not cost-effective? This example illustrates, in line with previous sections, how the relevance of science is, in one way limited in being one of multiple inputs, and in other ways broad in providing input to enlightenment and values (the role of the climate and the usefulness of preserving it), problem-framing (such as how mitigation and adaptation are two different problems), and to design and evaluate of a range of different policy options (measures taken and measures that could be envisioned to mitigate climate change and adapting in response to its impacts). In this context, the practicability of the precautionary principle as per the Rio Declaration is questionable. Nonetheless, to the extent that the precautionary

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<sup>129</sup> Boesch, "The role of science in ocean governance.", p. 195.

<sup>130</sup> Philippe Sands et al., *Principles of international environmental law*, 4th ed. (Cambridge: Cambridge University Press, 2018), p. 230.

<sup>131</sup> "UNGA/CONF.151/26 (Vol. I) Rio Declaration On Environment And Development," (1992)..

<sup>132</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*, p. 30.

<sup>133</sup> Pörtner et al., *IPCC 2019: Summary for Policymakers. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (IPCC special report)*, available at <https://www.ipcc.ch/srocc/>, p. 35

approach or principle expresses to recognize uncertainty and to exercise precaution in future decision-making, it is certainly both relevant and practical.

Adding to the questionable practicability of the precautionary approach or principle, is another arguably questionable aspect in an ocean governance context. Three recent assessments of the global state of the environment (arguably, a relevant point of reference for ocean governance decision-making) all indicate the urgency of taking action. Does it make sense to discuss “reason to postpone measures” (as per the precautionary principle) when the “urgent need to take action” and the “Code red for humanity” clearly signals that we are beyond the state of precaution? Even if these three science-based reports come with some uncertainty, the “reasons to postpone measures” aspect of the precautionary approach appears outdated in ocean governance of the 2020s in the face of the global environmental problems of the ocean reflected in these reports. Until future scientific assessments find that the deterioration of the global (marine) environment has been restored at healthy levels, these scientific inputs indicate that measures should continuously and increasingly be undertaken from a perspective of urgency rather than precaution.

#### 4.3 Relevance of science to the substance of governance instruments

As per the previous sections, this study is based on the assumption that ocean governance is under continuous influence by streams of real-world changes, changing political priorities and trends, changes of perceptions of the world, and changes of ideals, to which the scientific input only provides part of the input yet in different ways. This section interrogates how scientific input is relevant to the substance of governance instruments.

The question is first how science is relevant to the spatial approach to governance instruments. As per section 2.4, the partition underlying governance instruments, dividing areas into geographically delimited units, could be determined by arguments of “natural” systems (beyond administrative and more). Thus, scientific input could be relevant to support where it is more or less “natural” to draw the lines. For example, in deciding in which areas to plan for expanding blue (marine) economic activities, scientific knowledge on the robustness of ecosystems is relevant (alongside other concerns, such as where most resources are available or accessible, access to infrastructure, and interference with existing activities). Scientific knowledge is equally relevant in determining where to establish marine protected areas, which may be decided based on scientific input on which areas are (most) vulnerable (alongside other concerns such as shipping lanes; existing, traditional, and potential new uses of areas; threatened or vulnerable species; capacities and status of the larger marine area of which the protected area belongs, and the degree of protection needed or desired).

Further, science may also inform governance about the importance of scale. Not only are the Earth system processes global in scale,<sup>134</sup> but many human pressures impact on a global scale.<sup>135</sup> The human impact on any area results from the aggregation of local, regional, and global scale pressures induced on that area over time. Scientific knowledge on the mix of local and global pressures could inform on the relative

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<sup>134</sup> J. Rockstrom et al., *Planetary Boundaries: Exploring the Safe Operating Space for Humanity*, 2009; Will et al., "Planetary boundaries: Guiding human development on a changing planet."

<sup>135</sup> Joseph R. Burger et al., "The Macroecology of Sustainability," *PLoS Biology* 10, no. 6 e1001345 (2012), <https://doi.org/10.1371/journal.pbio.1001345>; Lena Schøning, "The Contribution of Integrated Marine Policies to Marine Environmental Protection: The Case of Norway," *International Journal of Marine and Coastal Law* in press (2020), pp. 5-7.

relevance of local measures (such as restricting local activities), as opposed to, for example, responses to reduce global pressures (such as national measures to mitigate climate gases).

The second question is how science is relevant to the “what and how” of governance instruments. Science has a vital role in providing knowledge about (marine) ecosystems in assessment reports. The approach of any scientific reports and assessments will certainly influence what it finds and highlights. It may describe threats to an area or different ecosystem components existing in an area. Knowledge about ecosystem components may be considered and used in quite different ways, whether to support their protection, exploitation, or eradication (if an invasive species). Scientific inputs on the existence of marine resources eligible for human exploitation, such as krill, snow crabs, or hydrothermal vents, may provide for setting up policies or regulatory regimes providing for economic exploitation of these resources, while scientific reports of the existence of cold-water reefs may provide for restrictions of use. The policy and regulatory options relevant to such knowledge depend, amongst others, on the assessment approach, on values and political positions, technology, and accessibility of the component.

Further, science has a significant role in providing status reports. Status reports may recommend overall policy choices on how to adopt, change, or adapt governance instruments. For example, the IPCC special report of 2019 on the ocean and cryosphere “highlights the urgency of prioritising timely, ambitious, coordinated and enduring action (*very high confidence*)”<sup>136</sup> to mitigate climate change. This scientific input could for example translate to reducing climate gas emissions. Advocacy scientific input (section 2.2) in terms of how to reduce such emissions could also be envisioned. In regulating industries and granting or withdrawing permits to operate and emit, whether to upscale or downscale activities, governance instruments may consider the potential impact of individual activities, an entire industry and its life cycle impacts, or the cumulative impacts on a certain area, all of which depend on input from the natural sciences.

Insofar as governance instruments modify human activities or human behavior, which is embedded in and affect the natural environment, the natural science inputs to the design or change of governance instruments is more or less indirect. Sometimes scientific findings in the natural environment can be traced back to an activity and point to more or less specific governance options, such as the tracks from bottom trawling on the seabed pointing to potential modification of bottom trawling (unless regarded, for instance, as tolerable damage or marine cultural landscape). Other times, the activity causing the negative influence is less obvious. For example, scientific findings may indicate that a decline of the population of the key Arctic species of polar cod may be due to ocean warming and oil emissions.<sup>137</sup> The ocean warming stem from the global amount of climate gases, while the oil emissions may not easily be traced to any particular activity or source. Further, any measures to be adopted for the protection of the polar cod population would concern future climate change emissions or oil emissions, which would need to be predicted. Moreover, the current policy risk profile may in any event allow certain negative effects, which again depends on the value of the oil emitting activity (whether fisheries, offshore petroleum extraction, or shipping), and the authority on the hand of the governance actor (such as the limited authority of individual states over shipping or over activities in the high seas). Similarly, the tracks of

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<sup>136</sup> Pörtner et al., *IPCC 2019: Summary for Policymakers. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (IPCC special report)*, available at <https://www.ipcc.ch/srocc/>, p. 35.

