

14. Charting the Deep: An Oxford-Style Debate on the Future of Seabed Governance

‘Self-governance at depth: The international seabed authority and verification culture of the deep sea-mining industry,’ Raphael Deberdt and Cara B. G. James, *Resources Policy* Vol. 89 (2024) (academic article)

‘The current status of deep-sea bed mining governance at the International Seabed Authority,’ Catherine Blanchard, Ellycia Harrould-Kolieb, Emily Jones, and Michelle L. Taylor, *Marine Policy* Vol. 147 (2023) (academic article)



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Self-governance at depth: The international seabed authority and verification culture of the deep-sea mining industry

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Highlights

- The International Seabed Authority is in the last steps of defining a mining code for deep sea mining operations.
- The geography and structure of the DSM industry makes it challenging to establish a verification system.
- The corporations and the ISA are increasingly moving towards self-regulations.
- Recommendations for more independent verification are provided.

Abstract

Deep-sea mining requires the creation of a new set of regulations, mitigation measures, and auditing procedures for the companies operating in this sector. In this article, it is argued that the verification system proposed by the International Seabed Authority, the UN body tasked with policing this industry, fails to respond to the needs for a proactive assessment of environmental impacts. This work proposes that strict, quantitative auditing culture should be re-worked to introduce much needed flexibility to match the fast-paced evolution of deep-sea knowledge. It also highlights some structural limitations of the draft regulations, guidelines, and standards, including vaguely defined terms that could constitute major challenges once the industry enters its production cycle. The current definition of the ISA Mining Code and its related documents promotes a self-regulatory system, where companies operating in the area are wholly responsible for reporting their own adherence to regulations. Based on document analysis, as well as informal exchanges with industry operators, governments, and international organizations, it is found that the bulk of environmental systems knowledge in the mining area has been provided or sponsored by corporate actors, helping them shape the guidelines for the regulations. This self-regulation also extends to the verification process, with few truly independent mechanisms. The article concludes with a proposal of five avenues for improvement, targeting the structures in which verification is envisioned but also the ways in which data is collected.

Introduction

In March 2023, Nauru Ocean Resources Inc. (NORI) submitted data to the International Seabed Authority (ISA) collected through 17 offshore campaigns (The Metals Company, 2023). According to NORI, the data defines resource availability and supports environmental assessment of its deep-sea mining (DSM) activities in the Clarion Clipperton Zone (CCZ) (ibid.). This zone is located in the middle of the Pacific Ocean and contains metal-rich nodules lying on the seabed, at depths of 4–6 km. Since 2012, The Metals Company (TMC), NORI's parent company, has partnered with scientists to gather, analyze, and publicize findings on the deep ocean. Under the auspices of a transition away from fossil fuels, the new mining frontier is on a quest for self-legitimization. This article addresses this process through an analysis of the verification systems at the heart of the industry. This research argues that, as the nature of DSM operations dictates that only the mining operator has physical access to the extractive site, the industry is heading towards the development of one of the most extensive models of self-regulation to date. The implementation of a culture of auditing, relying on technocratic instruments (ISA exploitation regulations, standards, and guidelines), allows companies and regulators to ignore the 'beyond the visible'¹ nature of the

industry. This model largely prevents independent audits and relies almost exclusively on corporate self-definition and self-acceptance of verification (see Fig. 4).

Seabed mining is presented by its supporters as the most sustainable source of metals to power the green transition (Paulikas et al., 2022) and a critical environmental stressor by its opponents (Pinheiro et al., 2023; Frölicher and Jaccard, 2023). The International Energy Agency (IEA) (2021) estimates that by 2040, demand for cobalt will be 21 times higher than in 2020. Similarly, nickel demand will increase 19-fold, and manganese by a factor of 8. These increases are predominantly driven by growth in electric vehicle (EV) sales and coupled demand in batteries. While some researchers argue that increased land-based mining and metal recycling could meet these needs (Olivettim Elsa et al., 2017), most studies focus on supply risks and constraints (Sun et al., 2019; Helbig et al., 2018; Tian et al., 2021). In the context of growing geopolitical tensions and the limited availability of North American and European critical minerals, DSM companies have heralded themselves as responding to both resource criticality and scarcity (Childs, 2020; Pontecorvo, 1974; Probyn, 2023). As the industry releases resource assessments and production timelines, Global North countries have been hesitant to announce their stance on extraction in the deep seas. For example, Canada's 2023 statement on deep-sea mining fell short of rejecting licensing in international waters, instead focusing on "areas under its jurisdiction" (Natural Resources Canada, 2023) but the country recently clarified its position of support for a moratorium (Global Affairs Canada, 2023). As of this writing, countries advocate for bans (e.g. France), moratoriums (e.g. United Kingdom and Mexico) or a precautionary pause (e.g. Brazil and Chile) (Deep Sea Conservation Coalition n.d.a). Aside from government statements, several large end manufacturers such as Google and BMW have also shown their hand on the issue by pledging a moratorium on using DSM-sourced materials, forgoing them from their supply chains until sufficient information becomes available to endorse their environmental credibility (Deep Sea Conservation Coalition n.d.b).

DSM is not a new endeavor. In 1997, a small Canadian company, Nautilus Minerals, began exploring the Bismarck Sea within the territorial waters of Papua New Guinea. In 2011, the company received a Mining Lease to mine the Solwara I area, located at a water depth of around 1600 m (Filer and Gabriel, 2018; Steiner, 2009). The extraction never occurred, and Nautilus Minerals filed for bankruptcy in 2019. DeepGreen Metals, founded in 2011, inherited some of Nautilus Minerals' expertise (Willaert, 2021) through the hiring of some of its former team, including CEO Gerard Barron. The company rebranded as TMC in 2021 (ibid.), the year of its (catastrophic) debut on NASDAQ, where it has since lost more than 95 percent of its value.² At a similar time, other companies sprang up in Belgium (Global Sea Minerals Resources, GSR) and England (UK Seabed Resources, UKSR³), and countries around the world started exploring the feasibility of deep-sea extraction. This article builds on findings provided by the whole ecosystem of deep-sea mining

organizations but relies significantly on the strategy adopted by the most visible player, TMC.

Polymetallic (manganese) nodules range in size from around 5–20 cm, are generally of flattened spherical shape, and are found lying freely on the seabed of ocean abyssal plains around the world. The CCZ is considered to contain the highest abundance of this deposit type, with ISA modeling of sample data giving a conservative estimate of 20–30 billion tons of high-grade polymetallic nodules across the 4 million km² surveyed.⁴ To put that in perspective, this area alone is forecast to contain 3–4 times the total global (land-based) cobalt reserves, double the current nickel estimates, and represent an increase on terrestrial copper reserves of around 25 percent (Hein and Mizell, 2022). Additionally, the nodules are thought to contain around 15 million tons of Rare Earth Elements (REEs), viewed as a core geopolitical bottleneck due to China's current dominance in their production (Fan et al., 2023). These metals are all critical for the emerging EV battery industry and other low-carbon technologies, as highlighted by their 'top 6' prime position in the 2022 Canadian Critical Minerals Strategy.⁵ Finally, the industry also raises questions of redistribution of minerals proceeds to land-based producers seeing their sales diminishing (Wilde et al., 2023).

