



To mine or not to mine the deep seabed?

The relative influence of competing NGO views in defining “serious harm” to the marine environment

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Abstract

Several studies have noted that the International Seabed Authority (ISA) scores low on public participation. However, none have studied the efforts of non-governmental organizations to exert influence on the ISA’s rulemaking processes. I examine how environmental NGOs and private mining contractors attempt to sway one narrow, but existential, part of the ISA’s draft exploitation regulations between 2014 and 2019: the definition of “serious harm” to the marine environment. Although environmental NGOs appear to have been more successful in influencing that definition, the interests of private contractors may still prevail. Despite the efforts of environmental NGOs, the term “serious harm” remains largely undefined, allowing for more subjectivity and flexibility in interpretation. This challenge is exacerbated when combined with current institutional weaknesses and limited scientific expertise within the ISA. Ongoing negotiations and recent developments may, however, alter this outcome.

Keywords Deep-sea mining · International Seabed Authority (ISA) · Serious harm · NGO influence · Stakeholder consultations

Introduction

Beyond boundaries of national jurisdiction, a vast array of valuable minerals can be found on the seabed and its subsoil. Legally known as the “Area”, this space and its resources are governed by the United Nations Convention on the Law of the Sea (UNCLOS), and the 1994 Agreement relating to the implementation of Part XI of UNCLOS (United Nations Convention on the Law of the Sea 1982; Agreement relating to the Implementation of Part XI of UNCLOS 1994). At the heart of the regime is the International Seabed Authority (ISA), through which State Parties organize and control all mineral resource-related activities. Since 2014, they have been working on a set of regulations concerning exploitation, which according to plan will be finalized in 2025.

Underpinning the ISA’s management of the Area is one particularly important principle: “the common heritage of [hu]mankind”. According to this principle, “All rights in the resources of the Area are vested in [hu]mankind as a whole, on whose behalf the Authority shall act” (UNCLOS, 1982, art. 137(2)). However, as exploitation may be nearing reality and tensions between conflicting interests are rising, scholars question whether states alone can represent and serve the diversity which humankind constitutes. By extension, they criticize the ISA for not sufficiently including non-governmental organizations (NGOs) in its decision-making processes (Ardron et al. 2018; Christiansen et al. 2018; Jaekel et al. 2017; Wil-laert 2020).

Indeed, several recent studies have shown that the ISA scores low on public participation (Ardron 2018; Ardrone et al. 2023; Morgera and Lily 2022). Yet, none has studied the efforts of NGOs to exert influence: their success, or lack thereof, to shape the outcome of the exploitation regulations. This article is a first attempt at helping to fill that knowledge gap. It focuses specifically on the competing interests of NGOs: environmental NGOs

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on the one hand, and mining firms that have exploration contracts at the ISA, hereafter referred to as private contractors, on the other. Their competing interests are identified through a formal stakeholder process held by the ISA, and the analysis centres around one narrow but existential part of the regulations: the definition of “serious harm” to the marine environment.

In essence, “serious harm” refers to a level of harm so significant that strong action is required to avoid it. Originating from UNCLOS, the term serves as a threshold for when the ISA, due to environmental concerns, may reject applications to start mining as well as intervene to halt ongoing mining operations (Harrison 2022, p. 166; Hitchin et al. 2022, p. 6; Levin et al. 2016, p. 246). Thus, how this term is defined and operationalized is of great importance to the private contractors seeking to begin extraction in the near future, and to the environmental NGOs seeking more knowledge and a precautionary approach. In this article, I ask: *Whose interests, if any, prevail?*

As negotiations between member states are currently ongoing, the final outcome with regard to “serious harm” and its definition in the exploitation regulations remains unknown. Therefore, given the challenges of studying a still open-ended process, my analysis is limited to the drafting of the regulations, which was led by the ISA’s Legal and Technical Commission (LTC) between 2014 and 2019. In examining whose interests prevailed during that period, I analyse eight draft versions of the exploitation regulations, as well as comments made on these drafts through the stakeholder consultations — the first of its kind held by the ISA. Additionally, I have conducted interviews with former members of the LTC and the ISA Secretariat.

My analysis identifies the following main NGO interests: the environmental NGOs ask that “serious harm” be defined in terms of “significant adverse impacts” and “best available science”, whereas the private contractors want the “concept of scale” and “unlawful harm” to be included. The analysis further indicates that the environmental NGOs may have had some influence on the definition of “serious harm”, but not comprehensively so. Rather, as the definition of “serious harm” stands, it may benefit the private contractors more. Although some of the environmental NGOs’ interests are reflected in the definition of “serious harm”, the term remains largely undefined. This may give room for greater flexibility and subjectivity in interpretation for both the ISA and the private contractors. Viewed together with current institutional weaknesses of the ISA (Jaeckel 2017, pp. 290–292), the private contractors could arguably have an advantage in determining what “serious harm” actually is, and when an intervention may occur. Ongoing negotiations and recent developments may, however, alter this outcome.

Approaching NGO influence in a competitive context

Although global rulemaking is largely the domain of states, there is broad consensus that NGOs sometimes succeed in shaping international policies. Indeed, the influence that NGOs do or not exert has been subjected to thorough scrutiny, especially within the literature on International Relations (Arts 1998; Betsill and Corell 2001; 2007; Keck and Sikkink 1998; Knoke 1990).

When examining influence within this field, a widely used distinction is to characterize NGOs as being non-profit, as opposed to for-profit, and normatively motivated, as opposed to materially motivated (Martens 2002, p. 278; Sell and Prakash 2004, pp. 143–144). It follows that many studies of NGO influence focus on a single non-profit actor, or a group of such actors that largely hold similar objectives. More rarely is the phenomenon examined in light of competing interests, or systematically compared between opposing NGO groups — even if most issue-areas entail conflict (Bloodgood 2011, p. 117).

In contrast, I draw on a broader concept of NGOs. As in the leading works of Betsill and Corell (2007, p. 4) and Oberthür et al. (2002, p. 31), I define NGOs as permanent organizations that (1) are not formed by intergovernmental agreement, (2) have expertise or interests relevant to a given international institution (here, the ISA), and (3) express views independent of those of any national government. Thus, the spectrum of NGO actors includes private companies and multinational corporations that — particularly within deep-sea mining — are very often active in international policymaking.

The broad NGO concept adopted here helps to shed light on the competitive context in which regulatory development unfolds at the ISA. In particular, it allows for a greater range of interests, including conflicting ones. By extension, a clear dividing line emerges, at which environmental NGOs and private contractors largely stand on opposing sides. As evidenced by their comments in the consultation process, and as shown later, the former ones call for a conservationist and precautionary approach, in view of environmental risks and our still-limited knowledge about the deep sea. The latter ones wish to start exploitation in response to the growing demand for metals, while also emphasizing the need for predictability to attract investors. This perspective of competing interests ties in with the literature on interest groups but is surprisingly underused concerning NGO influence in international relations (Bloodgood 2011; Sell, Prakash, 2004, p. 168).

Relative influence: a measure

Given the “common heritage of [hu]mankind” principle, and the competitive context that characterizes rulemaking

at the ISA, it is pertinent to ask: Whose interests prevail? To answer that question, I examine the relative influence of the environmental NGOs and the private contractors, as compared to each other.

Of course, the study of *relative* influence in turn gives rise to a more fundamental issue: what is meant by *influence* in the first place? As in the works of Betsill and Corell, I understand “influence” as occurring “when one actor intentionally transmits information to another that alters the latter’s action from what would have occurred without that information” (Betsill and Corell 2001, p. 74). This understanding is based on the generally accepted assumption that information and knowledge are amongst the most important means whereby NGOs can shape international policies (Betsill and Corell 2001, p. 74; Keck and Sikkink 1998, p. 25; Sell and Prakash 2004, pp. 146–147; Tallberg et al. 2015, p. 214).