<sup>137</sup> Morgan Elizabeth Bender et al., "Combined effects of crude oil exposure and warming on eggs and larvae of an arctic forage fish," *Sci Rep* 11, no. 1 (2021), <https://doi.org/10.1038/s41598-021-87932-2>.

bottom trawling may point to the activity of trawling yet raises a number of questions whether to modify or tolerate the trawling activities, by relocation, stronger requirements to the gear or to avoiding an area or continue as before. Thus, any (causal) link between, on one hand, scientific evidence of human influence on ecosystems (the negative effects of bottom trawling or decline of the polar cod population), and, on the other hand, human activities or human behavior (many of which leads or may lead to oil pollution and climate gas emissions, or drives the demand for fish, oil, or shipping) has multiple ends. Which activity to modify by policy or regulation is not (and will probably never be) entirely clear at the micro decision-making level based on the scientific input.

Perceiving the governance-science interface in a causal way that links scientific input with governance response may have some undesired effects. It may lead to a drive for gathering more knowledge, as a means to strengthen the causal link between scientific input and governance response that will in fact never be clear. Further, some approaches of adaptive or responsive governance and management may rest on the assumption that this link exists: that what and how to adapt is a given based on (marine) scientific findings. Section 6.3 explores this in more detail.

Perspectives of aggregation may to some extent remedy the lack of clarity or causal link between scientific input and policy and regulatory options. These may be status trends over time or statuses of multiple studies of larger areas in aggregation. These may point to overall trends unlike individual inputs, resembling trends of climate change unlike climate variations. For example, while individual links as per the aforementioned examples are not always clear, the aggregation of multiple scientific assessments nonetheless identify overfishing and pollution as main pressures or drivers on the global marine ecosystems. Therefore, arguably, what is clear is that overfishing and pollution should be addressed, reduced, and mitigated. Nevertheless, how, where and by whom, is not given, and other concerns beyond these inputs are also relevant, as section 4.2 has explained.

The fourth question asks for the relevance of science to the demands and design of ocean governance actors. Perceptions of what ocean governance is influence who one sees as relevant actors. Often, multiple actors are envisioned: citizens, communities, private companies, NGOs, sub-state entities, states, and international organizations. The scientific knowledge relevant to these groups of actors is somewhat similar and somewhat different. While input relevant to enlightenment, orientation, values, and, to some extent, problem-framing may be universal to these actors, the combined set of intervention potential of each group of actors differs. States have multiple capacities, including that of making and changing policies and regulations, while citizens and NGO primarily may influence other actors, such as through voting, activism, or as consumers. Private companies may modify their activities and products relevant to different purposes and influence changes through their roles as sector representative, consumer of goods and services, and beyond. Thus, the strategies relevant to different ocean actors diverge, entailing that different advocacy scientific input (to “co-design, evaluate and monitor strategies for reaching a common goal that all actors want to pursue”)<sup>138</sup> will be relevant to them. Ocean governance research that does not diversify or specify ocean actors may identify solutions and options that are only available to some of them.

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<sup>138</sup> Science Advice for Policy by European Academies, *Making Sense of Science Under Conditions of Complexity and Uncertainty*, p. 59, section 3.1.

The fifth question concerns the relevance of science to the objectives and purposes of ocean governance. As per section 2.4, some typical objectives relevant to ocean governance instruments are the sustainable use of a marine resource or a marine area; the protection or preservation of marine ecosystems, areas, or ecosystem components such as species; economic value-creation or the strengthening and development of maritime industries; employment and settlement in coastal communities. These objectives reflect the current paradigm and, like any objectives, reflect values. Yet, values and objectives are, at least partly, influenced by enlightenment and orientation, therefore science may also be relevant to the values held by individual scientists, citizens, administrators, and politicians, as well as to the societal objectives that their communities agree on. The objectives reflecting a need to protect or preserve or use the marine ecosystems in an environmentally sustainable way, have emerged on the agenda as scientific reporting on the pressures on these environment (as well as the pressures themselves) has increased. For example, in 1972, the UN Conference on the Human Environment was held, drawing international attention to environmental problems.<sup>139</sup> This was the UN's first major conference on environmental problems in general (unlike specific problems). Further, more recent research on climate change and the planetary boundaries may have changed the perceptions of some of whether we value and need to protect the global earth environment or the environment of one's own (marine) backyard.

## 5. Law from a Governance Perspective

The question for this section is how law is relevant to structures and processes; ideals and standards; and substance of governance instruments. This question demands, initially, an introduction of "law" in the context of this paper. On one hand, "law" is eligible as (social) science as per previous section 4. Knowledge about law certainly informs governance as one of multiple inputs and provides input to enlightenment (how humans within and across nations organize relations by law), orientation (the law relevant to certain topics such as fisheries or the law setting out societal goals), and values (knowledge about law may impact on the desire for maintaining those laws). Knowledge about law may further provide input to problem-framing (whether the problem is the law, or the law pose a barrier to or may facilitate responses to the problem); and as input to design and evaluation of a range of different policy options (such as different alternative laws).

One the other hand, and primarily, this study approaches law, on its own terms, from a governance perspective. "Law" as per this study means formal norms: norms that regulate and orders behavior, authority, and contestation (as will be further explained in section 5.1). Formal norms include international norms that regulate relations between states, states and international organizations, and (occasionally) states and individuals. Further, formal norms include national legal norms specific to each national legal system, which regulates and orders how the state is organized; the distribution of the areas, resources, and ecosystems over which the state has jurisdictional or sovereign rights; regulation of behavior; and the relations between the state and citizens, companies, and organizations. The formal norms in mind are widespread and state-centric, unlike a pluralistic take that captures broader variations of norms such as traditional and religious law and cultural and social norms (which certainly also regulate and order behavior, authority, and contestation). The formal norms in mind could be legally binding or

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<sup>139</sup> Jan H. Jans, "Stop the Integration Principle," *Fordham International Law Journal* 33, no. 5 (2010), p. 1535. Sands et al., *Principles of international environmental law.*, p. 21-51 provides a more extensive historical account, and on p 227, explains how a UN conference in 1949 and a UN resolution of 1971 also identifies the linkage between environmental conservation and socio-economic development.

non-binding (for example, soft law<sup>140</sup>). Law is further perceived as a social construction (or a collective fiction)<sup>141</sup> –resulting from political choices, unlike derived from an inherent universal morality.<sup>142</sup> On this assumption, law is not inherently good or bad, but serves certain purposes reflecting the political choices of the time of adoption or coming into existence. Throughout history and currently, law has been and is used, in some regimes, as a tool of injustice, oppression, and stagnation, and in other regimes, as a tool of justice and promotion of broadly supported societal goals. Law may serve as a powerful tool to meet broadly supported governance goals yet may be an equally powerful tool to those seeking to resist or challenge the same goals.<sup>143</sup>

The mere existence of law does not lead to the intended effect. Law as written may remain unimplemented (or untranslated), selectively implemented, translated to something different, and even impossible to implement.<sup>144</sup> Some reasons for law being hard or impossible to implement could be the existence of conflicting laws or an institutional culture or purpose in conflict with the law; lack of knowledge, competence, or resources; or resistance to the law.

The next section will conceptualize how law captures legal structures embedded in governance structures; defines and is adopted by governance processes; is reflected in ideals and standards of governance; and may equal certain governance instruments.