This extractive process of deep-sea mining produces two main points of environmental interest: a sediment cloud that spreads out along the seafloor behind the collector vehicle, and a second, less concentrated, sediment cloud of waste from the onboard nodule cleaning process that is released at a yet-undetermined depth in the water column.⁶ This stacks up an impressive resume of potential environmental stresses, including habitat destruction and removal, sediment blanketing, organism suffocation, noise and light pollution, and release of toxic contaminants (i.e. metal dissolution).⁷ As with any environmentally destructive process, mitigation strategies can be emplaced to reduce harm to a level deemed 'acceptable.'⁸ The core critique against DSM lies in its potential for negative environmental impacts, exacerbated by limited scientific information available on deep-sea ecosystems.⁹ To address this, the ISA's Mining Code aims at codifying the practices of companies, sponsoring states and other actors, in line with the United Nations Convention on the Law of the Sea (UNCLOS) of December 10, 1982 (Childs, 2022; Proelss and Steenkamp, 2023; Young, 2020). The technical fixes of this Mining Code and its supplemental standards and guidelines are the focus of this article and, as Rose (1999, 33) argues, define a "domain to be governed as an intelligible field with specifiable limits and particular characteristics." The selective and calculated actions that hide complexities in the benefit of a policy intervention (Le Billon and Spiegel, 2022, 771) is, the paper argues, built around the ISA Mining Code and its audit system. As this article addresses the verification of DSM operations, it introduces the existing conceptualization of the audit culture, a well-explored anthropological field (Shore and Wright, 2015). Performed through technical fixes that effectively privatize the commons, the industry and the current paradigm of its verification mechanism refute the geographical specificity of its operations (in the open seas) and the limited

scientific expertise availability. At a time of what Strathern (2000) described as a “tyranny of transparency,” in which independent third-party verification constitutes the core of the global sustainability agenda, the DSM industry encourages a narrative of self-assessment in its most extreme form. This research was conducted collaboratively, leveraging contrasting expertise in geophysics and anthropology. While addressing in part the legal structures of the ISA code, the authors are not legal scholars and, as such, approach these limitations from the authors' disciplinary background. The strength of this article relies on this combined understanding of physical deep-sea mining dynamics and, as a prospective exploration of the limitations of verification in the industry, ability to theorize practical applications with potential deeply concerning impacts. Although so far DSM companies have been at the forefront of deep-sea knowledge production (Paulikas et al., 2020), including through the definition of the worth or not of ecosystems (Katona et al., 2023), more than 750 scientists from 44 countries have signed the Marine Expert Statement Calling for a Pause to Deep-Sea Mining (n.d). This article is the result of an in-depth assessment of the proposed structure of verification, as well as a series of exchanges with DSM companies, researchers, and government authorities. The paper provides recommendations to establish effective verification requirements of the industry and argues that taking inspiration from land-based mining constitutes a severe limitation.

The article proceeds as follows: the first part addresses the state of the industry, including its regulatory systems. The second part explores the ISA's technical fixes and the culture of auditing that, it is argued, targets the invisible. This invisibility through geographical isolation creates a significant obstacle to any verification process. Part three conceptualizes a new form of self-regulation in the open seas, favored by both the industry's role in the definition of the rules and the inaccessibility of their extractive site. Finally, the closing section recommends actions to improve the verification model and address the main shortcomings of the current system.

Section snippets

Deep-sea mining regulations and the “two-year rule”

Despite the current breakneck speed of development in the DSM industry, the sector has a long and torrid history. First imagined in the 1960s, the exploration and extraction of minerals from the seafloor is informed by a utopian understanding of its immense and almost unlimited reserves of minerals (Sparenberg, 2019; Mero, 1978; Cronan, 2022).¹⁰ This first section analyzes the ...

Technical fixes: auditing ‘beyond the visible’

The development of the ISA's Mining Code responds to a need for technical fixes (Nightingale et al., 2020) from an industry on a quest for legitimacy. The DSM sector's regulatory framework, created by an assemblage of draft documents and stakeholder consultations, aims at providing a legal grounding to corporate actors (and to a lesser extent governmental organizations) to begin extraction in the area. This article argues that these technical fixes sustain a culture of auditing that reproduces ...

Self-regulation from start to finish

This article argues that the current model of verification and the culture of auditing being implemented by the ISA favors self-regulation. It suggests that as an international body, the ISA outsources the power to regulate to corporations. This situation is the result of both political motivations, geographical realities, and financial limitations that impede the ability to conduct effective verification of DSM operations in the open seas. Unlike its land-based counterparts, the DSM sector ...

Recommendations for an effective verification system in the open seas

As this article highlights, establishing a verification mechanism in the open seas and on operations located kilometers below the surface is particularly challenging. The current model, embraced by the ISA and reproducing logics of land-based resource extraction, is at best limited in its ability to effectively and proactively address environmental risks. This culture of auditing is based on a weak definition of third-party verification and collusion with corporate actors. The result risks ...

Conclusion

This article is inscribed in a long series of publications pleading for a precautionary approach to DSM. The industry, through the development of what is described as a “proactive” and “innovative” mining code, supports that the available environmental data and the legal apparatus being defined by the ISA will already ensure the sustainability of operations on the seafloor. This article illustrates that the level of requirements included in the existing draft regulations, guidelines, and ...

CRedit authorship contribution statement

Raphael Deberdt: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Cara B.G. James:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. ...

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. ...

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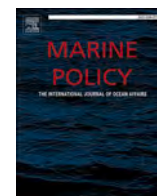
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The current status of deep-sea mining governance at the International Seabed Authority

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ABSTRACT

This article describes the current state of deep-sea mining governance in areas beyond national jurisdiction, providing an accessible overview of the structure and functioning of the International Seabed Authority (ISA), as well as some background information on the different instruments developed by the ISA for deep-sea mining regulation, control and management. In particular, the article focuses on the way environmental considerations are currently being discussed and negotiated under the Draft Exploitation Regulations. Given that there are no official records kept of ISA meetings, this article thereby also provides an overview of a body of information that is difficult to access.

1. Introduction¹

The deep seabed represents, in scientific, technological, and legal terms, a new frontier for research and management. While unique deep-sea ecosystems are just starting to be discovered and understood [1], the presence of rich minerals, such as nickel and cobalt,² has caught the attention of industry, interested in their use for the development of 'green' and other technologies, such as mobile phones [2]. While exploitation of these minerals has begun in domestic jurisdictions, albeit on a small scale, this article is concerned with exploitation in areas beyond national jurisdiction i.e. the deep-seabed, where the vast majority of minerals are to be found. Exploitation has not yet begun here and remains, for now, unregulated. Such exploitation cannot go ahead without regulation in place. If mining and related activities begin, however, this will likely have substantial impacts on ocean ecosystems [3]. It is therefore vital that regulations are put in place and are effectively enforced. In response to this lacuna, the International Seabed Authority (ISA or the Authority), the intergovernmental organization mandated with the control and regulation of deep-seabed mineral

related activities [4],³ started the process of developing a set of regulations and complementary instruments for the control and management of minerals of the seabed and ocean floor and subsoil in areas beyond national jurisdiction, or what is referred to as "the Area" [5, art. 1(1) (1)].