Accordingly, I assess relative influence along two dimensions: (1) the *gains* of the various actor groups, i.e. the number of times they have exerted influence; and (2) the *comprehensiveness* of these gains. Examination of the NGOs’ gains is based on their goal attainment (Betsill and Corell 2001, p. 76) — whether their main objectives are reflected in the definition of “serious harm”. In addition, this dimension controls for the potential influence of other actors. However, while giving an initial indication of relative influence, the number of gains alone can easily be misleading: even if gains are made, they may be fairly minor, and, consequently, the relative influence lower than at first glance. Therefore, I evaluate their comprehensiveness by holding them up against legislation and best practices within similar issue-areas. In this way, albeit without offering a legal analysis, already established regulations can be indicative of what is usually the norm/standard, and how far from it, or close to it, the gains of the NGOs are.

Methods and materials

Apart from comparison, my analysis of relative influence is based on process tracing, tracking the development of “serious harm” and its definition between 2014 and 2019. In this period, an ISA body consisting of 30 independent experts¹ — the Legal and Technical Commission (LTC) — was responsible for discussing and refining eight draft versions of the exploitation regulations, which were first formulated by the ISA Secretariat and external consultants. The LTC’s final draft was delivered to the Council, the ISA’s executive body, in March 2019, and is currently being negotiated by its 36 member states.

¹ The Legal and Technical Commission (LTC) was expanded in 2023, and now includes 41 members. See <https://www.isa.org.jm/organs/the-legal-and-technical-commission/>.

Regarding materials, I rely mainly on data from various documentary sources. The aforementioned eight drafts are used to trace the changes made to the definition of “serious harm” over time. To identify the main objectives and influence of environmental NGOs and private contractors, I have studied written comments made through six open consultations, held in parallel to the drafting process (Table 1).

Altogether 267 submissions were made through these consultations. Of these, 54 came from environmental NGOs and 32 from private contractors. The remaining 181 were submitted by ISA member states and other actors (Fig. 1). In the analysis, I use these to control for their possible influence. In addition, I have added a further control by studying reports issued by the Earth Negotiations Bulletin (ENB). ENB is an independent reporting service on UN environment and development negotiations. Between 2017 and 2019, it reported from five of the ISA’s main meetings. Finally, LTC and Council documents, as well as reports

Table 1 Overview of the draft exploitation regulations and consultations

2014, February	Stakeholder Survey. Available here Consultations
2015, March	Developing a Regulatory Framework for Mineral Exploitation in the Area. Available here Consultations
2015, July	Draft framework, High level issues and Action plan, Version II 15 July 2015. Available here
2016, February	Working Draft Regulations and Standard Contract Terms on Exploitation for mineral Resources in the Area. Available here Consultations
2017, January	A Discussion Paper on the development and drafting of Regulations on Exploitation for Mineral Resources in the Area (Environmental matters). Available here
2017, August	Draft Regulations on Exploitation of Mineral Resources in the Area (ISBA/23/LTC/CRP.3*). Available here Consultations
2018, June	Revised Draft Regulations on Exploitation of Mineral Resources in the Area (ISBA/24/LTC/WP.1). Available here
2018, July	Revised Draft Regulations on Exploitation of Mineral Resources in the Area (ISBA/24/LTC/WP.1/Rev.1). Available here Consultations
2019, March	Draft Regulations on Exploitation of Mineral Resources in the Area (LTC’s final draft) (ISBA/25/C/WP.1). Available here Consultations
2020–ongoing	Negotiations and adoption

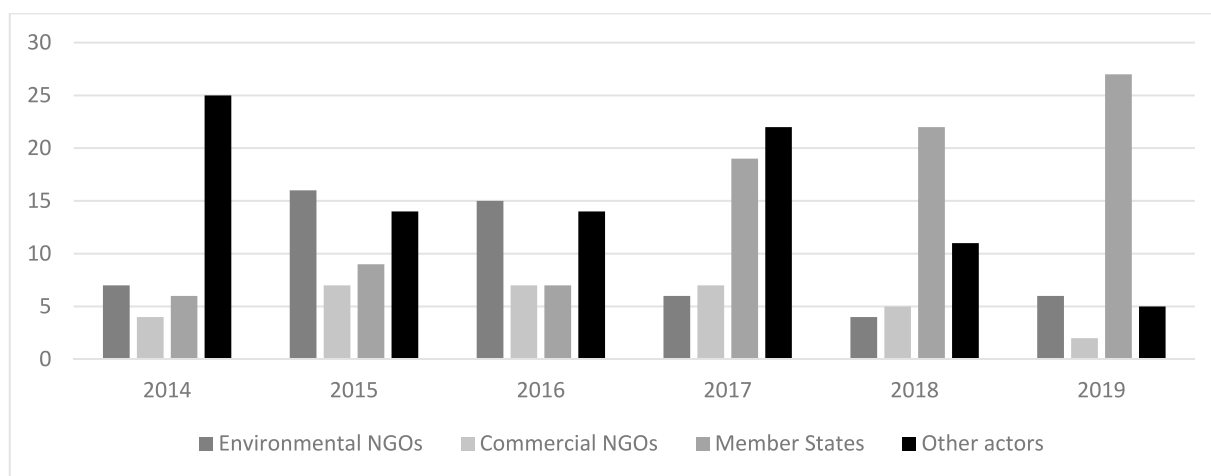


Fig. 1 Overview of submissions

from ISA workshops on environmental issues, form part of my data material.

To provide more insight into the decision-making of the LTC, I also conducted interviews with three former members, as well as two former members of the Secretariat, who all participated in the deliberations of the draft regulations. The interviews were conducted in 2022, apart from one carried out in early 2023. All of them were recorded and transcribed, and collection and storage of data was done according to requirements from Sikt — Norwegian Agency for Shared Services in Education and Research. Due to ethical considerations, especially the controversy of deep-sea mining, the interviewees were given full anonymity.

Selection of NGOs and submissions

When examining the NGOs' relative influence, some clarifications regarding the selection of those actors and their submissions are also in order. To start with, the category of environmental NGOs refers to all non-governmental organizations with interests related to the conservation and protection of the marine environment. This includes, but is not limited to, scientific ones, consultancies, and activist groups. Obviously, the environmental NGOs are far from a homogenous group. As such, this category is also a result of pragmatic considerations: In practice, it is nearly impossible to separate one actor's influence from another, as they largely share preferences (in some cases, parts of their submissions are in fact identical). By contrast, the more homogenous group of private contractors refers to those contractors, or mining companies set to become contractors, which are not owned by states. Private contractors of the ISA hold license to explore for minerals at the deep seabed beyond national jurisdiction. NGOs' submissions

have been selected according to each consultation round if they provide statements about "serious harm" that can be translated into identifiable objectives. Thus, those that simply state that "serious harm" should be defined, but not *how* this ought to be done, are excluded.

As shown in Table 2 the number of submissions made by environmental NGOs and included in the final sample totals 23; private contractors' submissions add up to 14. The environmental NGOs are mainly large international organizations, often connected to broad research networks, whereas the private contractors, especially Nauru Ocean Resources Inc. (NORI), are companies close or eager to start exploitation activity. Three of them — NORI, Tonga Offshore Mining Limited (TOML), and Marawa Research and Exploitation Ltd. — are owned by the Canadian entity The Metals Company (TMC).

At stake: to mine or not to mine?

Having set out the context and approach for examining relative influence, one question must be revisited before conducting the analysis: Why is "serious harm" so important in the first place — and why do the environmental NGOs and private contractors hold opposing interests in defining it?