## 5.1 Relevance of law to governance structures and processes

This section first investigates the relevance of law to governance structures. Multiple institutional and instrumental structures of governance co-exist as section 3.1 has set out. Ruhl et al. explains how a legal system is

the system that creates, implements, and enforces formal rules governing society ... [including] both the institutions tasked with creating and applying legal rules, as well as legal instruments, such as laws and regulations.<sup>145</sup>

Thus, the legal system of Ruhl comprises both institutional and instrumental elements. If policies are added to the legal instruments, the legal system of Ruhl further resembles the hierarchical governance

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<sup>140</sup> On soft and hard law, see for example, Dinah Shelton, "Soft law," in *Routledge Handbook of International Law*, ed. David Armstrong (London: Taylor & Francis, 2009)., Lavanya Rajamani, "The 2015 Paris Agreement: Interplay Between Hard, Soft and Non-Obligations," *Journal of Environmental Law* 28, no. 2 (2016), <https://doi.org/10.1093/jel/eqw015>, <https://doi.org/10.1093/jel/eqw015>.

<sup>141</sup> Yuval N. Harari, *Sapiens : a brief history of humankind* (First U.S. edition. New York : Harper, [2015], 2015). <https://search.library.wisc.edu/catalog/9910419687402121>.

<sup>142</sup> Woolaston, *Ecological Vulnerability: The Law and Governance of Human–Wildlife Relationships*.:“Classical writers of legal theory, such as John Austin, H. L. A. Hart and Ronald Dworkin have long debated the existence of a definition of law and whether one is even necessary. One major point of contention is whether law has natural or positivist foundations, that is, whether law is derived from a ‘higher’ source and is based on an inherent, universal morality or whether law is a social construction that is only loosely associated with morality.”, p. 10.

<sup>143</sup> Luis Felipe López-Calva and Yongmei Zhou, *Governance and the law* (Washington, District of Columbia, USA: World Bank Group 2017), <https://doi.org/10.1596/978-1-4648-0950-7>.

<sup>144</sup> López-Calva and Zhou, *Governance and the law*.

<sup>145</sup> Ruhl, Cosens, and Soininen, "Resilience of Legal Systems: Toward Adaptive Governance.", p. 510.

mode of Kooiman, which comprises both the legal and the policy arena.<sup>146</sup> If policies are added (for example, as soft law<sup>147</sup>) as instrumental elements, the legal system of Ruhl moreover resembles the governance structures that this study articulates (or governance system although not in the sense of system theorists as per section 2.1).

As per López-Calva and Zhou, law serves three governance roles in modern states.<sup>148</sup> The first role is that of ordering behavior of individuals, organizations, or states. The second role is to order power through establishing and distributing legal authority and power, or ways of using legal authority and power, among state actors, between a state and its citizens, between states, and between states and regional and international organizations. The third role is to “order contestation by providing the substantive and procedural tools needed to promote accountability, resolve disputes peacefully, and change the rules.”<sup>149</sup> The first two roles are relevant to the governance structures while the third role is relevant to the governance processes (and beyond). The first role of ordering behavior is often recorded by regulation and policies, reflecting the instrumental side of governance. Law as an instrument of governance sets out rules about how individuals, organizations and companies, and states shall behave, in regulations and policies, conventions and treaties and as customary law. The instruments are numerous, reflecting numerous partitions of governance.

The second role of ordering (legal) authority and power is recorded in mandates, reflecting the institutional sides of governance. Mandates included mandates to a ministry, a directorate, or a regional or international organization, set out in statutes or other foundational documents, instructions, regulations, conventions, if not implicitly through the establishment of an institution or organization. These countless mandates further reflect countless partitions of governance. The mandates that set out the institutional and instrumental structure of governance reflect legal authority or power. Legal power is vested in states as sovereign units within which peoples are organized. By the law of sovereignty, states have terrestrial and marine entitlements and legal and jurisdictional power over territories and waters, activities, and citizens.<sup>150</sup> The formal legal authority of states forms the basis for (re)distributing access to resources and marine spaces to private persons, economic entities, and local communities (under national law). The legal governance structure perspectives are different from perspectives focusing on, for example, economy, relations, or (real) power (such as military power, power of size, power of alliances) and interests, as well as those focusing on interactions. Moreover, governance approaches focusing on multi-level management perspectives or multiple actors may marginalize or exclude the legal power perspective, as it is characteristic of one legally empowered kind of actors (sovereign states), in this sense state-centric. Nonetheless, also from a governance perspective, “there is general agreement that

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<sup>146</sup> Kooiman, *Governing as Governance.*, p. 123. Kooiman sees hierarchical governance as opposed to the modes of self-governance and co-governance.

<sup>147</sup> On soft and hard law, see for example, Shelton, "Soft law.", Rajamani, "The 2015 Paris Agreement: Interplay Between Hard, Soft and Non-Obligations."

<sup>148</sup> López-Calva and Zhou, *Governance and the law.*, p. 83. They conceptualize these roles for national law, yet this study has expanded on the roles' description to capture international law.

<sup>149</sup> López-Calva and Zhou, *Governance and the law.*, p. 83.

<sup>150</sup> "United Nations Convention on the Law of the Sea of 10 December 1982, 1833 *U.N.T.S.* 3, (UNCLOS) art 2, art 56, and art 77 ", Ian Brownlie, *Principles of public international law*, 7th ed. (Oxford: Oxford University Press, 2008). p. 289., describes the principles of state jurisdiction over territory and the permanent population.



authority and steering are its two core components."<sup>151</sup> Therefore, law ordering legal authority is a key perspective to the institutional and instrumental structures of governance.

The possibilities and options vested in the legal authority perspective extends beyond the existing institutions and instruments. While existing institutions and instruments reflect formalization (if not cementation) of political choices as per current and previous choices, the legal authority does empower relevant actors to create new institutions and instruments, to redesign or transform existing structures, and to phase out or wind-up institutions and instruments (and what they manage or regulate) as they see fit. The practical possibilities of powering change are certainly a question. Once created, structures of institutions and instruments may not easily be revised (such as to reflect different partitioning). These institutions and instruments reflect self-imposed restrictions on multiple states and rules of the game for multiple actors. Further, existing partitioning and fine regulation of topics adhering to that partitioning add to the challenge. While in the last decade new ocean paradigms have been launched in policies and research,<sup>152</sup> including maritime security, blue economy, ocean health, and ocean justice, the legal instruments and institutions at large remains unchanged. Some recent international exceptions are the Kunming-Montreal Global Biodiversity Framework,<sup>153</sup> the High Seas Treaty,<sup>154</sup> and the High-Level Panel for Sustainable Ocean Economy.<sup>155</sup>

The question is now how law is relevant to governance processes, which will be explained in brief. The third role of ordering contestation is reflected, amongst other things, in the governance process that provides for the dynamism of law. The third role of ordering contestation derives from the nature of law as a device providing terminology, structure, and formality for naming and ordering things and for challenging and arguing for and against this order.<sup>156</sup> As per López-Calva and Zhou,

Law increasingly provides the common language for, and demarcates the arenas of contest among, very different contenders: citizens and states; multinational corporations and indigenous people; states, citizens, and international organizations.<sup>157</sup>

Law plays a constitutive or foundational role of defining many governance processes.<sup>158</sup> Through establishing the mandates for state actors (the second role of law for governance), law would explicate the separation of state power, the responsibilities of different agencies and government branches, and their role in the policymaking and implementation or translation process. The mandate provided will impact on the governance processes in which they are involved, whether they are formal processes adhering to the logic of the government partitioning or whether they are diverging from this logic formally or informally, legally, or de facto. Law-making processes are one kind of governance processes setting out the rules about making rules, oftentimes subject to constitutions. Section 5.2 sets out the ideals and standards that law-making processes are designed to meet.

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<sup>151</sup> Biermann et al., "Global Goal Setting for Improving National Governance and Policy.", p. 75.