Work to develop these regulations has been ongoing since 2011 [6]. In 2021, Nauru, a small island developing state, triggered 'the two-year rule'. This rule is found in a provision of the 1994 *Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea* (Part XI Agreement or the Agreement) [7, Annex, Section 1, para 15], which provides that upon the request of a party, the ISA shall complete the adoption of rules, regulations and procedures necessary to facilitate the approval of plans of work for exploitation within two years of the request [8]. According to this rule, the ISA would need to finalize the relevant rules by mid-2023 [6]. Whether the two-year rule imposes a 'hard' deadline has however been discussed informally by negotiators, and the issue will most certainly be discussed in formal settings at the upcoming sessions of the ISA Council in October–November 2022 and beyond.

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¹ This article has been revised for the last time in October 2022, prior to the third part of the Council's 27th session, which started on 31 October. The article therefore does not cover the discussions held by the Council during that meeting.

² Three different types of minerals, found in three different types of geographical/geological landscapes, are currently managed in the deep seabed: polymetallic nodules (on abyssal plains), cobalt-rich ferromanganese crusts (on seamounts), and polymetallic sulphides (on and around hydrothermal vents).

³ It is to be noted that deep-sea mineral related activities exclude the exploitation of oil and gas.

One of the greatest challenges posed by attempts to regulate deep-sea mining is that there is simply not enough known about deep-sea ecosystems, their connectivity with other ocean areas and their role in earth systems [1]. There is not enough data on likely impacts or how such impacts can be managed, if at all [1]. Moreover, there is a need to create a regulatory framework that is clear enough to give guidance to contractors, yet flexible and adaptive enough to ensure it is ‘future proof’. This is one of the reasons why the environmental and scientific communities, together with local communities, indigenous people and civil society more generally, have long sounded the alarm at the prospect of deep-sea mining and have called for a pause, at least until more is known about the ecology of the deep sea and how it is likely to be impacted [1, 3,9]. Facing the more imminent start of exploitation has initiated a flurry of statements of concern, including from nearly 700 marine experts [9], civil society [10], government entities [11], para 184] and private companies [12] alike. Many of these parties then convened in September 2021 in the International Union for the Conservation of Nature (IUCN) Congress and voted in favor of a moratorium on deep-sea mining [13], which was then complemented by powerful statements from heads of states at the UN Ocean Conference in June 2022 [14], showing support from state and non-state actors alike.

In addition to environmental concerns, the start of deep-sea mining raises questions about the equitable sharing of benefits resulting from such activities in light of the fact that the deep seabed and its resources are the “common heritage of [hu]mankind” [5, art. 136]. Concerns have also been expressed by States with strong mining industries about the potential decline of the competitiveness of terrestrial mining activities [15].

This article focuses on the development of the Draft Exploitation Regulations (DR), which are meant to regulate the exploitation of mineral resources in the Area,⁴ focusing in particular on environmental considerations. This article first describes the ISA, its mandate, and its different organs, in order to grasp how the different structures within the institution interact with law - and decision-making processes. The article then delves into the events and instruments surrounding the development of the regulatory framework for mineral-related activities. The article finally describes the content of the DR, by focusing on the environmental interests and considerations found therein.

It is key to note that there are no reports or records detailing ISA proceedings. This is concerning from the perspective of accountability and democratic participation, rendering it difficult to access up to date information about the status of negotiations at the ISA. This article therefore also provides an overview of otherwise difficult to access materials. Furthermore, negotiations at the ISA are ongoing and policies are changing rapidly. It is therefore to be noted that the version of the DR discussed below is the one published by the ISA Council in 2019 [16], except when discussing Part I and II [17] and Part IV and VI [18] and related Annexes, which refer to the revised texts published ahead of the second part of the 27th Session of the ISA Council held in July 2022.

2. What is the ISA?

The ISA is an international organization created under the United Nations Convention on the Law of the Sea (UNCLOS) [5, art. 156] and the Part XI Agreement, and which has been in operation since 1996 [4]. Its main function is to “organize and control [mineral-related] activities in the Area, particularly with a view to administering the resources of the Area” [5, art. 157(1)], and it shall do so for the benefit of humankind as a whole [5, art. 140]. Another important aspect of the ISA’s mandate is its environmental obligation to “ensure effective protection for the marine environment from harmful effects which may arise from” activities in the Area [5, art. 145]. All State Parties to UNCLOS are *ipso*

facto members of the ISA [5, art. 156(2)]. There are currently 167 member States and the European Union.⁵

The ISA is composed of three principal organs: the Assembly, the Council and the Secretariat [5, art. 158(1)]. First, the Assembly is the supreme decision-making and political organ of the ISA, and it is formed by all members of the ISA [5, art. 160]. It has the power to establish the general policies of the ISA [5, art. 160(1)], and it approves the rules and regulations recommended by the Council [5, art. 160(2)(f)]. The Assembly also elects the Finance Committee, which oversees the financial management of the ISA [7, Annex, Section 9; 19]. Second, the Council is the executive organ of the ISA [5, art. 162(1)]. It has the power to establish the specific policies of the ISA and to recommend rules, regulations and procedures [5, art. 162(2)(o)]. The Council has two organs [5, art. 163(1)]: 1) the Legal and Technical Commission (LTC), which, *inter alia*, reviews plans of work for activities in the Area, prepares assessments of the environmental implications of activities in the Area, makes recommendations to the Council on the protection of the marine environment, and formulates rules, regulations and procedures [5, art. 165] (including the DR), and 2) the Economic and Planning Commission [5, art. 164]. The Economic and Planning Commission is not yet operational (mostly due to a lack of funding) so its functions are currently carried out by the LTC. The third principal organ is the Secretariat, which provides administrative and legal services, as well as scientific and technical input, through its offices of Administrative Services, Legal Affairs and Environmental Management, Mineral Resources and through the Executive Office of the Secretary General which also includes the Compliance Assurance Regulatory Management Unit [20]. In addition to these three principal organs, the ISA is finally composed of the Enterprise. Although not currently operational, the Enterprise is meant to be the operational arm of the ISA, which shall carry out mineral-related activities in the Area [5, art. 170] for the benefit of humankind. Since 2018, a Special Representative for the Enterprise has been appointed to represent the perspective of the Enterprise on matters related to the operationalization of the Enterprise among other things [21]. Fig. 1 illustrates the different organs of the ISA and summarizes their functions.

3. The processes and instruments surrounding the development of the Draft Exploitation Regulations

This section provides a ‘temporal’ overview of the evolution of the DR [23]. We believe this is necessary as the DR is currently under negotiations and different versions might be circulating. We hope that this overview helps the reader understand better how different parts of the DR and different versions relate to one another.

3.1. The Mining Code

As part of its mandate to organize and control all mineral-related activities on the international seabed and administer the mineral resources of the Area for the benefit of humankind as a whole [5, arts. 157 (1) and 140], the ISA has, for the past two decades, been engaged in the development of the Mining Code [24]. This Code consists of a set of rules, regulations and procedures covering the prospecting, exploration and exploitation of minerals on the deep seabed. From 2000–2013, the ISA developed regulations on the prospecting and exploration of deep-sea minerals for each of the three resources currently being explored on the deep seabed: polymetallic nodules, polymetallic

⁴ Consequently, this article does not address the management of mineral resources within national jurisdiction.