"Serious harm" as a term in the context of deep-sea mining originates from Part XI of UNCLOS, which sets out the regime governing the deep seabed beyond national jurisdiction, also known as the Area. According to UNCLOS Article 162(2)(w), the ISA's Council is to issue emergency orders for the suspension or adjustment of operations to prevent "serious harm" to the marine environment arising out of activities in the Area. Further, Article 162(2)(x) gives the Council competence to disapprove areas for exploitation by contractors or the

Table 2 Overview of selected NGOs and submissions

	Selected environmental NGOs	Selected private contractors
Consultations 2014	Deep-Ocean Stewardship Initiative (DOSI) Deep Sea Conservation Coalition (DSCC) International Union for Conservation of Nature (IUCN) Terre Policy Centre	Tonga Offshore Mining Limited (TOML) UK Seabed Resources Ltd. (UKSRL)
Consultations 2015	Deep-Ocean Stewardship Initiative (DOSI) Deep Sea Conservation Coalition (DSCC) International Union for Conservation of Nature (IUCN) World Wide Fund for Nature (WWF)	Marawa Research and Exploitation Ltd Nauru Ocean Resources Inc. (NORI) Tonga Offshore Mining Limited (TOML)
Consultations 2016	Deep-Ocean Stewardship Initiative (DOSI) Deep Sea Conservation Coalition (DSCC) Earthworks Institute for Advanced Sustainability Studies (IASS) Oasis Earth	Global Sea Mineral Resources (GSR) Nauru Ocean Resources Inc. (NORI)
Consultations 2017	Deep-Ocean Stewardship Initiative (DOSI) Deep Sea Conservation Coalition (DSCC) The PEW Charitable Trust	Deep Ocean Resources Development (DORD) Nauru Ocean Resources Inc. (NORI)
Consultations 2018	Deep-Ocean Stewardship Initiative (DOSI) Deep Sea Conservation Coalition (DSCC) Neptune and Company Inc	Global Sea Mineral Resources (GSR) Nauru Ocean Resources Inc. (NORI) Tonga Offshore Mining Limited (TOML)
Consultations 2019	Deep-Ocean Stewardship Initiative (DOSI) Deep Sea Conservation Coalition (DSCC) International Union for Conservation of Nature (IUCN) The PEW Charitable Trust	Global Sea Mineral Resources (GSR) Nauru Ocean Resources Inc. (NORI)

Enterprise² if substantial evidence indicates a risk of “serious harm”. Accordingly, “serious harm” provides a crucial threshold for when the ISA can intervene — by rejecting applications for exploitation contracts and halting ongoing mining operations — to protect the marine environment.

This confers significant powers on the ISA. However, the Convention fails to specify exactly what “serious harm” involves and when it occurs; it simply leaves the term undefined. One reason may be to allow for some flexibility in meaning and interpretation — a common legal practice. Another point could be the low level of understanding of deep-sea biodiversity and ecosystems when the Convention was drafted. At the time, it was commonly assumed that mining could take place without causing serious environmental harm, because the deep sea was seen as a lifeless zone to begin with (Lily and Hughes 2020, p. 9; Levin et al. 2020, p. 4).

Since then, scientific surveys have documented the abundance of organisms living in the extreme conditions of the

deep sea (Rabone et al. 2023). Moreover, many organisms and their ecosystems are closely intertwined with the mineral resources on the seabed. Although data remain incomplete and scarce, and many species are yet to be discovered, it is now recognized that mining will cause harm to these marine communities. Indeed, *all* extractive industries inflict damage on some level. The crux of the matter, and of central concern the exploitation regulations, is to determine what type and amount of harm is acceptable, and when harm is approaching serious unacceptable levels, triggering an intervention.

For the environmental NGOs and private contractors, the controversy lies here. Firstly, it is inherently difficult to determine exactly where to draw the line. The lack of data and knowledge makes baselines inadequate, and the measurement of environmental impacts challenging at best (Levin et al. 2016, p. 248; Christiansen et al. 2022, p. 2). Thus, the unknown extent of environmental damage caused by deep-sea mining, together with limited scientific observations, and uncertainties as to those observations, suggests a management approach built around precaution. This implies a definition and operationalization of “serious harm” based on conservative/low thresholds that may be adapted as our understanding of the deep sea increases.

² The Enterprise is a currently non-operational organ of the ISA, mandated to carry out mining activities in the Area directly. See <https://www.isa.org/jm/organs/>.

Secondly, and by extension, this raises the question of how available technology, and its ecological footprint, compares to such a threshold. For polymetallic nodule extraction, set to be conducted in the Clarion Clipperton Zone (CCZ) between the coast of Mexico and Hawaii, dredging is the current collector system at hand. Through this system, nodules are pumped up to a surface platform, in the process creating two plumes: one sediment plume after nodules and sediments are separated from each other and the latter ejected at the back of the vehicle; and one plume of fine-grained particles created by the return water (Weaver et al. 2022, p. 4). Such plumes are likely to affect habitats and ecosystems at the mining site and beyond, and may even smother much of marine life (Amon et al. 2022, p. 8). In addition, ecosystems may be disrupted by the light and noise generated from mining activities (Williams et al. 2022). Ultimately, if such impacts are classified as “serious harm”, it may very well be a no go for companies and investors eager to start mining.

Altogether, while how “serious harm” is defined holds the potential to stop mining, it may conversely lead to the extinction of species and loss of habitats — a scenario whose short- and long-term consequences are unknown. Moreover, what harm is acceptable or not, and how explicit that threshold is, also affects monitoring, enforcement, and legal liability. Thus, both environmental NGOs and private contractors clearly have stakes in the outcome. Again, the question is: Whose interests, if any, prevail?

The evolution of “serious harm” in the draft regulations

To solve this puzzle, a prerequisite is to pinpoint the changes made to “serious harm” over time. Indeed, given its importance in the regulations, the ISA has made defining this term a priority from the inception of the drafting process. The concept occurs for the first time in the ISA’s initial stakeholder survey from 2014,³ when recipients were asked how “serious harm” should be defined and interpreted in the regulations on exploitation (ISA 2014, p. 9). Building on this work, the LTC released a regulatory framework in March 2015, followed by a revised version and action plan in July that same year. In both cases, the LTC recognizes that a “vast amount of work” needs to be done on the environmental part of the regulations, including agreement on the thresholds for “serious harm” (ISA 2015a, p. 27; 2015b, p. 30). In July 2015, the LTC further notes “serious harm” as “a key term in the exploration and

future exploitation codes”, making “operationalizing serious harm through background studies, expert input and subsequent review workshops” one of the priority deliverables for the ensuing 12 to 18 months (ISA 2015b, p. 52; LTC 2015, p. 16). The Council endorses this priority deliverable at the ISA’s 21 session (Council 2015, p. 1).

Accordingly, the term “serious harm” appears in the first working draft of the exploitation regulations issued in 2016 (ISA 2016a). However, it is not defined until January 2017, when the ISA issues a discussion paper on environmental matters. Here, “Serious Harm to the marine environment” means:

(...) any effect from activities in the Area on the Marine Environment which represents a *Significant Adverse Change* in the Marine Environment determined according to the rules, regulations and procedures adopted by the Authority, on the basis of Internationally Recognized Standards and practices. (emphasis added) (ISA 2017a, p. 99)

Further, “Significant Adverse Change”

...means important harmful changes in ecosystem diversity and integrity, the productivity of the biological communities within the Marine Environment; or the threat to human health through direct exposure to pollutants, or through consumption of exposed aquatic organisms; or important loss of aesthetic, recreational, scientific, or economic values (ibid).