<sup>152</sup> Christian Bueger and Felix Mallin, "The Ocean Revolution: A New Framework for Cross-Paradigmatic Ocean Policy and Research," *SSRN Electronic Journal* (01/01 2022), <https://doi.org/10.2139/ssrn.4014064>.

<sup>153</sup> UN/CBD/COP/15/L25, "Kunming-Montreal Global Biodiversity Framework."

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<sup>155</sup> "About the Ocean Panel <https://oceanpanel.org/about-ocean-panel/>," World Resources Institute, 2023.

<sup>156</sup> López-Calva and Zhou, *Governance and the law.*, p. 83.

<sup>157</sup> López-Calva and Zhou, *Governance and the law.*, p. 94.

<sup>158</sup> López-Calva and Zhou, *Governance and the law.*, p. 91.

Legal requirements may exist for diverse kinds of governance processes or phases of it. Requirements to governance processes could appoint someone responsible for conducting the process in a certain way or at a certain frequency. The OSPAR Convention requires assessments of the quality status of the marine environment of the Northeast Atlantic to be made at regular intervals.<sup>159</sup> Another example relevant to the knowledge gathering and analysis phase is the Espoo Convention that requires environmental impacts to be assessed prior to the planning of certain activities.<sup>160</sup> Relevant to the first process phase, duties to gather knowledge (such as by requiring environmental impact assessments as per the Espoo Convention example, or assessments of economic or administrative character) as well as providing legal authority to gather knowledge exist. Law may grant rights to obtain or obligations to produce knowledge, such as environmental information, or to consult with certain stakeholders (such as local communities, indigenous peoples, and economic actors). With respect to the decision-making phase, law may provide authority or mandate to design and adopt policies and regulations, tools and strategies, including strategic and individual decision-making. These aspects concern the substance of governance instruments, which section 5.3 will elaborate. Legal requirements could also apply to the implementation (or translation) or monitoring phase.

Relevant to some governance processes, law brings in a different phase – the enforcement phase (which could also be perceived as a process on its own – the enforcement process). Institutions and instruments of legal enforcement (such as courts) facilitate that certain actors (such as economic actors or indigenous peoples) under certain conditions may pursue certain claims (such as entitlement to areas or ecosystem components/resources) related to their legal position (such as entitlement to a license or right of non-infringement). These institutions and instruments may ensure that certain decisions meet certain standards and that legal positions are not hampered unless they follow certain procedures. The enforcement mechanism therefore strengthens existing legal positions.

Changing existing legal positions through law-making and law-revisioning process is demanding and time-consuming and may meet resistance from politicians, stakeholders, and those privileged by the existing legal positions. Therefore, revision and adaptation of instruments and decisions, which have or may have implications on the legal positions of legal and natural persons, may be demanding, time-consuming, or hindered.

## 5.2 Relevance of law to ideals and standards of governance

Now the relevance of law will be approached from the perspective of governance ideals and standards, asking how law is relevant to the ideals and standards of governance. Law is often associated with certain ideals and standards.

As per section 5.1 law-making processes are a particular kind of governance processes. Law-making processes are designed to include procedures “guaranteeing that the law corresponds to a broad social consensus on basic values”.<sup>161</sup> Law-making processes are further designed to meet certain ideals and standards including thoroughness and transparency. As law-making processes often involve consulting stakeholders and parliamentary adoption, governance instruments and decisions formalized in law meet certain standards of participatory processes and legitimacy. These ideals and standards could, at least in

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<sup>159</sup> Art 6 of the OSPAR Convention, reference to be completed.

<sup>160</sup> ESPOO Convention, reference to be completed.

<sup>161</sup> Francis Fukuyama, "Transitions to the Rule of Law," *Journal of democracy* 21, no. 1 (2010), <https://doi.org/10.1353/jod.0.0145>, p. 34.

principle, also be designed and built into governance processes resulting in something different than a legal instrument, such as a plan, policy, or strategic decision.

Further, law is also strongly associated with some other ideals and standards, such as predictability, finality, and enforceability that are less relevant to policies and strategies. The concept of “rule of law” captures such ideals and standards. Fukuyama conceptualize the rule of law not to be bound by a specific substantive understanding, but “as a set of rules of behavior, reflecting a broad consensus within the society, that is binding on even the most powerful political actors.”<sup>162</sup> As per López-Calva and Zhou, the rule of law “at its core requires that government officials and citizens be bound by and act consistently with the law.”<sup>163</sup> Teitel similarly understands it as adherence to settled laws.<sup>164</sup> This bindingness and adherence to law is what paves the way for predictability, finality, and enforceability.

Versions of the rule of law that has moved beyond predictability, finality, and enforceability to focus on property rights and contract enforcement, or the modern Western understanding of human rights, which includes equal rights for women and racial and ethnic minorities.<sup>165</sup> A report of the UN Secretary-General on the rule of law and transitional justice in conflict and post-conflict societies uses a definition that includes such elements:

For the United Nations, the rule of law refers to a principle of governance in which all persons, institutions and entities, public and private, including the State itself, are accountable to laws that are publicly promulgated, equally enforced and independently adjudicated, and which are consistent with international human rights norms and standards. It requires, as well, measures to ensure adherence to the principles of supremacy of law, equality before the law, accountability to the law, fairness in the application of the law, separation of powers, participation in decision-making, legal certainty, avoidance of arbitrariness and procedural and legal transparency.<sup>166</sup>

This definition of rule of law may trigger many important questions to ocean governance, such as whether current structures, processes or instruments of ocean governance are fair, equal, and just.<sup>167</sup> In literature on ocean governance, some use the rule of law seemingly in the procedural sense, focusing on predictability.<sup>168</sup>

Formalizing the outcome of governance processes as law has certain benefits, relevant to ocean governance (and beyond) as captured by the rule of law concept. These include avoiding arbitrariness and ensuring that governance is transparent or legitimate. The entrenchment of law, setting strong requirements to changing it, may provide credibility over time by guarding against shifts in preferences.<sup>169</sup> Like any ideal, formalization in law may also be perceived as disadvantageous. Once adopted, law could

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<sup>162</sup> Francis Fukuyama, *Political Order and Political Decay : From the Industrial Revolution to the Globalization of Democracy* (Profile Books, 2014)., p. 19.

<sup>163</sup> López-Calva and Zhou, *Governance and the law.*, p. 83.

<sup>164</sup> Ruti Teitel, "Transitional Jurisprudence: The Role of Law in Political Transformation," *Yale L.J.* 106 (1996).

<sup>165</sup> Fukuyama, *Political Order and Political Decay : From the Industrial Revolution to the Globalization of Democracy.*

<sup>166</sup> UN Secretary-General S/2004/616, *The rule of law and transitional justice in conflict and post-conflict societies*, United Nations (New York, USA, 2004).

<sup>167</sup> Or the normative limits of legitimate political change in the midst of ecological transformation, inspired by Teitel, "Transitional Jurisprudence: The Role of Law in Political Transformation.", p. 2018.

<sup>168</sup> Platjouw and Sojininen, "Reconciling the rule of law with adaptive regulation of marine ecosystems – Challenges and opportunities for the Arctic and beyond."