⁵ The United States of America are not a party to UNCLOS and therefore not a member of the ISA. They however participate and intervene as observers in meetings, but do not possess any voting power.

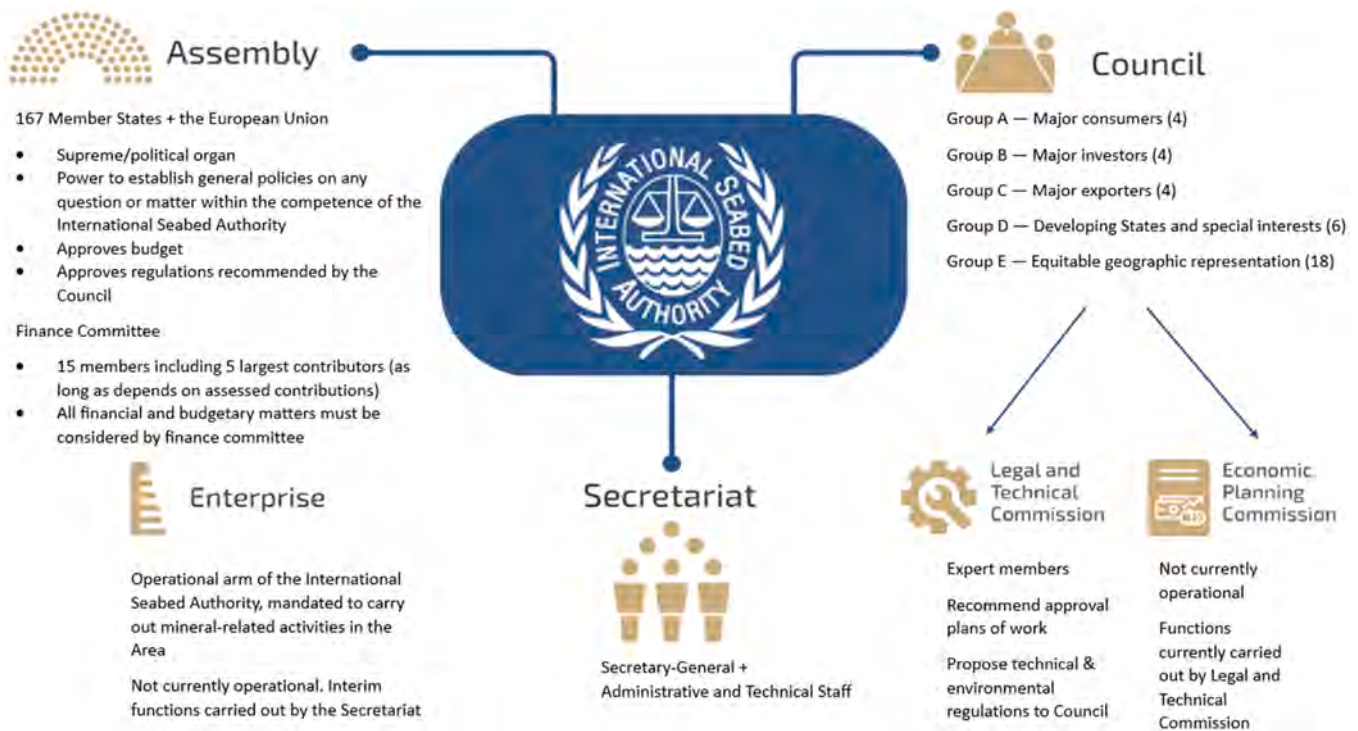


Fig. 1. The ISA and its organs (ISA) [22].

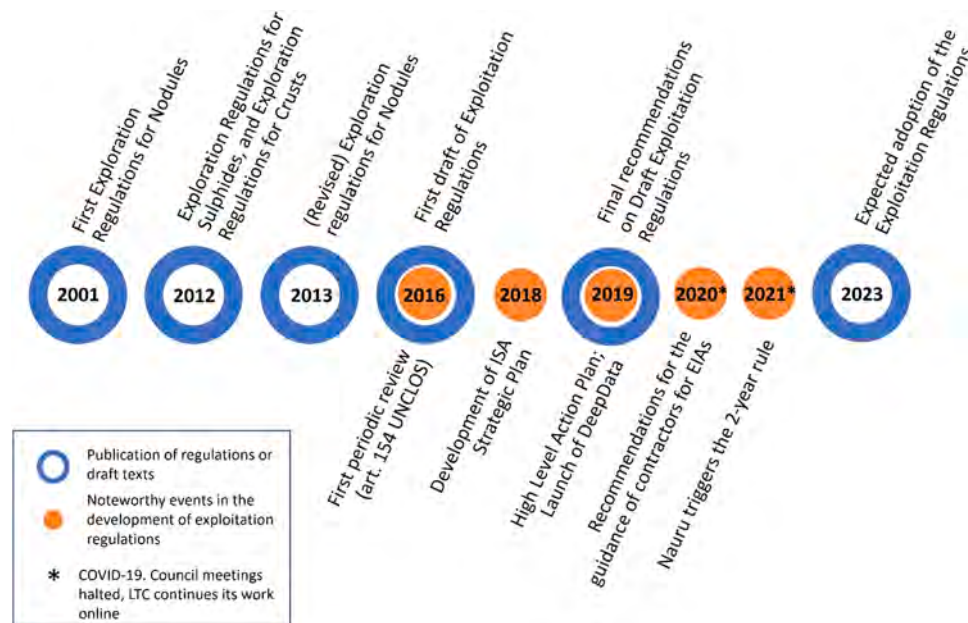


Fig. 2. Important legal and political developments at the International Seabed Authority (ISA). Acronyms used: UNCLOS – United Nations Convention on the Law of the Sea; EIA – environmental impact assessment. (inspired by Ginsky, Singh & Markus, 2020).

sulphides, and cobalt-rich ferromanganese crusts [25].⁶ Following the procedure established in such regulations, exploration contracts were granted to contractors (States and private companies sponsored by

⁶ A first version of the Exploration Regulations for Polymetallic Nodules were published in 2000, but these regulations were revised to better align with the Exploration Regulations for Polymetallic Sulphides and Exploration Regulations for Cobalt-rich Manganese Crusts, published in 2010 and 2012 respectively. The current version of the Exploration Regulations for Polymetallic Nodules was adopted in 2013.

States) for an initial duration of 15 years, extendable thereafter by periods of up to five years each [7, Annex, Section 1, para 9]. Since 2001, 31 contractors have been granted such exploration contracts [26].

In 2011, the ISA started developing a regulatory framework for exploitation activities. Based on preliminary discussions, a stakeholder survey, a first working draft in 2016, a first version in 2017, a first revision in 2018 [27], additional workshops and stakeholder consultations [6], the LTC provided the Council with its final recommendations on the DR during the first part of the Council's 25th Session in March 2019 [16]. Considerations of the DR started at the second part of

this 25th Session in July 2019. The Council invited further stakeholder consultation by October 2019, which were then discussed during the first part of the Council's 26th Session in February 2020. The discussions on the DR were halted for two years due to the outbreak of the COVID-19 pandemic but resumed during the first part of the Council's 27th Session in March 2022.