This definition of “serious harm” is identical to the one adopted in the ISA regulations for prospecting and exploration on polymetallic nodules, polymetallic sulfides, and cobalt-rich ferromanganese crust, issued in 2000 (updated in 2013), 2010, and 2012 respectively (Assembly 2010; 2012; 2013). The further definition of “significant adverse change”, however, is a new element. Acknowledging the challenges in both defining and operationalizing this latter term, the discussion paper on environmental matters emphasizes that further measurement criteria must be developed by an expert working group (ISA 2017a, p. 99).

However, in August 2017, a new draft offers a sharply revised version of “serious harm”:

“Serious harm to the Marine Environment” means any Environmental Effect from activities in the Area on the living or non-living components of the Marine Environment and associated ecosystems beyond that which is negligible or which has been assessed and judged to be acceptable by the Authority pursuant to these Regulations and the relevant rules and regulations adopted by the Authority (ISA 2017b, p. 108).

This definition is based on parts of the one considered by the Preparatory Commission for the ISA in 1990

³ Here, it might be helpful to revisit Table 1. Overview of the draft exploitation regulations and consultations.

— but omits the original and additional reference to “serious harm” as that which also represents: “(a) significant adverse changes in the living and non-living components of the marine and atmospheric environment; (b) significant adverse changes in the ecosystem diversity, productivity and stability of the biological communities within the environment; or (c) loss of scientific or economic values which is unreasonable in relation to the benefit derived from the activity in question” (Preparatory Commission for the ISA and ITLOS 1990, art. 2(2)). As such, and in contrast to the previous definition, it now appears that the ISA alone can decide what environmental damage should or should not be considered as constituting “serious harm”.

Then, in June 2018, the definition is again changed drastically, back to the one used in the environmental discussion paper from 2017. One new element is, however, added, namely that the determination of “serious harm” should be informed by “Best Available Scientific Evidence”:

“Serious Harm” means any effect from activities in the Area on the Marine Environment which represents a significant adverse change in the Marine Environment determined according to the rules, regulations and procedures adopted by the Authority on the basis of internationally recognized standards and practices informed by *Best Available Scientific Evidence* (LTC 2018, p. 93). (emphasis added)

“Best Available Scientific Evidence” is further defined as:

The best scientific information and data accessible and attainable that, in the particular circumstances, is of good quality and objective, within reasonable technical and economic constraints and based on internationally recognized scientific practices, standards, technologies, and methodologies (ibid).

This definition is repeated in the two following drafts of July 2018 and March 2019. None of them includes an additional definition of “significant adverse change”, but rather relies on rules, regulations, and procedures yet to be adopted by the ISA. Although efforts have since been made at further defining and operationalizing both “serious harm” and “significant adverse change” in standards and guidelines (Secretariat 2018a, p. 12; 2019a, p. 8; ISA 2019a, p. 12), progress has been slow, with the ISA remaining largely silent on this issue. Recent events in 2022 and 2023, however, could indicate a change in direction. I briefly return to this matter when I discuss the implications of the forthcoming analysis, and in my concluding remarks.

Precision versus dilution? Main NGO objectives

Why did the definition end up in this exact manner, and did any of the NGOs participating in the consultations influence the outcome? In this section, I identify the NGO’s main objectives, before examining how these objectives coincide with the various definitions of “serious harm”.⁴

For the environmental NGOs, a recurring theme in their submissions, and what may be considered their first objective, is that “serious harm” should be defined in terms of “significant adverse impacts”. As stated by IUCN (2014, p. 16) and DOSI (2014, p. 16), this is in line with “current practice”; they have no wish to “unnecessarily change the meaning of the terms”. According to DSCC (2014, p. 2), “the widely accepted criterion of ‘significant adverse impacts’ should be adopted”, whereby “if a significant adverse effect, or threat of a significant adverse effect, occurs, mining should stop, pending an assessment of whether measures can be developed to avoid or remedy the effect or potential effect (...)” (ibid). Specifically, a majority of the environmental NGOs mention the UN Food and Agricultural Organization (FAO), and the International Guidelines for the Management of Deep-sea Fisheries in the High Seas, as one possible point of departure (2009) (DOSI 2014, p. 16; DSCC 2014, p. 2; DSCC 2015, pp. 11–12; IUCN 2014, p. 16; WWF 2015, pp. 4, 6, 24). Here, “significant adverse impacts” are defined as those that compromise ecosystem integrity in a manner that (i) impairs the ability of affected populations to replace themselves; (ii) degrades the long-term natural productivity of habitats; or (iii) causes, on more than a temporary basis, significant loss of species richness, habitat, or community types (FAO 2009, pp. 4–5).

However, the environmental NGOs also recognize the further necessity of, and continue to push for, a definition and operationalization of “serious harm”/ “significant adverse impacts” that is adapted to deep-sea mining. This second objective includes the development of baselines, criteria, indicators, and thresholds, i.e. what to measure, how to measure it, and, ultimately, setting a limit that impacts should not exceed (DOSI 2015, p. 9; 2016, p. 9; Pew Charitable Trust 2017, p. 4; DSCC 2018, p. 19; Neptune and Company 2018 p. 4). Terre Policy Centre (2014, p. 4) suggests that “serious harm” could be defined with stricter criteria such as irreversible harm and harm that threatens species presence. DSCC (2014, p. 22) underlines the “need to take into account impact on water column and species in the water column, as well as benthic impacts”, and DOSI (2015, p. 5) that “the concepts of species extinction risks,

⁴ As of writing, the submissions are on file with the author, but no longer available at the ISA’s webpage.

and disruption of population connectivity should be incorporated into the definition (...). In addition, any cumulative effects should be accounted for (DSCC 2017, p. 16). WWF (2015, p. 3) notes that “an adequate environmental baseline” should be established to enable the development of “strategies to avoid significant adverse impacts (SAIs) to [Ecologically or Biologically Significant Marine Areas] EBSAs and [Vulnerable Marine Ecosystems] VMEs (...)”. Finally, DOSI refers to a recent publication by some of its experts titled “Defining ‘serious harm’ to the marine environment in the context of deep-seabed mining”. Amongst other things, they highlight measures of biodiversity, abundance, habitat quality, population connectivity, heterogeneity levels, and community productivity as metrics that may serve as threshold indicators (DOSI 2016, p. 9; Levin et al. 2016, p. 248). Deep concern is a consistent theme across the submissions, as operationalization is a prerequisite for several regulations in the drafts to function. In particular, this applies to the act of disapproving areas for exploitation and contractors’ applications, in cases where a risk of “serious harm” exists (DOSI 2016, p. 9; WWF 2015, p. 17; Earthworks 2016, p. 2).

The third and last objective of the environmental NGOs highlights the lack of knowledge, and the importance of identifying what must be known to avoid “serious harm”. DOSI (2017a, p. 19) emphasize that the term “urgently needs to be defined by environmental experts and included in the regulations”. Likewise, DSCC (2017, p. 4) reminds the drafters that “the aim should be to avoid significant adverse effects, and to implement best available science”. Also, the Pew Charitable Trust (2017, p. 4) cautions that “serious harm” should be “based on and updated according to best available science”.

In contrast, the first objective of the private contractors is to define “serious harm” according to the “concept of scale”. As noted by Tonga Offshore Mining Limited (TOML) (2014, p. 12), the ISA needs to “recognize that mined area is likely to be very small part of overall CCZ resource”. Also, Marawa Research and Exploitation Ltd (2015, p. 8) underlines that the CCZ “essentially contains one single large deposits of polymetallic nodules (...)”, and that “the area of the impact should be considered in the context of the CCZ as a whole”. It draws the conclusion that “while some mineral development impact may be significant in defined local areas, such impact may not be significant in terms of the CCZ (...)”, as seen in its entirety. Likewise, “Nauru Ocean Resources Inc (NORI 2018, p. 4) emphasizes that “it is important that the term ‘Serious Harm’ is not defined in such a way as may be used to prevent the very act of exploitation from being approved” and that, therefore, “the threshold needs to be set higher and the concept of ‘scale’ introduced”. It is assumed that “at the scale of the mining operation it may be arguable that there is a significant adverse change”, but that this is less likely at the regional scale (ibid).