<sup>169</sup> López-Calva and Zhou, *Governance and the law.*

be demanding to change, perceived as cementation of choices (which is only disadvantageous so long as what is cemented in law is deemed disadvantageous), and institutional arrangements may develop around them, making them even more demanding to change. While legal instruments may attempt to grasp today what is relevant tomorrow, unforeseen circumstances and consequences and changing political preferences may lead to a desire for change, of processes, of partitioning, of legal instruments, or of decisions based on them. For these and other reasons, law will have to strike a balance between the concerns of inflexibility (for reasons of accountability, predictability, ensure adherence and finality, avoid arbitrariness and more) and concerns of flexibility (providing margin of appreciation, discrepancy, delegation of powers, responsiveness, or adaptivity). Inevitably, these sets of concerns of inflexibility and flexibility are contradictory. Yet, as per Bohman, "(a)daptive governance measures in law does not have to entail unpredictable laws or uncertainty."<sup>170</sup> Further, as per Platjouw and Soininen

good examples [exist] that allow reconciling different rule of law values, including coherence, predictability, stability and legal certainty, public participation, and accountability, with the need for adaptive regulation and governance. Adaptivity may be built into the legal design of aquaculture or fisheries regulation, adaptivity may be fostered through iterative planning and licensing systems, and also the law-making process itself may be adaptive.<sup>171</sup>

Thus, Platjouw and Soininen argue that rule of law and adaptivity could be reconciled. However, this study has highlighted how a claim for adaptivity should be nuanced in multiple ways by considering the complexity of competing and potentially conflicting scientific and non-scientific inputs relevant to policies and regulation, the multiple policy and regulatory alternatives that scientific evidence may give rise to, the demand for political anchoring or legitimacy of changes or adaptations to policies or regulations, and beyond. How the view of this study on the diverse yet limited roles of scientific input could be reconciled with (selected) rule of law ideals and standards (predictability) remains to be investigated. If one imagines scientific inputs such as increased eutrophication in a marine area, which policy options could it give rise to? Restrict nearby conventional agriculture, or nearby conventional aquaculture, or improve nearby waste-water treatment facilities? How and to what extent? Building into the legal design adaptive capacity to handle such situation is at best challenging, as agriculture, aquaculture, and wastewater in most cases would be regulated in different instruments. Moreover, this kind of adaptive thinking has the capacity to blur or overlook the indirect drivers of problems. For example, perhaps ocean warming is enhancing the effects of eutrophication,<sup>172</sup> to which uncertainty is attached, and which raises the question of which activities or behavior leads to ocean warming.

A related question to the ideals of rule of law, in the meaning of legal certainty and predictability, is in whose interests it is to have legal certainty (or, at the opposite end, flexibility). Some examples of economic actors promoting legal certainty or predictability are fishers relying on a quota, having invested

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<sup>170</sup> Brita Bohman, "Regulatory control of adaptive fisheries: Reflections on the implementation of the landing obligation in the EU common fisheries policy," *Marine Policy* 110 (2019/12/01/ 2019), <https://doi.org/https://doi.org/10.1016/j.marpol.2019.103557>, <https://www.sciencedirect.com/science/article/pii/S0308597X1930329X>.

<sup>171</sup> Platjouw and Soininen, "Reconciling the rule of law with adaptive regulation of marine ecosystems – Challenges and opportunities for the Arctic and beyond.", p. 3.

<sup>172</sup> Jessica Pazzaglia et al., "Does Warming Enhance the Effects of Eutrophication in the Seagrass *Posidonia oceanica*?", Original Research, *Frontiers in Marine Science* 7 (2020-December-03 2020), <https://doi.org/10.3389/fmars.2020.564805>, <https://www.frontiersin.org/articles/10.3389/fmars.2020.564805>.

in vessel and gear with the quota in mind, or investors planning for investments in low trophic species harvest and production. These actors wish to limit their economic risk, which legal certainty and predictability could provide for. Yet, other actors and interest (including other interests of these fishers and investors) could equally benefit from legal certainty and predictability to limit environmental risk, the risk that the functions of the ecosystems are maintained to enable resource outtake. In theory, legal certainty and predictability could, on one hand, serve the interest of economic entities in facilitating a steady economic regime. On the other hand, legal certainty and predictability could, at least in theory, serve environmental interests, for example, ensuring the protection of ocean health that the fishers and investors (and beyond) depend on. Yet, as current status trends of the marine environment clearly indicate its continuous deterioration, one could plausibly argue that the current environmental protection in law remains theoretical. This raises the question of the law as written vs. the law as right, which could also be framed as a question of rule of law,<sup>173</sup> which, however, is out of scope of this study.

### 5.3 Relevance of law to substance of governance instruments

As per section 3.3, the substantive instruments of governance are policies and regulations. From a perspective of law that embraces any formal law, including soft-law instruments, policies and regulations could both be labelled as law. Therefore, as per the undertaken governance perspective, the substance of governance instrument aligns with an approach to law embracing soft- and hard-law instruments. Accordingly, the instruments of governance equals instruments of law (under the soft-law approach) and the substance of laws could be mapped using each of the approaches to the substance of governance as per section 3.3 (where; what and how; who; why). Certainly, investigations of governance instruments could also go beyond studying legal instruments. For example, Rudd et al. investigates "Ocean Ecosystem-Based Management Mandates and Implementation in the North Atlantic," by using a multi-level approach studying political mandate, legislative structure, and non-regulatory implementing policy.<sup>174</sup>

While the governance perspective resembles soft-law approaches, some governance and research questions rather attract a hard-law approach. Notably in ocean governance, permission to interfere with ecosystems (such as emission permits, resource use and outtake, new constructions, and area use) would often require a (hard) legal basis, as would distribution of and obtaining individual rights to ecosystem components. This explains the usefulness of a (hard) law focus in ocean governance. One may ask why interference with ecosystems requires a hard legal basis. One explanation is that by the logic of sovereignty, territorial and jurisdictional entitlements are distributed between states. Further, through the social contract between a state and its citizens, the state is responsible for and is granted authority to dispose over and interfere with ecosystems, whether to be conducted by public entities or private companies. The details of how this authority is disposed of are normally regulated by (hard) law.

Which legal instruments that are relevant for ecosystem and ocean governance depend on how the substance-matter of ocean governance is perceived. If determined by their geographical scope of application (where), international and national legal instruments would often define the geographical scope to which they apply. The Law of the Sea Convention is a key international legal instrument that divides the ocean into different zones and sets out states' rights and obligations relevant to each

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<sup>173</sup> Teitel, "Transitional Jurisprudence: The Role of Law in Political Transformation."

<sup>174</sup> Murray A. Rudd et al., "Ocean Ecosystem-Based Management Mandates and Implementation in the North Atlantic," Original Research, *Frontiers in Marine Science* 5 (2018-December-14 2018), <https://doi.org/10.3389/fmars.2018.00485>, <https://www.frontiersin.org/article/10.3389/fmars.2018.00485>.

geographical zone.<sup>175</sup> Other international legal instruments applicable in ocean areas include the High Seas Treaty.<sup>176</sup> It applies to the high seas, the ocean areas beyond national jurisdiction. Some national legal instruments applicable in ocean areas are the Marine Management Plans of Norway and the Marine Resources Act of Norway.<sup>177</sup> The geographical approach reflects the area that the convention seeks to protect but does not necessarily regulate those activities against which an area needs protection.