In order to facilitate discussions on the DR, the Council, during the first part of its 26th Session in early 2020, created three informal working groups on thematic issues: the Informal Working Group on the Protection and Preservation of the Marine Environment [28], the Informal Working Group on Inspection, Compliance and Enforcement [29], and the Informal Working Group on Institutional Matters [30]. These working groups complement the work of the existing Open-Ended Working Group in Respect of the Development and Negotiation of the Financial Terms of a Contract, set in 2019 [31].

In parallel to the development of the DR, the LTC has been working on sets of Standards and Guidelines (S&G) to assist in the understanding and implementation of more technical aspects of the DR [32]. While the Standards are expected to be legally binding on contractors, the Guidelines will be of recommendatory nature only. In the development of the S&G, the LTC is following a three-fold approach: first, the LTC develops S&G deemed necessary to be in place by the time of adoption of the DR (phase 1 S&G); second, those deemed necessary to be in place prior to the receipt of an application of a plan of work for exploitation (phase 2 S&G); and third, those deemed necessary to be in place before commercial mining activities commence in the Area (phase 3 S&G). The LTC finalized a draft version of phase 1 S&G, which underwent stakeholder consultations in 2020 and 2021. A revised draft of most of phase 1 S&G was made available in advance of the first part of the Council's 27th Session in early 2022; yet the revision process was highly criticized by delegations for its lack of transparency. Indeed, most members of the Council deemed it impossible to go over the revised draft as the changes were not kept track of and were not explained [33]. Additional discussions on the revised draft of phase 1 S&G are therefore expected in upcoming sessions of the Council. The development of the S&G is complicated by the fact that it is occurring in parallel with the DR, which they are designed to complement. This means that the S&G need to be revised and revisited each time the DR is modified [34, p. 3]. It is to be assumed that waiting until the final completion of the DR before starting the preparation of the S&G would have however delayed the process too significantly.

3.2. Other significant legal and political developments at the ISA

The development of the DR (and of the Mining Code more broadly) should not be considered in isolation from other political, legal and governance developments within the ISA [35]. These elements have each influenced the way the DR is currently shaped and being revised. Fig. 2 summarizes a selection of important recent legal and political developments at the ISA and how they relate to the development of the DR.

Three of the events in the development of the exploitation regulations highlighted in Fig. 2 are of particular interest and worthy of further discussion. First, as per Article 154 of UNCLOS, in 2016 the ISA underwent a review of the manner in which the international regime of the Area has operated in practice [36]. There were 34 recommendations suggested, covering the regime for the exploration and exploitation of deep-sea minerals in the Area, the performance of principal and subsidiary organs, and the future-proofing of the ISA. The following recommendations are of direct relevance for environmental considerations within the DR.

Recommendation 2 calls for better management and the sharing of data [36, p. 18], which is crucial for a better understanding and, consequently, protection of the environment. This has been addressed, at least partially, by the creation in 2019 of DeepData, an "internet-based data management system [...] to host all deep seabed

activities related data and in particular, data collected by the contractors on their exploration activities, as well as any other relevant environmental and resources related data for the Area" [37]. The need for cooperation in data sharing is also reiterated in the DR [17, Reg. 3]. DeepData has, however, been widely critiqued for being an incomplete database with 'limited functionality' [38].

Recommendation 3 asks that contracts follow standard terms and conditions and detailed plans of work [36, p. 18]. This is currently being addressed through the template contracts found in the Annexes to the DR, which are to be complemented by the various S&G. These standard terms and conditions should additionally be guided by Strategic Environmental Goals and Objectives (SEGOs), which are to be developed by the ISA [34,39]. Many environmental obligations for contractors are embedded in such documents, hence their importance for environmental considerations. As of October 2022 however, SEGOs have not been agreed at the ISA, and neither is it clear whether or by whom their development is taken forward.

Recommendation 5 states that clear and enforceable rules and standards for protection and preservation of the marine environment need to be developed, with mechanisms for assessment and enforcement in all ocean basins [36, p. 21]. This is currently being addressed through the development of the DR and associated S&G. The question, often raised by representatives from civil society, is whether the instruments currently under development will be sufficient to reach the ultimate objective of protection and whether the ISA will have the ability to enforce them [40].

Recommendation 6 asks for a better engagement with the scientific community [36, p. 21]. Gaining scientific knowledge on the environment is key to understanding its components, how they are connected, and how they can be protected. Given the number of critical environmental knowledge gaps that exist with regards to the deep ocean, improved collaboration between scientists and decision-makers will be essential in the future [1].

Recommendations 31 and 33 call for an improvement of transparency in the ISA in general, and in the LTC specifically [36, p. 55]. Transparency is a core concept in ensuring equity in the access to information, and in ensuring participatory processes, which opens the door to a broader variety of voices, including environment-centred ones. The need for improved transparency at the ISA is a continuous concern and often a source of criticism [41]. Although the DR alludes to transparency on some occasions [18, Regs. 44(1)(a)(iv) and 41(1)(c); 17, Reg. 2(e)(vi)], much more needs to be done, not only to ensure that transparency has a legal basis within the DR, but also to ensure transparency in processes to develop the DR and related instruments.

A second event in development of the exploitation regulations highlighted in Fig. 2 is the creation of the Strategic Plan of the International Seabed Authority for the Period 2019–2023 [42], adopted by the Assembly in August 2018. This plan consists of 39 strategic directions spread over nine clusters, ranging from the strengthening of the regulatory framework for activities in the Area, to the protection of the marine environment, the development of scientific research and the improvement of transparency. In 2019, the Strategic Plan was complemented by the High Level Action Plan of the International Seabed Authority and Priorities for the 2019–2023 Period [43] as well as Performance Indicators [44], which consist of concrete actions necessary to implement the objectives of the Strategic Plan. It is uncertain to what extent these actions have been undertaken due to setbacks related to the Covid-19 pandemic. However, it is expected that both Plans will be updated by the end of their current term in 2023.

The third event included in Fig. 2 that is important to cover is the March 2020 LTC revision of the *Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising*

from exploration for marine minerals in the Area [45].⁷ These Recommendations, first put in place in 2013 [46], contain a set of “procedures to be followed in the acquisition of baseline data, and the monitoring to be performed during and after any activities in the exploration area with potential to cause serious harm to the environment” [45], para 9]. Although not binding and targeting exploration activities, these Recommendations remain a valuable instrument for the implementation of the Mining Code as a whole – including the DR – as they highlight the importance for contractors to collect data and knowledge, and to cooperate for the development of environmental strategies.

4. Environmental considerations within the Draft Exploitation Regulations

The DR currently under revision and negotiation by the Council⁸ is divided into 13 Parts and ten Annexes. Annexes consist mostly of template documents for the exploitation contracts themselves or for different plans or statements that contractors are required to prepare under the regulations e.g. Regulation 47 on Environmental Impact Statements (EIS). The DR is further complemented by a series of ten S&G having been deemed to be necessary to be in place by the time of adoption of the DR (phase 1 S&G). These S&G generally provide more detailed information on how the plans and statements should be prepared by contractors, as well as on the establishment of environmental baseline data.