In addition to their first objective, the private contractors express the following, second objective: That “unlawful” harm should be the threshold for stopping an ongoing mining operation to protect the marine environment, and that this concept should be included in the definition of “serious harm”. Whereas the draft regulations require the contractors to suspend activities if there is a risk of “serious harm” to the marine environment, NORI (2018, p. 4) notes that “as is the case with all extractive activities, there will be an environmental impact, which is the cost incurred by society to obtain the raw materials essential for global social and economic development”. NORI further acknowledges that the ISA is establishing these regulations in order to permit exploitation in the Area, and (...) understands that it is not the intention (...) to prevent normal exploitation activities from occurring” (ibid). Thus, the “serious harm” that the ISA is trying to prevent should explicitly be that which (i) exceeds what was reasonably expected to occur when the Plan of Work was approved; or (ii) results from a wrongful act; or (iii) is caused by the Contractor carrying out activities that have not been permitted under and approved Plan of Work (ibid, p. 10). This suggestion is echoed by Global Sea Mineral Resources (GSR) (2018), p. 6), who states that production should only be temporarily reduced or suspended if it is required to protect the marine environment from unlawful harm, meaning “a type of serious harm that exceeds what was foreseen in the Plan of Work, is caused by activities not permitted under the Plan of Work, or is caused by a wrongful act”. Also, TOML (2018, pp. 1, 6) indicates that “serious harm” and “significant adverse change” is “beyond that which was reasonably anticipated in the Plan of Work or Contract”.

Importantly, the NGOs’ objectives, as reflected in their submissions and summarized in Table 3, differ quite substantially from each other. On the one hand, the environmental NGOs make efforts at specifying the definition and the point at which “serious harm” actually occurs.

By contrast, the efforts of private contractors appear to be aimed at providing predictability as to when the ISA can or cannot intervene, while also diluting the definition somewhat. Surely, assessing environmental damage on a regional scale is crucial as it enables the study of combined effects from several parallel projects, as well as cumulative effects. However, current limitations in terms of baselines and data may undermine the very ability to measure and monitor environmental changes in the CCZ as a whole accurately (Jaeckel 2017, p. 277).⁵ In addition come the varying sampling methods used (Clark 2019, pp. 457–458), which means that combining collected data in larger-scale analysis may, at this point, be challenging. As such, determining the risk of “serious harm” regionally becomes a demanding task. Moreover, various species and populations are believed to

⁵ The Clarion Clipperton Zone spans 4.5 million square kilometres; Jaeckel, note 6, 277.

exist only locally: they could be wiped out by significant disturbances at this scale. This shows the need to assess impacts also at smaller scales when evaluating “serious harm”.

As for unlawful harm, a definition based on this concept could imply that ongoing operations need not be adapted if “serious harm” is detected. As stated by NORI: “if there is a ‘significant adverse change’ to the environment caused by the contractor simply carrying out the permitted Plan of Work, this will not fall within the definition of ‘serious harm’” (NORI 2018, p. 5).

Relative influence: a partial win for the environmental NGOs?

Having identified the environmental NGOs’ and private contractors’ main objectives, I now turn back to the starting point, namely whose interests prevail. Accordingly, instances of goal attainment — that is, congruence between the NGOs’ main objectives and the various definitions of “serious harm” — are established, and the causal link between them discussed. Whereas no instances of goal attainment by the private contractors are found, two possible gains made by the environmental NGOs are detected and considered in this section.

First gain: re-instating “significant adverse change”

The first main objective of the environmental NGOs is that “serious harm” be defined as “significant adverse impacts”, meaning impacts that compromise ecosystem integrity. Some congruence is found between this objective and the content of “serious harm” already in January 2017, when the first definition appears in the discussion paper on environmental matters. At this point, the draft regulations refer to “significant adverse change” when defining “serious harm”, a concept that at least in wording appears close to the preferences of the environmental NGOs. However, this outcome should not be seen as a result of the environmental NGOs’ input to the consultation process. Rather, as that definition of “serious harm” is identical to the one applied in the ISA’s exploration regulations, it originates here.

Interestingly, the same discussion paper further defines “significant adverse change”, meaning amongst other things “important harmful changes in ecosystem diversity and integrity”. This also coincides with the environmental NGOs first objective. Moreover, “significant adverse change” has not been defined in other regulations. Thus, while it is later removed, it may be a result of their efforts. Any clear conclusions are, however, difficult to draw, as formal consultations were neither conducted beforehand nor after the release of this document. As such, in this case, any attempts at exerting influence must have occurred through other channels.

Yet, what speaks in favour of the environmental NGOs causing “significant adverse change” to be part of the final definition included in the draft regulations of June 2018, and thereby a certain degree of goal attainment, are the following events. In August 2017, a new draft of the exploitation regulations is made public by the ISA secretariat. At this point, no attempts have yet been made to reflect the views of the LTC on the draft (Secretariat 2017, p. 1). Still, the definition of “serious harm”, as compared to the one in January 2017, is changed considerably. It is not based on the exploration regulations, nor on “significant adverse change”: rather, it states that by “serious harm” is meant any environmental effect beyond that which is negligible, or which has been assessed and judged to be acceptable by the ISA. As mentioned above, this definition builds on the Preparatory Commission’s definition from 1990, but excludes the references to “serious harm” as that which also represents: “(a) significant adverse changes in the living and non-living components of the marine and atmospheric environment; (b) significant adverse changes in the ecosystem diversity, productivity and stability of the biological communities within the environment; or (c) loss of scientific or economic values which is unreasonable in relation to the benefit derived from the activity in question” (Preparatory Commission for the ISA and ITLOS 1990, art. 2(2)). While these subsections, especially (a) and (b), would have naturally led to the monitoring of particular indicators of the ecosystem’s health, such as abundance, diversity, productivity and stability (Ardron 2020, p. 20), the definition of “serious harm” is now left with a “subjective” or “self-referential” criterion (Currie and Morato 2017, p. 20).

Table 3 NGOs’ main objectives

Environmental NGOs	Private contractors
(1) “Serious harm” should be defined in terms of “significant adverse impacts”, i.e. impacts that compromise ecosystem integrity	(1) “Serious harm” should be defined according to the concept of scale, i.e. regional, not local impact
(2) “Serious harm”/ “significant adverse impacts” should be further defined and operationalized in the context of deep-sea mining, including criteria, indicators and thresholds	(2) “Serious harm” should be defined as unlawful harm, i.e. that which (i) exceeds what was reasonably expected to occur when the plan of work was approved; or (ii) results from a wrongful act; or (iii) is caused by the contractor carrying out activities that have not been permitted under an approved Plan of Work
(3) The definition/determination of “serious harm” should reflect expertise and best available science	

Although the Preparatory Commission's definition of "serious harm" had earlier been addressed in the discussion paper on environmental matters, as well as at workshops attended by several of the environmental NGOs (ISA 2016b; 2017c), that was largely in the context of needing further operationalization, environmental goals and objectives, and indicators. Indeed, in a letter to the ISA, DOSI (2017b, p. 8) states that part (b) of that definition "should be *expanded* to include more aspects of the marine ecosystems of interests". As such, the abbreviated version of "serious harm" included in the 2017 draft seems to have been an unexpected move. Consequently, this change in definition creates a counterreaction amongst the environmental NGOs, as expressed in the following round of consultations. For instance, DSCC (2017, pp. 4, 16) states that "the definition of 'serious harm' is in need of amendment" as "clearly serious harm can never be acceptable. The aim should be to avoid significant adverse effects (...)". As such, the ISA "should not judge 'serious harm' as acceptable". Also, DOSI (2017a, p. 19) emphasizes the need for revision as "with the current definition, the Authority [ISA] judges what is acceptable". Likewise, the Pew Charitable Trust (2017, p. 4) stresses that "the definition of 'serious harm' provided for in the draft regulations is in need of amendment, as it appears to no longer be a science-based standard", indeed it "could be incompatible with the requirements of Article 192, the obligation to protect and preserve the marine environment; Article 194.5, the obligation to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life; and the Sustainable Development Goal (SDG) 14.2 commitment to avoid significant adverse effects".