Under the “what and how” approach as per section 3.3, which legal instruments that are relevant to ocean governance depend on the perception of ocean governance. If it is perceived as the management of maritime activities, the legal instruments of relevance are those that regulate existing or emerging activities, such as conventions and regulations of shipping, fishing, aquaculture, or offshore renewable energy. If ocean governance is perceived as those activities that interfere with marine ecosystems (which these ecosystems need protection against), a delimitation of relevant instruments is demanded, as most activities (maritime and land-based) do interfere with marine ecosystems (such as inducing some pollution, waste, or GHG emissions). If the criteria or approach of selection reflects the main threats to the global marine environment, the instruments relevant to overfishing, increased use of space, climate change, and non-native species (which the IPBES 2019 report identify as the five main threats), could be relevant. If the selection focuses on local pressures, the relevant legal instruments will depend on what these local pressures are. The selection could also capture certain legal instruments that may shed light on how international or national law targets global, regional, national, and local pressures. Further, the selection could focus on indirect drivers common to all or most pressures, such as, as per the IPBES report on Global Biodiversity and Ecosystem Services, “a variety of economic, political and social factors, including global trade and the spatial decoupling of production from consumption”.<sup>178</sup>

Under the “who” approach that targets relevant actors of ocean governance and demands to those actors, different actors attract different legal instruments. Coastal states’ rights and obligations are, for example, set out in the Law of the Sea Convention.<sup>179</sup> Regulation of coastal communities is subject to any national or local regulation of such communities. Economic actors, as maritime industries are often organized, are regulated by corporate legislation of various countries.

The “why” approach targets the purpose or societal objective of a governance instrument. While policies, plans, and strategies may discuss societal objectives in more detail, legal instruments are often characterized by providing short formulations of purpose or objectives in the legal text (while the non-legally binding preamble or *travaux préparatoire* may elaborate on the purposes and objectives). The regulation of behavior, authority, or contestation may rarely be derived by these objectives. The purposes

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<sup>175</sup> "United Nations Convention on the Law of the Sea of 10 December 1982, 1833 *U.N.T.S.* 3, (UNCLOS)."

<sup>176</sup> *Reference to be updated.*

[https://www.un.org/bbnj/sites/www.un.org/bbnj/files/draft\\_agreement\\_advanced\\_unedited\\_for\\_posting\\_v1.pdf](https://www.un.org/bbnj/sites/www.un.org/bbnj/files/draft_agreement_advanced_unedited_for_posting_v1.pdf)

<sup>177</sup> Integrated Management Plan for the Norwegian Marine Areas. Report nr. 20 to the Storting, (2019-2020); Marine Resources Act, "Lov om forvaltning av viltlevende marine ressursar (havressurslova) LOV-2008-06-06-37," (Oslo: Lovdata, 2008).

<sup>178</sup> Díaz et al., *IPBES 2019: Summary for policymakers of the global assessment report on biodiversity and ecosystem services (summary for policy makers)*. IPBES Plenary at its seventh session (IPBES 7, Paris, 2019).

<sup>179</sup> "United Nations Convention on the Law of the Sea of 10 December 1982, 1833 *U.N.T.S.* 3, (UNCLOS)."

and objectives of legal instruments are nonetheless relevant to the interpretation of other provisions that regulate behavior, authority, and contestation.<sup>180</sup>

## 6. Lessons offered to Ocean Governance Research

### 6.1 Governance and its interfaces

Having explored a governance perspective comprising different components and how science and law relate to those components, the time has come to make some overall observations of the approach and draw further lessons relevant to ocean governance research. This study has shown how different theoretical approaches to governance exist, to bring awareness to them and to illustrate how different governance approaches may be associated with different theories and may suit different tasks or research questions, depending on, for example, whether one aims to investigate at a systems level or focus on components of a system. Identifying and articulating a governance perspective has further provided a generic framework into which components of governance may belong. As such framework, the governance perspective could be used as a tool to clarify some common ocean governance issues. As shown, structural risks and management process phases are no different if the matter is terrestrial or marine, if the matter concerns facilitating defense interests, or managing taxation or education. Further, the processes and structural risks are in theory no different if the governance unit is an organization, a state, a public entity, or a private company.<sup>181</sup> Promoting generic characteristics and risks of any systems as solutions to or ways forward for ocean governance remains an incomplete exercise. While these inherent structural risks and processes of generic governance are also relevant to ocean governance, to call, for example, for coordination or participatory processes without justifying or clarifying what it is that we need to coordinate and why; why coordination is appropriate at the account of other ways of enhancing integration in the ocean governance case at hand; and to what extent coordination will fix the problem remains an incomplete exercise.

Arguably, much research on ocean governance focuses on (phases of) governance processes, governance structures, and ideals and standards. One intention of the undertaken governance perspective has been to investigate the substance of ocean governance, as provided for through a process of elimination of structures and processes and ideals and standards generic to governance. Unpacking the substantive section has been an exploratory undertaking. It remains to see if the approach has carved out a research space: the substance of ocean governance.

Unpacking a governance perspective has facilitated the mapping of what in certain respects is a nuanced relationship between governance, science, and law. The governance-science relationship captures how science may contribute to enlightenment, change of values, problem orientation, and policy and regulatory design and evaluation, yet provides only one of many concerns informing governance. The governance-law relationship involves how law provides one vital governance structure (that of formal legal authority); how law defines and is adopted by governance processes; how law is reflected in ideals and standards of governance; and how law may equal governance instruments.

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<sup>180</sup> For international treaties, this is reflected in art 31 of the United Nations, "Vienna Convention on the Law of Treaties." Treaty Series 1155 (May): 331," (1969). For national regulation, consult the doctrinal method of each state.

<sup>181</sup> Quist and Hellström, "Process Management as a Contagious Idea: A Contribution to Røvik's Virus-Inspired Theory.", p. 902.

## 6.2 Cross-sectoral approaches and partitioning

One assumption of the chosen governance perspective is that governance demands partition. This assumption challenges calls for integration, and for holistic, and cross-sectoral approaches. How do these calls consider non-partition or redesigned partition of governance institutions, processes, and instruments and for which purposes? Do they ask for less partition or redesigned partition, in merit or structure or both?

One common demand to practiced ocean governance by ocean governance scholarship is the need for cross-sectoral management of marine activities. Now how does this hypothesis resonate with the partitioning imperative? These sectors have some common interfaces, such as operating at sea, which justifies some kind of integration, coordination, or consultation, to the extent operations overlap in time and space, to account for the interests of different activities. Yet, on the other hand, there are clear differences between marine sectors. For example, it appears inappropriate to co-manage the issues of how to distribute cod quotas between countries, which tourists a country would want to attract, and which offshore renewable energy sources to prioritize. Bilateral distribution of cod quotas could, for example, more appropriately be co-managed with other fisheries or bilateral affairs between those two countries. Which tourists a country wants to attract could be co-planned with which infrastructure the country wants to facilitate, whether airports, cruise ports, or train tracks. Which offshore renewable energy source to prioritize could appropriately be dealt with in combination with the issue of which mix of energy sources, which energy infrastructure and which energy consumption a country wants to facilitate. Thus, cross-sectoral management of tourism, fisheries, offshore energy production, and other marine sectors is appropriate for some purposes but not for all. This paper suggests that the calls for cross-sectoral, integrated, or holistic approaches should be justified, and their purposes specified.

One common purpose to justify cross-sectoral approaches is that it could increase attention to cumulative environmental impacts.<sup>182</sup> The impacts on the environment of the different marine sectors such as fisheries, shipping, tourism, and other marine sectors, throughout their life cycles, would include local waste, physical disturbance, and use of space impacts (at sea and on shore), resource outtake, global pollution, and carbon dioxide (CO<sub>2</sub>) impacts. Thus, the impacts vary in scale and nature, some traceable at sea, some on land, and some only in aggregation (such as CO<sub>2</sub>), if traceable at all. These impacts could be perceived as a result of the demand for the activity (such as fisheries meeting a demand for food), of the regulation of fisheries throughout their lifecycle, or of the available substitutional goods and services (such as other sources of food and employment). Considering these circumstances, the question remains if any of these impacts, such as from fisheries, would be appropriately governed in combination with impacts from shipping, tourism, and other marine sectors. While cumulative environmental impacts may be necessary to inform about the environmental status of a certain marine space, it does not necessarily mean that the activities operating in a certain marine area should be governed in integration.