4.1. Environmental obligations for different actors and their level of application

Before embarking on the exploration of environmental considerations themselves, it is first important to identify the different actors involved in the application of such considerations. The DR embodies and operationalizes different environmental obligations placed upon three main groups of actors [47, p. 158–160]. First, the development of the DR is one way for the ISA to fulfil its duty under Article 145 of UNCLOS to develop the relevant rules for the protection of the marine environment. Second, the ISA, sponsoring States, and contractors are required to apply the precautionary approach [48], which is reflected in the DR [17, Reg. 2(e)(ii)]. Third, contractors have a duty to take the necessary measures to prevent and reduce harm to the marine environment, pollution, and other risks. This includes, *inter alia*, the preparation of different environmental statements and emergency/contingency plans before the activity starts, and to monitor during and after activities. These obligations are fleshed out in the DR. Other actors’ involvement might also be requested for obligations to be met, such as independent reviewers for performance assessments or open consultations for stakeholders [18, Regs. 46bis(4)(4)(c) and 47(3)(c)]. Lastly, States also have individual legal responsibilities to ensure that persons or enterprises under their jurisdiction or control carrying activities in the Area do so in conformity with the relevant legal instruments, including UNCLOS [5, art. 139(1)].

These different actors’ obligations illustrate that environmental interests and considerations come into play at four levels: first, the ISA has an overarching obligation to protect the marine environment, which

reflects a global perspective; second, the ISA also has regional obligations to address regional particularities; third, contractors have specific obligations linked to the protection of a defined mining site and the surrounding areas [39, p. 3]; and fourth, individual States have the responsibilities, among others, to ensure that entities sponsored act in accordance with the terms of the contract and other relevant legal instruments [5, Annex III art. 4(4)]. The SEGOs that are to be developed by the ISA should therefore reflect this four-fold approach to environment-related obligations.

4.2. Main environmental considerations

Environmental considerations can be found throughout the DR. The discussion contained in this section presents an overview of a selection of relevant provisions that explain the procedures and processes that will allow exploitation activities.

4.2.1. Part I of the Draft Regulations

Part I is composed of four regulations, which should be understood as applying to the DR in its entirety, and which sets out the fundamental policies, overarching objectives and principles of the DR. Regulation 1, addressing the use of terms and scope, is directly relevant for environmental considerations for three reasons. First, it ensures the compatibility of the DR with Part XI of UNCLOS (para 2), including the environment-related provisions found therein. Second, para 5 specifically provides that the DR should be supplemented by S&G as well as further rules, regulations and procedures, in particular on the protection and preservation of the marine environment. The DR is therefore not to be understood as a self-contained instrument for marine environmental protection and should be complemented. Third, many of the terms used throughout the DR are defined in its Schedule, which forms an integral part of the DR (para 6). Although the Schedule provides clarification on the meaning of many terms linked to environmental considerations (e.g. best environmental practice, environmental effect, marine environment, serious harm), many terms are not defined (e.g. damage to the marine environment, ecosystem approach, effective protection, protection, preservation) and their inclusion in the Schedule is currently under consideration.

Regulation 2 is of particular interest as it lists the effective protection of the marine environment as one fundamental policy under the DR, which is to be embodied through different principles, including the precautionary approach, the ecosystem approach, the polluter-pays principle, access to data and information, accountability and transparency in decision-making, and effective public participation. Although these principles are well-known in environmental and ocean governance [49], their scope of application in the context of deep-sea mining still triggers uncertainty [50]. A proposal made by Spain at the second part of the Council’s 27th session in July 2022 suggested to shorten Regulation 2 substantially, with the goal to streamline and simplify its content by referencing to relevant legal instruments instead of listing all principles and approaches [51]; this proposal is to be discussed at the third part of the Council’s 27th session in November 2022.

Regulation 3 refers to the duty to cooperate and exchange information. In the context of deep-sea mining, where data is scarce, knowledge remains plagued by important gaps [1], and capacities vary enormously; this provision acts as the legal basis upon which the ISA, States, and non-State actors shall work together to ensure that the environmental impacts of exploitation activities are observed, measured, evaluated and analysed, and that the findings and results of such observations and analysis are widely shared and disseminated (para e). Regulation 4, for its part, warrants that the duty to protect the marine environment from serious harm also extends to areas under the jurisdiction or sovereignty of coastal States. This means that contractors must ensure that their activities conducted in ABNJ should not seriously impact areas within national jurisdiction.

⁷ While issued in 2020, the Recommendations were discussed by the LTC during its meeting in March 2019.

⁸ As the DR is still under negotiations, the exact wording of their provisions might change. We therefore focus, throughout the report, on the ones contained in the final 2019 Draft Exploitation Regulations (ISBA/25/C/WP.1). However, when referring to provisions contained in Parts IV or VII of the DR, we refer to the revised version discussed at the second part of the Council’s 27th session in July, 2022 (ISBA/27/C/IWG/ENV/CRP.1/Rev.1). When referring to the provisions contained in Parts I or II of the DR, we refer to the revised version discussed at second part of the Council’s 27th session in July, 2022 (ISBA/27/C/IWG/IM/CRP.1).

4.2.2. Part IV of the Draft Regulations

While the regulations found in Part I set the scene for environmental considerations of general application, it is in Part IV that specific environmental obligations take shape. Although this article does not aim to review each regulation contained in Part IV, the main goal of the following discussion is to better understand the different obligations that fall upon contractors, and the different environmental plans and statements they need to prepare. As Part IV has been subject to in-depth negotiations during the first and second parts of the Council's 27th Session in March and July 2022, and many proposals have been submitted by delegations, the following discussion does not address the specific wording and content of relevant regulations, but focuses mostly on general functioning.

It is first to be noted that the application of the precautionary principle and the necessity for accountability and transparency in the assessment, evaluation and management of environmental effects from exploitation are restated in Part IV (Regulation 44), highlighting their particular significance in the context of the protection of the marine environment. The inclusion of other general principles, such as the ecosystem approach, has been suggested by some delegations, but clarification has been sought on the practical implications of such proposal. Additions to Regulation 44 have also made it clear that general obligations apply equally to the ISA, sponsoring States, and contractors.

One other addition to the revised version of Part IV is an express reference to Regional Environmental Management Plans (REMPs) (Regulation 44bis). REMPs, policy instruments to ensure the management of and environmental protection from mining activities in a specific region, have been at the heart of the Council's discussions in recent years. Following the adoption of the REMP for the Clarion-Clipperton Zone in 2012 [52] (which was revised in 2021 [53]), the Council decided to develop REMPs in other priority regions [54]. A Draft REMP for the northern Mid-Atlantic Ridge was released in April 2022, and stakeholders comments characterized it as a good start, although still presenting many gaps especially with regards to area-based management tools included therein [55]. On the basis of the comments received, a revised version of the REMP was published in early October 2022, and is to be discussed at third part of the Council's 27th session in November 2022. The important element brought forward by the DR regarding REMPs is the fact that a REMP should be established before exploitation contracts are granted. A joint proposal made by the African Group and 17 other member States at the second part of the Council's 27th session in July 2022 reiterated the importance of having REMPs in place before a contractor's Plan of Work is to be considered [56].