Then, in the new draft released in June 2018, following stakeholder consultations, the definition is reversed. Now, "serious harm" again incorporates the qualitative threshold of "significant adverse change", which is to be determined according to the ISA's rules and regulations as well as recognized international standards and practices. That this turnaround is due at least partly to the environmental NGOs' inputs appears likely, especially as regards the timing and the backlash described above. To some extent, additional data point in that same direction: At the Council meeting held March 5–9, 2018, the President specifically requests the LTC to review, amongst other, the definition of "serious harm" in the draft regulations, in light of the submissions made through the consultation process (Council 2018a, p. 10). The definition of "serious harm", together with other key issues, is considered at the following LTC meeting held March 13–16, 2018 (Council 2018b, p. 2), and the Secretariat is further requested by the LTC to take into account these deliberations in

revising the draft regulations (*ibid*, p. 3). While there is no way of knowing exactly what went on in these deliberations, it is reasonable to assume that the Secretariat followed advice from the LTC, as one of its functions is to provide such secretariat services when asked to.

As for the remaining actors involved in the consultations, only Tonga (Tonga 2017, p. 2) and the African Group⁶ (Algeria 2017, p. 14) — apart from the environmental NGOs — briefly criticize the definition of "serious harm" and the absence of precaution. Also, the UK raises concerns and recommends the application of the precautionary principle, but agrees to the threshold of "negligible", as opposed to "significant adverse change" (UK 2017, p. 14). Similarly, at the Council meeting held in August 2017, just after the draft regulations had been released, Jamaica is the only member state to briefly mention "serious harm" — although not how it should be defined — according to the Earth Negotiations Bulletin (Earth Negotiation Bulletin, 2017a, p. 1; 2017b, p. 2). At the Council meeting in March 2018, only Australia, according to Earth Negotiation Bulletin, refers so "serious harm" — but solely by emphasizing the importance of this and other definitions in the draft regulations (Earth Negotiation Bulletin 2018).

As for the interviews, one interviewee who was a member of the Secretariat confirms that the Preparatory Commission's definition of "serious harm" was seen as "worth exploring as it seemed more practical in its approach" (interview, 19.05.22). At the same time, it was agreed to solicit stakeholder feedback (*ibid*). Another interviewee, also working at the Secretariat, recalls disagreement within the ISA drafting team, as to whether the ISA alone should be able to decide what harm is acceptable. Although stakeholder feedback would be collected through the consultations, this was still deemed problematic because relatively few tended to participate (interview, 28.10.22). Either way, the August 2017 draft was released including the then-definition of "serious harm", and stakeholder consultations were conducted. The three former members of the LTC recall that, generally, all stakeholder comments received, including summary documents from the Secretariat, were thoroughly scrutinized (interviews, 28.01.22; 09.09.22; 03.03.23). However, while none of them excludes the possibility of the environmental NGOs having an effect on the definition of "serious harm" and the changes made to it — indeed, some consider it likely — details of that discussion are, unfortunately, hard to track down (*ibid*).

⁶ The African Group is one of several regional groupings at the ISA and represents 47 nations.

Second gain: adding “best available scientific evidence”

The drastic changes made to the definition in August 2017 also lead the environmental NGOs to emphasize that the determination of “serious harm” must be based on best available science, as reflected in their third objective. One reason for this may be to underscore the scientific process central in evaluating harm, including reliable baseline data and avoidance of inferior sampling methods. Moreover, the use of best available science could provide greater room for the precautionary approach. Indeed, this term and similar are used in other international regimes requiring that decision-making must be based on the best scientific information available at the time, rather than waiting for all relevant data to be collected or proof that a problem actually exists (Goldsworthy 2022, pp. 53–54).

In this case, as in the case above, congruence is found between the environmental NGOs’ objective and the revised definition issued in June 2018. Now, the determination of “serious harm” is to be informed by “best available scientific evidence”, a term first introduced by the ISA in its environmental discussion paper from January 2017. Certainly, its inclusion in the definition of “serious harm” leaves less doubt regarding the role of science — as opposed to the role of the ISA — in assessing and judging what impacts are acceptable and not. As such, is in line with the preferences of the environmental NGOs.

Again, this congruence is interesting, especially due to timing. That the change in definition may have occurred due to stakeholder submissions is further supported by a briefing note prepared by the Secretariat for the March 2018 meeting of the Council. In this briefing note, the Secretariat summarizes all stakeholder submissions, including how several stress “that the definition of serious harm should be based on *best available science* and the precautionary principle” (Secretariat 2018b, p. 7). One intent behind the note was to enable the Council to provide “appropriate guidance to support the Legal and Technical Commission in its ongoing regulatory development role” (ibid, p. 4). It is reasonable to assume that the information contained in this document did reach the LTC, as it is the Council, within the decision-making structure of the ISA, that gives direction to the LTC.

With regard to the remaining actors in the consultations, as above, only the African group and Tonga, apart from the environmental NGOs, directly mention “best available science” as an important basis for determining “serious harm” (Algeria 2017, p. 14; Tonga 2017, p. 2). As for the reports made by the Earth Negotiation Bulletin, none of the ISA’s member states mentions “best available science”, neither in 2017 nor in 2018.

Amongst those interviewed, one then-member of the LTC states that the term, in general, was introduced

quite early in the drafting process, and that it was based on similar language in regulatory frameworks originating from other jurisdictions (interview, 03.03.23). Another then-member states that the intention of best available scientific evidence, as used across the drafts and not specifically tied to “serious harm”, was to capture many complex problems in a manner that is adequately open to future advanced knowledge (interview, 09.09.22). Neither interviewee, however, recalls any discussions related to the inclusion of the term in the definition of “serious harm” (interviews, 09.09.22; 03.03.23). Yet, one person at the Secretariat recalls discussing best available scientific evidence, and its inclusion in connection with “serious harm”, with one environmental NGO representative. The idea was to create time and room for scientists to warn if there was a risk of destroying ecosystems and habitats at the deep seabed, although both recognized that this would be challenging due to the ISA’s limited capacity to conduct monitoring (interview, 28.10.22).

Confidence in findings

Having identified the possible gains made by the environmental NGOs and discussed their causal connection, a short note on the reliability of the findings is in place. After all, despite efforts at a systematic approach towards assessing relative influence, challenges exist that should not be overlooked. Indeed, it is difficult to determine instances of influence with a high degree of certainty, and the NGO literature has struggled with a problem of over-determination (Betsill and Corell 2001, p. 71). One challenge here is the limited transparency of the ISA, and especially the LTC. The lack of meeting minutes makes it hard to know what information is missing from the analysis, as there is no public documentation of the content and details of LTC discussions. Although interviews have provided more insight into the process, no clear conclusions can be drawn based on them. In particular, this makes it challenging to clearly separate the effects of the environmental NGOs, from the possible effects of those few member states that also commented on “serious harm”. Nevertheless, the data do suggest that the stakeholder submissions were important, with the environmental NGOs as the most active actors who also provided the most specific comments in terms of criticizing the definition of “serious harm”.