These cross-sectoral examples illustrate that while partitioning is necessary, how-to partition is demanding as inherent limitations exist in any approach. Ideally and theoretically speaking, plural cross-cutting perspectives could be useful, as each would be limited, even those deeming themselves holistic,

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<sup>182</sup> For example, Charles, "People, oceans and scale: governance, livelihoods and climate change adaptation in marine social-ecological systems."; Kelly et al., "Investigating options on how to address cumulative impacts in marine spatial planning."; Josh Martin, "A Transnational Law of the Sea," *Chicago journal of international law* 21, no. 2 (2021). *check*



integrated, coherent, or cross-sectoral. What is integrated from one perspective, such as managing in combination activities using the same marine space, may not be integrated from the perspective of environmental impacts of one sector. Practically speaking, plural cross-cutting policies and regulations, strategies and tools could be envisioned, however cross-cutting institutional structures may conflict with a concern for structural integration as well as the desire of lean institutions and organizations.

On this background one may ask of the relevance of integration. Certainly, naming a perspective integrative (or holistic or coherent) does not account for the inherent limitations existing in any approach.<sup>183</sup> In the scholarship on ocean governance, calls for integration are frequent. I suggest that integration should shift its focus to outcome. The aggregated or “integrated” outcome of current management actions, for example, as concerns the marine environment, is currently seen in status reports which indicate trends. These status reports call for action, in terms of changes to the outcome. Integration of, for example, processes or structures may not necessarily lead to a change in outcome, as efforts, for example, could be neatly coordinated, yet be insufficient in aggregation. This study encourages future research to focus less on process and structure and ideals and standards and more on substance: to achieve integration in desired outcome.

### 6.3 Science-based decision-making

Having articulated how science may contribute to enlightenment, change of values, problem orientation, and policy and regulatory design and evaluation, yet provides only one of many concerns informing governance, the question is now what “science-based” decision-making is. As per section 4, science informs decision-making in multiple ways. Further, scientific input may substantiate a number of different policy options or political positions and is subject to interpretations both at giving-advice end and the receiving-advice end. Thus, one should carefully consider not to overestimate the role of marine science and underestimate the range of governance options it may give rise to. Nonetheless, aggregations of multiple environmental scientific assessments, compared to individual inputs, may indicate trends that may give rise to taking measures, yet the many options and details of which would still be a matter of debate.

The question is now what this theoretical framework has to offer to science-based decision-making. I wonder if sometimes the calls for science-based decision-making are actually calls for prioritizing marine environmental scientific input more in the decision-making. In my view, such calls should preferably be clarified as such, and not framed as calls for “neutral” scientific inputs, regardless of whether the input furthers economic, social, or environmental interests. On the one hand, persuasive arguments exist to prioritize environmental interest. On the other hand, framing such arguments as “neutral” (science), points to a distinct set of questions, such as to the extent the decision-making is not science-based, fact-based (or fake) or based on misunderstandings, or which interests are furthered by science, and which are not. Calls for science-based decision-making should clarify what they mean by this, whether to prioritize environmental concerns, to avoid decision-making based on false assumptions or misunderstandings, or something else. Each of these alternative interpretations points to different problems.

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<sup>183</sup> Schøning, "A Critical Assessment of the Contribution of Integrated Ocean Management to Protection of the Marine Environment."

One interpretation of “science-based decision-making,” that prioritizes environmental interests, is that it indicates that decision-making should consider recent or updated information about the environment. In my view, this interpretation is closely related to calls for adaptive governance, which entails that governance should continuously adapt in response to new or updated scientific inputs (on the (marine) environment). As per sections 3 and 4, decision-making happens against streams of influences and inputs, some scientific some non-scientific. How a researcher or the law should qualify which of these influences and inputs that should trigger adaptation and which kind of adaptation is at best challenging. Rather, if the calls essentially concern prioritizing environmental interests, alternative ways for governance to prioritize environmental concerns should be a topic of investigation.

#### 6.4 Adaptation or responsiveness

The reality of responsive decision-making is challenged by the fact that human interference with the marine environment happens at multiple scales. The many problems of the (marine) environment are not controllable by any single decision-maker.<sup>184</sup> The impact on an area or an ecosystem component results from a set of pressures or stressors (climate change, local and global pollution, area use), some local and some global. This means that what to respond to, how to respond, and who should respond will often be unclear.

Another dimension or scale complicating the possibility of adaptation or responsiveness is time. Marine science can be future-oriented or predictive about the future (such as scenario-based research or future studies), yet much marine science concerns present time observations or gathering of data. The timespan from when data is gathered to the research is compiled, processed, or analyzed to a shareable format (such as published) may span from days to years. Thus, the science to which governance should adapt (as per the calls for adaptive governance) is oftentimes yesterday’s news. Adding to the time lapse, governance responses take time to adopt and put to practice, and any desired effect may further take time to emerge. Therefore, timespan complicates responsive or adaptive governance. Arguably, adaptation in the face of this multi-impact and multi-scale reality over which no single decision-maker has control may not always reflect an appropriate frame, except in the cases where it is clear what to adapt to and how to adapt. Calls for adaptive management and governance could preferably reflect these nuances.

Insofar as existing knowledge on the status of the marine ecosystems arguably supports a range of existing different political positions, the question remains which input or influences that triggers adaptation of governance. For a simplified example, under a conservative government, will new knowledge that the ocean temperature keeps increasing trigger adaptation of those strategies that a green party would have adopted in the first place based on previous measurements? And how would a green party government adapt? The extent to which a policy or regulation sets out that it should adapt in face of, for example, increasing ocean temperatures or red listing of a species, or if a policy or regulation already accounts for an increasing ocean temperature, how to adapt is somewhat clarified up front. If, however, the policy or

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<sup>184</sup> “The production of energy, the exploitation of resources, the transformation into goods and services, and the consumption thereof occur at a global scale, as resources, production facilities and end consumers often reside on each continent (...) Throughout this process, waste products are created. Further, the capacity of the biosphere to absorb or detoxify the substances resulting from these global processes is also global in scale,” Schøning, “A Critical Assessment of the Contribution of Integrated Ocean Management to Protection of the Marine Environment.”, p. 43; Burger et al., “The Macroecology of Sustainability.”, p. 4.

regulation does not mention the change of circumstance that new scientific evidence reflects, whether unforeseen or not planned for, to adapt does not trigger a specific policy option. The change of circumstance could be used as an argument to adapt by changing the fundamental design of existing policies and regulations, which likely invoke a particular decision-making procedure. The change of circumstance could also be used as an argument to adapt by changing individual decisions in terms of such policy or regulation, such as strengthening requirements to licenses to operate or relieving restrictions applicable to a marine protected area or phasing out certain harmful activities. Such adaptation could be within the margin of appreciation of the relevant authority yet could also interfere with the rights and obligations of actors, which could pose a barrier or require certain procedures to be made. Further, to exemplify from a the end of governance options, which input or influence (including scientific evidence) would invoke a set of international treaties facilitating circular economy or revise the regulatory devised objectives and priorities of economic actors?