Similarly, discussions are being conducted on the development of the S&G, their normative value and their relationship with the commencement of exploitation, for instance, whether S&G should be adopted before any exploitation activity is authorized (Regulation 45) [57].

Subsequent regulations then delve into the different plans and documents required from contractors:

- Contractors must prepare an Environmental Management System (EMS) (Regulation 46), which aims to present the "organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining environmental policy, goals and Environmental Performance" [58, p. 96; 59, para 1]. Contractors shall also carry out an Environmental Impact Assessment (EIA) of the potential effects (including cumulative effects) on the marine environment of the proposed mining operation (Regulation 46bis).
- The results of the EIA and of an Environmental Risk Assessment (ERA) [60] are to be reported in a EIS (Regulation 47, see also Annex IV to the DR). The objective of an EIS is to "demonstrate that the proposed mining operation is in accordance with all applicable environmental Standards and with the requirements of the applicable" REMP [18, Reg. 47(4)].

- Contractors shall then ensure that they continuously monitor the effects of the mining operation on the marine environment identified in the EIS (Regulation 46ter, and also Regulation 51), which is to be reported through the Environmental Management and Monitoring Plan (EMMP) (Regulation 48, see also Annex VII to the DR).
- Contractors are also expected to undertake performance assessments of the EMMP, to assess the compliance of the mining operation with the plan, the continued appropriateness and adequacy of the plan, and the conformity of the plan with the REMP (Regulation 52). The ISA must then review these performance assessments.

The EIS and the EMMP, together with Closure Plans, which "set out the responsibilities and actions of a contractor for the decommissioning and closure of mining activities, including the post-closure management and monitoring of residual and environmental effects" [18, Reg. 59] (see Part VI of the DR), constitute the Environmental Plans. The way the different plans, statements and assessment relate to one another is summarized in Fig. 3.

The revised version of Part IV further contains a new regulation on test mining (Regulation 48bis). Most delegations welcomed this addition. The scope of the new provision is yet to be fleshed out, and its interaction with test mining during the exploration phase clarified, but several delegations have expressed interest in joining inter-session meetings to discuss this point further. This is crucial as the LTC has recently approved new test mining in the Clarion-Clipperton Zone [61]. The details of this process will be fed back to the Council during the third part of its 27th session in November 2022 by the Chair of the LTC.

Part IV of the DR further covers pollution control (Regulation 49) and the restriction on mining discharges (Regulation 50). Contractors shall also ensure that the Emergency Response and Contingency Plan, required with their Plan of Work (see Regulation 7 in Part II of the DR) is maintained and tested (Regulation 53). Part IV concludes by establishing an Environmental Compensation Fund (Regulations 54–56), set to fund or compensate for the implementation of any necessary measures designed to prevent, limit or remediate any damage arising from activities in the Area and/or to restore or rehabilitate the Area.

4.2.3. Other relevant provisions in the Draft Regulations

Other provisions also contain environmental considerations that are of interest for this discussion. Regulation 11 discusses the publication and review of the Environmental Plans. These Plans are to be made available for members of the Authority and stakeholders to comment on them. Regulation 13, for its part, ensures that the Council assesses whether a contractor's Plan of Work provides for the effective protection of the marine environment (Regulation 13(4)(e)). Furthermore, Regulation 26 provides that a contractor must lodge an environmental performance guarantee, i.e. a financial guarantee reflecting the likely costs of the premature closure of exploitation activities, the closure of exploitation activities, and the post-closure monitoring and management of residual environmental effects (Regulation 26(2)). Finally, Regulation 59 ensures that environmental effects are considered during the decommissioning and closure phases of activities.

4.3. Non-monetary value of the deep sea

In 2019, consultants from the Massachusetts Institute of Technology (MIT) commissioned by the ISA presented a report on the development of an economic model and system of payments for the exploitation of polymetallic nodules in the Area [62]. This report explored the "implications of alternative financial payment mechanisms upon the economics of both the ISA, on behalf of mankind, and of seabed mining contractors [by defining] the rules and rates associated with payments from contractors to the ISA under future exploitation contracts concluded with the ISA" [62, p. 4, para 1]. These financial mechanisms are of crucial importance as they would shape benefit-sharing, would embody the polluter pays principle, and ways through which

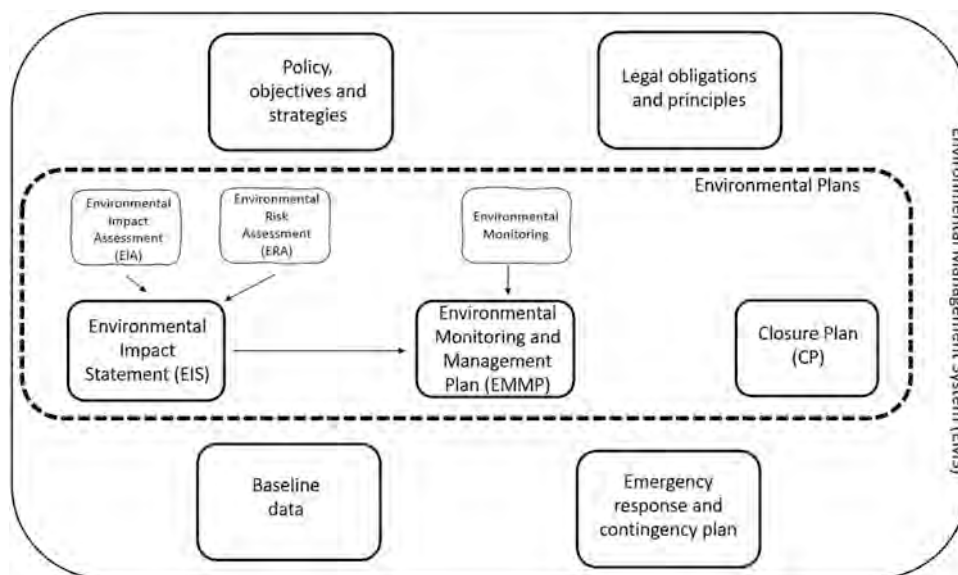


Fig. 3. Environmental Management System and Environmental Plans.⁹¹

humankind can be compensated for environmental degradation [34, p. 5]. The MIT report was criticized for not reflecting environmental considerations, especially considering that the protection of the environment is an intrinsic aspect of the ISA's mandate [63]. The need for the payment regime to reflect considerations that go beyond financial terms only has also been highlighted in a recent study, which identified the need for the payment regime to reflect the risks to the deep-sea environment (environmental considerations), the inclusion of stakeholder interests (broad participation), and deliver optimal returns to Human-kind (considerations of equity) [64].

In an attempt to overcome the environmental shortcomings in the payment regime, the Working Group on the Financial Terms of a Contract announced that it would commission a study on the environmental costs of deep-sea mining that would seek to put a price on deep-sea life and ecosystem services [65]. As explained by the Deep Sea Conservation Coalition, "[t]his proposal came as a result of the concern expressed by many States about the fact that a previous financial report commissioned by the ISA failed to account for anything to do with the environment" [63]. It is therefore to be expected that provisions of the DR related to financial aspects and payments will eventually be adjusted to include environmental considerations.