Comprehensiveness of gains

Although uncertainties exist with regard to influence, the previous sections indicate that the environmental NGOs may have been more successful than the private contractors. Based on the analytical framework, no gains — i.e. instances of goal attainment — are found

on behalf of this latter actor group. Accordingly, NORI continues to express dissatisfaction in its 2019 submission, as illustrated by the following statement: “The definition of ‘serious harm’ needs to be changed so as it cannot be interpreted to prevent the very activity of exploitation from occurring” (NORI 2019, p. 4). Yet — how comprehensive are the possible gains made by the environmental NGOs?

No definition Returning to the first gain — re-instating “significant adverse change” as the qualitative threshold after it was removed — one thing is clear: In choosing not to further define “significant adverse change”, the ISA is in practice left with no definition of “serious harm”. This potential deficiency also ties in with the environmental NGOs’ second objective which is not met, i.e. the need for a further definition and operationalization in the context of deep-sea mining, including criteria, indicators, and thresholds. The question is, how is “serious harm”/ “significant adverse change” defined in other regimes — and what can be learnt from them?

This issue has partly been addressed by Mengerink (2018, p. 465), who notes that “significant adverse change”, as applied by the ISA, is similar to the language of environmental impact assessment (EIA) regimes. In such regimes, EIAs are usually required if proposed activities are expected to cause “significant impact” or “significant effects”. By reviewing various international and national management systems,⁷ she derives seven factors as relevant in determining the significance of harm caused by deep-sea mining: (1) extent of impact, (2) duration and frequency of impact, (3) intensity and magnitude of impact, (4) probability of impact, (5) sensitivity and vulnerability of ecosystem, (6) cumulative effects of impacts, and (7) scientific uncertainty related to impact (ibid, p. 472).

However, while these factors may indicate what should be taken into account when evaluating the risk of “serious harm”, it is important to note that significant impacts/effects as used in most EIA regimes, and “significant adverse change” as used in relation to “serious harm”, are in part different concepts. As recognized by Mengerink, while the former triggers management actions — such as an EIA in the first place and mitigation measures — “serious harm” triggers high-level and substantial response measures, such as rejecting an application, prohibiting exploitation in a

particular area, or halting ongoing mining activities (ibid, p. 465).

Of perhaps greater relevance, at least as considered by the environmental NGOs themselves, is the term “significant adverse impacts” as applied in the FAO’s International Guidelines for the Management of Deep-Sea Fisheries in the High Seas (2009). These guidelines were developed in response to a United Nations General Assembly Resolution adopted in 2006, that called upon states and regional fisheries management organizations (RFMOs) to, amongst other, “assess, on the basis of the best available scientific information, whether individual bottom fishing activities would have *significant adverse impacts* on vulnerable marine ecosystems and to ensure that, if it is assessed that these activities would have *significant adverse impacts*, they are managed to prevent such impacts, or not authorized to proceed” (UNGA 2006, para 83(a)).

Arguably, “significant adverse impacts” as a trigger to not let activities proceed, that is, begin or continue a course of action, are more in line with “serious harm” and the events that may follow in its wake. Comparison of these two concepts, however, shows that the FAO guidelines go to greater lengths in terms of providing a definition. As mentioned earlier, significant adverse impacts are defined as “those that comprise ecosystem integrity (i.e., ecosystem structure and function) in a manner that: (i) impairs the ability of affected populations to replace themselves; (ii) degrades the long-term natural productivity of habitats; or (iii) causes, on more than a temporary basis, significant loss of species richness, habitat or community types” (FAO 2009, p. 4). Additionally, the guidelines state that impacts should be evaluated individually, in combination and cumulatively, and also list what factors should be considered when determining the scale and significance of an impact (ibid).

Lastly, in considering the comprehensiveness of the environmental NGOs’ gain, legislation regarding the concept of “serious harm” from the dredging industry may provide additional insight. One best practice highlighted as relevant to deep-sea mining is that carried out by the Environmental Protection Agency (EPA) of Western Australia (Grogan 2017, pp. 26–27). EPA’s technical guidance for environmental impact assessments of marine dredging proposals refers to “serious damage”, defined as “damage to benthic communities and/or their habitats that is effectively irreversible or where any recovery, if possible, would be unlikely to occur for at least five years” (EPA Western Australia 2021, p. 31). The guidance is based on the “zone of influence” approach, where no serious damage should be predicted to occur outside the Zone of High Impact, i.e. in the Zone of Moderate Impact or the Zone of Influence (ibid, p. 14). An additional technical guidance document for how to consider and present predictions of impacts is also provided (EPA Western Australia 2016).

⁷ Convention on Biological Diversity (CBD); Espoo Convention on Environmental Impact Assessment in a Transboundary Context; International Guidelines for the Management of Deep-sea Fisheries in the High Seas; Australia’s environmental impact assessment related to seabed mining; South Africa’s National Environmental Management Act: Environmental Impact Assessment Regulations.

Although based only on a limited number of legislation and best practices, the references above show that the concept of “serious harm”/ “significant adverse change” has been defined and operationalized in different ways exceeding the definition currently applied by the ISA. Adopting any definition to fit deep-sea mining may of course be time consuming and resource demanding due to limited knowledge and data. Still, few efforts had at the time been made by the ISA, which further underlines that this gain is not very comprehensive.

No scientific committee The second possible gain made by the environmental NGOs is the inclusion of “best available scientific evidence” in the definition of “serious harm”. In essence, this means that the determination of “serious harm”, or a risk of “serious harm”, should be informed by “the best scientific information and data accessible and attainable that, in the particular circumstances, is of good quality and objective, within reasonable technical and economic constraints and based on internationally recognized scientific practices, standards, technologies, and methodologies” (LTC 2018, p. 90).

Using best available science to inform policy and decision-making, particularly with regard to conservation measures and resource management, is today quite common at the national and international levels (Sullivan et al. 2006, pp. 460–465; Darren et al., 2010, p. 821–882; Köhler 2019; Goldsworthy 2022). However, determining what constitutes the best available science is not straightforward, especially not if stakeholders have differing interests, as well as disparate ideas of how to interpret the concept (Sullivan et al. 2006, p. 460). For this reason, to avoid politicization and ensure transparency, many international treaties and organizations, as well as national management bodies, rely on advice from scientific committees. Examples include the 1982 Convention on the Conservation of Antarctic Living Resources, as well as the 1998 Convention for the Protection of the Marine Environment of the North-East Atlantic.

Generally, there is extensive precedence for institutionalizing the provision of scientific and technical advice (Köhler 2019, p. 1). However, although this is largely the norm in recent environmental and resource management, there is as yet no scientific committee within the ISA — despite considerable uncertainty and scientific gaps related to effective environmental management of deep-sea mining (Amon et al. 2022). Rather, the task of evaluating best available scientific evidence would fall within the remits of the LTC, even if the LTC’s expertise, which mainly consists of lawyers and geologists, and only a few environmental scientists and experts on marine ecology, has been questioned as regards assessing environmental data (ibid, pp. 289–290; Christiansen et al. 2022; Billett et al. 2023). In meeting this challenge, the LTC may, according to its final draft regulations (2019),

seek further advice from “independent competent persons”. Yet, in parallel discussions, the ISA has highlighted that the use of such external expertise should not be an overly bureaucratic and formalistic process, that it should neither replace nor undermine the roles and responsibilities of the LTC, and that any involvement must be discretionary and not mandatory (Secretariat 2018c, pp. 4, 5, 9; ISA 2019b, pp. 1–5; Secretariat 2019b, pp. 7–8; LTC 2019, p. 4). Thus, as of this writing, how this procedure will be carried out, and whether it will ensure the use of external scientific expertise when needed, is an open question.