Ultimately, whether the adaptive frame is appropriate depends on the problem perception underlying calls for adaptation – to what perceived reality it is fit. If adaptivity is perceived as “something must change” then the adaptivity frame is certainly relevant to any undesirable reality yet begs for more specifications. If the perceived undesired reality is constantly changing in many directions (such as climate variabilities or the weather), it could attract adaptation. If, however, the perceived reality is rather that of a clear trend in one direction (such as the case is with climate change, albeit a product of climate variations), the situation is different. In the case of climate change, sufficient policy or regulatory responses must be adopted until trends have turned, thus it could rather be a question of sufficiency than adaptivity (although how to reduce emissions and which emissions to reduce is still difficult). While climate change, in this context, is an illustrative and simple example, transferring it to the reality of multiple environmental problems threatening the marine environment complicates matters. Yet global status reports on the marine environment communicate the harsh trend that it is continuing to deteriorate. One alternative response to this reality is to reduce environmental impacts to the extent possible (the extent of which certainly is a matter of debate). If or when the deteriorating trends are shifting back and forth, it may attract adaptation.

Some scholars separate technical problems from adaptive problems.<sup>185</sup> The problems and objectives of ocean governance could be perceived as capturing both problem types. While technical problems can be successfully addressed with facts, information, knowledge, the use of authority, and subject matter expertise, adaptive problems require confronting the status quo to change behavior, practices, priorities, and beliefs, to which we have been deeply committed. The approach to adaptive problems does not necessarily attract adaptivity but rather exploratory approaches that focuses on progress in outcome. Beyond the progress in outcome, which science to create, develop, or produce to inform adaptive problems similarly attracts an exploratory approach.

#### 6.4 The ecosystem approach in ocean governance

Aligning variants of the ecosystem approach with the approach to governance of this study makes for some reflections relevant to ocean governance. Multiple interpretations of the ecosystem approach exist. Some would highlight certain management process phases (as Kelly et al. cited on p. 19) or presumed

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<sup>185</sup> Ronald A. Heifetz, Alexander Grashow, and Marty Linsky, *The practice of adaptive leadership : tools and tactics for changing your organization and the world* (Boston, Mass: Harvard Business Press, 2009).

structural risks (“integrated management”, as per the Conference of Parties (COP) to the Convention on Biological Diversity (CBD) definition),<sup>186</sup> or certain ideals such as participation.<sup>187</sup> Definitions, principles, and literature on the ecosystem approach frequently refer to the ecosystem approach as capturing integrated management, participatory processes, monitoring, evaluation, and adaptation. As per this framework, these components are generic to any type of governance or management, thus rather than describing aspects of an ecosystem approach, ecosystem governance, or ecosystem-based management, they describe aspects of governance or management. The approach of this framework facilitates asking what remains of substance of the ecosystem approach, when the process phases, the structural risks, and the ideals and standards that is generic to all kinds of governance (including tax issues) are kept outside.

According to the CBD COP Decisions,<sup>188</sup> the ecosystem approach is “a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.”<sup>189</sup> In light of the approach of this study, the first part of this definition could be taken to refer to integrated processes or structures and the second part captures an objective, which reflects one element of substance (“why”).

The Malawi principles serves as another interpretation of the ecosystem approach.<sup>190</sup> In a paper titled “The Ecosystem Approach and the Search for An Objective and Content for the Concept of Holistic Ocean Governance,” Kirk finds that three of these principles concern the decision-making (or governance) process, four of them issues to be taken into consideration in decision-making, and four of them concerns objectives.<sup>191</sup> The latter four plus four could accordingly be considered as aspects of governance substance as per this study.

For the purpose of the OSPAR Convention, the OSPAR Commission has defined the ecosystem approach as:

the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity.<sup>192</sup>

Aligned with this study, this definition includes both structural aspects, an ideal of best available science, and some substantive aspects, including “to identify and take action on influences that are critical to the

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<sup>186</sup> "Convention on Biodiversity COP 5 Decision V/6 ". <https://www.cbd.int/decision/cop/?id=7148>.

<sup>187</sup> For example, Augustin Berghöfer, Heidi Wittmer, and Felix Rauschmayer, "Stakeholder participation in ecosystem-based approaches to fisheries management: A synthesis from European research projects," *Marine policy* 32, no. 2 (2008), <https://doi.org/10.1016/j.marpol.2007.09.014>.

<sup>188</sup> Decisions made by COP under the CBD. For an overview of the COP Decisions, see <https://www.cbd.int/ecosystem/decisions.shtml>. As held by Langlet and Rayfuse, “the definition and principles provided within the CBD regime remain a central articulation of the conceptual ideas of ecosystem-thinking”, Langlet and Rayfuse, "The Ecosystem Approach in Ocean Planning and Governance: An Introduction.", p. 2.

<sup>189</sup> UNEP/CBD/COP/DEC/VII/11.

<sup>190</sup> "Convention on Biodiversity COP 5 Decision V/6 "., section B.

<sup>191</sup> Elizabeth A. Kirk, "The Ecosystem Approach and the Search for An Objective and Content for the Concept of Holistic Ocean Governance," *Ocean Development & International Law* 46, no. 1 (2015), <https://doi.org/10.1080/00908320.2015.988938>.

<sup>192</sup> OSPAR Commission, *Bergen Statement* ([https://www.ospar.org/site/assets/files/36552/bergen\\_statement.pdf](https://www.ospar.org/site/assets/files/36552/bergen_statement.pdf), 2010).

health of ecosystems.” The Arctic Council definition further includes this substantive aspect.<sup>193</sup> Other conceptualizations of the ecosystem approach that include substantive aspects are variants emphasizing “maintenance of ecosystem integrity”<sup>194</sup> or “enable and ensure conservation of ecosystem service and take account of, or minimize, risks/threats to ecosystem function and structure.”<sup>195</sup> These examples of substantive aspects concern actions or interventions (“maintain”, “minimize”, “identify and take action”) combined with a desired outcome. Focusing on these or other substantive aspects of the ecosystem approach is one available venue to unpack or further the substance of the ecosystem approach.

## 6.5 The emerging field of study of ocean governance

This study has arguably demonstrated that ocean governance is emerging as a field of study on its own. It includes topics that are multidisciplinary concerning intertwined knowledge domains and themes, such as governance, science, and law, across the boundaries of traditional disciplines. The literature on ocean governance is vast and scattered across multiple distribution channels, which challenges theory building in this field. This study aims to instigate further discussion on and development of the theory of ocean governance.

The amount of literature produced and the current spotlight on ocean governance practices, such as developing new governance instruments focusing on ocean governance, internationally and nationally, indicates that this emerging field of study may not be a passing trend, but one that has come to stay. Hopefully, some of the future research on ocean governance will focus on exploring and developing the substance or merit of ocean governance, leading to progress in outcome in meeting the objectives of sustainably using and caring for the ocean.

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<sup>193</sup> Arctic Council, *Kiruna Declaration* (<https://pame.is/projects/ecosystem-approach>, 2013).

<sup>194</sup> Common statement by the Helsinki and OSPAR Commissions, *Towards an Ecosystem Approach to the Management of Human Activities*, available at [https://www.ospar.org/site/assets/files/1232/jmm\\_annex05\\_ecosystem\\_approach\\_statement.pdf](https://www.ospar.org/site/assets/files/1232/jmm_annex05_ecosystem_approach_statement.pdf) (2003).

<sup>195</sup> "Convention on Biodiversity COP 7 Decision VII/11".

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