5. Conclusion

Overall, this article has sought to provide a clear and accessible overview of the workings of the ISA and of the various instruments that are being discussed in relation to deep-sea mining. In particular, the article focused on the way environmental considerations are being framed and discussed in the DR. Negotiations are, however, ongoing, with the next meetings of the Council being due to take place in November 2022 and March 2023. A lot of work has yet to be done to evaluate how environmental considerations will be embedded into the DR, if deep-sea mining does indeed go ahead. However, it is clear from the outline above that there are multiple ways in which such considerations can be embedded more deeply, as negotiations continue.

CRediT authorship contribution statement

Catherine Blanchard: Conceptualization, Writing – original draft, Writing – review & editing. **Ellycia Harrould-Kolieb:** Conceptualization, Writing – original draft, Writing – review & editing. **Emily Jones:** Conceptualization, Writing – review & editing, Funding acquisition.

Michelle Taylor: Conceptualization, Writing – review & editing, Funding acquisition.

Data Availability

No data was used for the research described in the article.

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- [42] Strategic Plan of the International Seabed Authority for the Period 2019–2023, ISBA/24/A/CRP3 2018. See also International Seabed Authority Strategic Plan 2019–2023, online: https://isa.org.jm/files/files/documents/Strategic_Plan_Booklet.pdf (2018). Many inputs for the development of this Strategic Plan were also gathered through an expert workshop, the discussions of which have been streamlined in Towards and ISA Environmental Management Strategy for the Area. Report of an International Workshop convened by the German Environmental Agency (UBA), the German Federal Institute for Geosciences and Natural Resources (BGR) and the Secretariat of the International Seabed Authority (ISA) in Berlin, Germany, 20–24 March 2017, ISA Technical Study No. 17 (2017).
- [43] Draft high-level action plan of the International Seabed Authority for the period 2019–2023, ISBA/25/A/L2 2019.
- [44] Implementation of the strategic plan of the International Seabed Authority: draft performance indicators for the period 2019–2023, ISBA/25/A/5 2019.
- [45] Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area, ISBA/25/LTC/6/Rev1 2020.
- [46] Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area, ISBA/19/LTC/8 2013.
- [47] Michael Lodge, "Protecting the marine environment of the deep seabed" in Research Handbook on International Marine Environmental Law by Rosemary Rayfuse (Ed) (Cheltenham: Edward Elgar, 2017) 151.
- [48] See Responsibilities and obligations of States sponsoring persons and entities with respect to activities in the Area (Request for Advisory Opinion submitted to the Seabed Disputes Chamber), 2011 International Tribunal for the Law of the Sea Case No. 17.
- [49] See, e.g., Philippe Sands et al., Principles of International Environmental Law, 4th edition ed (Cambridge: Cambridge University Press, 2018). Alex Oude Elferink, "Governance principles for Areas Beyond National Jurisdiction" (2012) 27:2 International Journal of Marine and Coastal Law 205–260. Robin Warner, "International environmental law principles relevant to exploitation activity in the Area" (2020) 114 Marine Policy 103503.
- [50] Several delegations have indeed raised question as to the practical application of the precautionary and ecosystem approaches, see Authors' notes from ISA 27th Session: Council - Part I (on file with authors, 2022).
- [51] "Textual Proposal on Regulation 2 by Spain During the 27th Session: Council - Part II", (July 2022), online: https://isa.org.jm/files/files/documents/SPAIN_2_0.pdf.
- [52] Decision of the Council relating to an environmental management plan for the Clarion-Clipperton Zone, ISBA/18/C/22 2012.
- [53] Review of the implementation of the Environmental Management Plan for the Clarion-Clipperton Zone - Report and recommendations of the Legal and Technical Commission, ISBA/26/C/43 2021.
- [54] Preliminary strategy for the development of regional environmental management plans for the Area, ISBA/24/C/3 2018; "Environmental Management Plans", online: International Seabed Authority <https://www.isa.org.jm/minerals/environmental-management-plan-clarion-clipperton-zone>.
- [55] For all comments received, see "Submissions received with respect to the stakeholder comments on draft REMP", (2022), online: <https://isa.org.jm/submissions-received-respect-stakeholder-comments-draft-rem>.
- [56] "Textual Proposal on Regulation 44bis by the African group and 17 other member States During the 27th Session: Council - Part II", (July 2022), online: https://isa.org.jm/files/files/documents/JOINT_Proposal_44bis.pdf.
- [57] See, e.g., "Textual Proposal on Regulation 45 by Germany During the 27th Session: Council - Part I", (23 March 2022), online: https://isa.org.jm/files/2022-03/Regulation_45_Germany.pdf.
- [58] Developing a Regulatory Framework for Mineral Exploitation in the Area: A Discussion Paper on the development and drafting of Regulations on Exploitation for Mineral Resources in the Area (Environmental Matters), International Seabed Authority (Kingston, Jamaica: International Seabed Authority, 2017).
- [59] Draft standard and guidelines on the development and application of Environmental Management Systems Prepared by the Legal and Technical Commission, ISBA/27/C/7 2022.

⁹ This figure is illustrative and is not meant to be exhaustive of all plans and statements required by contractors. It focuses on elements discussed under Part IV of the DR.

- [60] Environmental Risk Assessment (ERA) is not currently defined in the DR, but a proposal made by the UK at the first part of the Council's 27th session in March 2022 suggests to define ERA as "the risk process for evaluating the likelihood and consequence of Environmental Impacts", see "Textual Proposal on Regulation 46bis by the United Kingdom During the 27th Session: Council - Part I", (23 March 2022), online: <https://isa.org.jm/files/2022-03/reg46bis-UK-rev.pdf>.
- [61] "ISA Legal and Technical Commission concludes its review of the environmental impact statement submitted by NORI for the testing of a polymetallic nodule collector under its contract for exploration in the Area", (15 September 2022), online: ISA <https://www.isa.org.jm/index.php/news/isa-legal-and-technical-commission-concludes-its-review-environmental-impact-statement>.
- [62] Report to the International Seabed Authority on the Development of an Economic Model and System of Payments for the Exploitation of Polymetallic Nodules in the Area, by Randolph Kirchain et al, Massachusetts Institute of Technology (2019).
- [63] "Day 9 - The Gloves Come Off", (31 March 2022), online: Deep Sea Conservation Coalition - International Seabed Authority (ISA) Deep-Sea Mining Negotiations Tracker <http://www.savethehighseas.org/isa-tracker/index.php/2022/03/31/day-9-the-gloves-come-off/>.
- [64] Thorsten Thiele, Hans-Peter Damian & Pradeep Singh, "A Comprehensive Approach to the Payment Mechanism for Deep Seabed Mining" (2021) IASS Policy Brief, online: https://publications.iass-potsdam.de/rest/items/item_6000737_2/component/file_6000738/content.
- [65] "Day 2 - Planet over Profit", (23 March 2022), online: Deep Sea Conservation Coalition - International Seabed Authority (ISA) Deep-Sea Mining Negotiations Tracker <http://www.savethehighseas.org/isa-tracker/index.php/2022/03/23/day-2-planet-over-profit/#more-234>.