Altogether, whereas the use of best available scientific evidence could provide some rigor to compensate for what is, as of yet, an insufficient definition of “serious harm”, procedures to judge what such evidence actually is appear weak. In effect, there may be a potential to apply the science that is most advantageous in terms of the interests held by any one actor. Therefore, neither does this gain appear very comprehensive.

Implications of analysis

Although the analysis does not discover any direct influence on parts of private contractors, this section illustrates how their interests may still be the ones to prevail. In part, this point relates to the environmental NGOs’ lack of comprehensive gains, as well as the one objective they are not able to achieve: further defining and operationalizing “significant adverse change”, and thus the ISA’s threshold for rejecting an application and intervening to stop a mining operation.

Terms such as “significant impact” and “significant adverse change” are subjective in nature, which requires that regulations give guidance to regulators, contractors, and stakeholders on how to assess such impacts and whether they cause “serious” environmental harm (Grogan 2017, pp. 26–27). However, although the ISA drafted binding standards and recommendatory guidelines to complement the exploitation regulations between 2019 and 2022, none of these makes reference to “serious harm” and “significant adverse change”, or what to measure and how to avoid crossing the line. Conversely, then, the absence of a definition and operationalization, or any further instructions, may provide more room for the private contractors to decide for themselves how to define and measure “significant adverse change”: what criteria to be included, what indicators to use, and what thresholds to stay below. A recent event may, however, help counter such an outcome. In November 2022, the Council adopted a decision to develop binding environmental threshold values, including the maximum level of harm that can be considered acceptable — a process that started in the

end of 2023 (ISA 2022, p. 2). Whereas “serious harm” is not mentioned in that decision, it is plausible that these threshold values will have a bearing on its definition when finalized.

That said, the lack of an explicit definition is not necessarily uncommon in extractive industries, and exactly where the bar for what is considered “significant” or “serious” by the regulator is, may be vague. Indeed, as noted by Clark (2019, p. 451), when it comes to both deep-sea mineral resource types and locations, there is variation in environmental characteristics. This requires the ISA to find a balance between prescriptiveness and flexibility in its regulations, perhaps also when it comes to “significant adverse change”. However, should the ISA end up with a vague definition, where limited guidance is provided, and where subjectivity is central, a robust process is required by the regulator to assess whether a contractor may cause “serious harm”. Also, as is the case in any contractor-driven process, the potential for bias must be understood and guarded against (Doelle, Sander, 2020, 516). This requires expertise, availability, support staff, and information systems, amongst other things (Kung et al. 2021, p. 9). However, the ISA’s institutional capacity is currently lacking in that regard. This is especially so for two of the processes that are central in assessing the potential and actual harm of an activity, and whether “serious harm” is involved: review of environmental impact statements (EISs) and monitoring of the effects caused by ongoing mining operations.

In both processes, the Legal and Technical Commission (LTC) plays an important role. It is the responsible organ when it comes to reviewing the EIAs/EISs submitted by contractors as part of the project approval process, including expected impacts and mitigation measures, as well as the relative importance and acceptability of residual impacts. Also when it comes to monitoring and compliance, is it the LTC that reviews the annual reports produced by contractors, as well as the performance assessments conducted in relation to their Environmental Monitoring and Management Plans (EMMPs). However, the LTC, which usually meets only twice a year for a total of 4 weeks, already has a large and growing workload. As others have recognized, this is the case even prior to the commencement of the exploitation phase, and its workload is thus likely to keep increasing (Jaekel 2017, pp. 290–292). In addition, as emphasized above, the LTC’s scientific expertise in terms of assessing environmental data has been questioned (ibid, pp. 289–290; Christiansen et al. 2022, p. 3). Despite these challenges, and the fact of being only an advisory organ, the LTC wields considerable informal power. Although its discussions are held behind closed doors, recommendations agreed upon by its members form the basis of Council decisions. Its informal power is particularly evident in the project approval process: if the LTC recommends that an application

be approved, including the EIS, the Council needs a two-thirds majority of its members present and voting, including a majority of members present and voting in all chambers, to reject and overrule that recommendation (ISA 1996, rule 70).

Summing up, this current combination of subjectivity and a lack of robust regulatory process could benefit the private contractors, because it provides more leeway in interpretation of “serious harm” and “significant adverse change”, but not necessarily a regulator that is strong enough to challenge or guard against it.

Concluding remarks and current developments

While the mineral resources of the Area — our common heritage — belong to “[hu]mankind as a whole”, controversies have arisen as to how humankind is comprised and spoken for within the ISA. The debate has gained increasing momentum as deep-sea mining nears reality, the polarization between commercial and environmental views is at a peak, and inclusion of non-governmental organizations at the ISA remains low. However, despite several scholarly contributions within this field, none have studied the actual influence exerted by NGOs through stakeholder consultations, and what interests prevail in this rulemaking arena.

By focusing on the definition of “serious harm” — a part of the regulations where the conservation-exploitation dividing line is evident — and the environmental NGOs and the private contractors’ submissions, the analysis has enabled an observation of competing interests and which ones, if any, are taken into account when drafting the ISA’s exploitation regulations. Although uncertainty exists, the environmental NGOs appear to have been more successful in that two of their main objectives are included, whereas evidence supporting any direct influence on parts of the private contractors is absent. However, the environmental NGOs’ lack of comprehensive gains, and the fact that their second objective — operationalizing “serious harm”/ “significant adverse change” — has not yet been met, gives greater room for flexibility and subjectivity in determining what these terms constitute. In practice, when combined with certain institutional weaknesses of the ISA and limited scientific expertise within the organization, this situation may prove to be more consistent with the private contractors’ interests. Indeed, the way in which “serious harm” was defined in 2018 provides less of a threshold for when applications may be rejected, or ongoing mining operations stopped, to protect the marine environment. Moreover, leaving the meaning of “significant adverse change” uncertain may offer contractors an opportunity to affect how this threshold is defined, in the absence of a strong regulator.

Of course, one limitation of the analysis is the lack of transparency that characterizes the rulemaking processes at the ISA. This reduces access to data that could shed additional light on my research question. Importantly, it also makes it hard for the NGOs themselves to understand whether their interests have been considered, in turn potentially lessening their trust in and ability to hold ISA decision-makers accountable.

Another complicating factor is the effort to study a still ongoing process. While I examine the period up until 2019, when the LTC delivered its final draft to the ISA Council, negotiations between member states have since commenced. The final outcome of these negotiations remains unknown. Yet, some recent events are worth noting. In November 2022, as mentioned above, the Council decided to start a process to develop binding environmental threshold values, including the maximum level of harm that can be considered acceptable, and focusing on the following topics: (i) toxicity; (ii) turbidity and settling of resuspended sediments; and (iii) underwater noise and light pollution (ISA 2022, p. 2). At the end of 2023, an intersessional group of scientific and technical experts, chaired by LTC members, started its work which will be ongoing until July 2024 (LTC 2023, p. 7). However, only time can tell when these thresholds will be ready, and the exact significance they will hold for the definition of “serious harm”, the private contractors and the prospect of exploitation. Secondly, in March 2023, a new amendment was made to the definition of “serious harm” in the then-draft version negotiated by the Council. As long requested by the private contractors, and repeated by NORI, TOML, and Blue Minerals Jamaica Ltd. earlier in 2023 (2023, p. 7), “serious harm” was defined as “an *unlawful* significant adverse change” (ISA 2023). This change of wording — if it stands — must be recognized as an important gain on their part.

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Declarations

Conflict of interest The author declares no competing interests.

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