2023

Sustainable Seabed Mining and the Phase 1 Environmental Standards and Guidelines

Keith MacMaster

Sustainable Seabed Mining - The Phase 1 Environmental Draft Standards and Guidelines

Keith MacMaster,
Schulich School of Law, Dalhousie University
kemacmas@dal.ca*

Abstract

The oceans are home to a rich diversity of plant and animal life and a source of food and marine resources that drive economies. Climate change and pollution are changing ocean dynamics and the ability to support life. Seabed mining in areas beyond national jurisdiction will add to the ocean's stressors and could cause severe environmental damage. The International Seabed Authority ("ISA") is mandated to manage access to and benefits from the seabed, its subsoil and mineral resources in areas beyond national jurisdiction (the "Area"). Although the *United Nations Convention on the Law of the Sea* sets out the legal framework for developing the Area and its resources, it does so in broad terms and leaves substantial gaps. These gaps include the scope of activities in the Area, the interrelationship of international obligations, the division of responsibilities between the ISA and sponsoring states, and the regulation of the mining system in situ. To partially fill these gaps, the ISA has drafted a set of "Phase 1" Standards and Guidelines under the *Draft Regulations on Exploitation of Mineral Resources in the Area*. This paper investigates and critiques five environmental Draft Standards from a precautionary and comparative law perspective. Phase 1 standards and guidelines should adopt a more rigorous interpretation of the precautionary principle. Additional recommendations include creating enhanced governance processes and incorporating an ecosystem-based framework for regional environmental assessments and management plans not present in Draft Standards. This research will assist academics, practitioners, governments, and the ISA with policies and strategies to enhance environmental and social protections from seabed mining.

* The author would like to thank the Ocean Frontier Institute for providing funding via a Seed Grant. The author also acknowledges Samantha Howard's assistance in helping to prepare the manuscript.

Introduction

> The part that we can play is to ensure that we set very high standards for the environmental issues that are involved in requirements, which could then hopefully discourage companies from pursuing it, because it'll be very costly.[1]

Deep-sea mining, if undertaken commercially, will retrieve mineral deposits from the deep ocean floor, which covers approximately 65% of the Earth's surface. Seabed mining in areas beyond national jurisdiction (known as the "Area") is 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 the United Nations Convention on the Law of the Sea of 10 December 1982* ("1994 Agreement").[2] The Area is the common heritage of mankind, and

[1] ABC Radio Australia, "Tuvalu reverses controversial decision to sponsor seabed mining" (14 April 2022) online: https://www.abc.net.au/radio-australia/programs/pacificbeat/tuvalu-reverses-seabed-mining-sponsorship/13840364.
[2] *United Nations Convention on the Law of the Sea 1833* UNTS 397, 1982 at Part XI; *Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982*, 1994.

activities in the Area are carried out to benefit humankind.[3] The International Seabed Authority ("ISA") is mandated to organize, carry out, and control activities in the Area, ensuring the effective protection of the marine environment from the harmful effects of seabed mining activities.[4] During the 25th session of the ISA, held between 25 February and 1 March 2019, the ISA began to undertake work on *Standards and Guidelines* for exploiting mineral resources in the Area as a priority.[5] A three-phase approach was recommended. Phase 1 created *Standards and Guidelines* deemed necessary to be in place by the time the draft regulations on exploitation were adopted. Phase 2 will create *Standards and Guidelines* prior to the receipt of an application of a plan of work for exploitation. Phase 3 *Standards and Guidelines* will be completed before commercial mining activities commence.[6] There are currently ten (10) *Standards and Guidelines for exploitation:*

1. *Draft guideline on the preparation and assessment of an application for the approval of a Plan of Work for exploitation**
2. *Draft standard and guidelines for the environmental impact assessment process**
3. *Draft guidelines for the preparation of environmental impact statements**
4. *Draft guidelines for the preparation of Environmental Management and Monitoring Plans**
5. *Draft standard and guidelines on the development and application of environmental management systems **
6. *Draft guidelines on the tools and techniques for hazard identification and risk assessments*
7. *Draft standard and guidelines for the safe management and operation of mining vessels and installations*
8. *Draft standard and guidelines on the form and calculation of an Environmental Performance Guarantee*
9. *Draft guidelines for the establishment of baseline environmental data*
10. *Draft standard and guidelines for the preparation and implementation of emergency response and contingency plans.7*

These Standards and Guidelines have not been reviewed by academic literature. However, they are important because the draft exploitation regulations require that the organs of ISA develop certain standards and guidelines to support the implementation of the regulations. Moreover, these Standards and Guidelines will be used by contractors in their application for an exploitation contract. It is important, then, to research these standards and guidelines to ensure that they provide for sufficient environmental protection.

---

[3] UNCLOS, *supra* note 2 at Articles 136, 140.
[4] *Ibid* at Article 145.
[5] ISA, *Report of the Chair of the Legal and Technical Commission on the work of the Commission at the second part of its twenty-fifth session* ISBA/25/C/19/Add.1 (11 July 2019) at Annex and Enclosures I and II.
[6] ISA, "The Mining Code: Standards and Guidelines" (website) <https://www.isa.org.jm/mining-code/standards-and-guidelines>. (accessed 7 March 2023).
[7] *Ibid*. Data is accurate as of October 2022.

This paper will review the first five draft *Standards and Guidelines* listed above, focusing on environmental impacts.[8] A comparative approach will be utilized. First, the *Standards and Guidelines* will be compared against the *Draft Exploitation Regulations* and the work of the ISA to determine which gaps exist, using the precautionary approach and the common heritage as guiding principles. Next, environmental impact assessments from a terrestrial context and land-based plans of work from Canada and New Zealand will be compared against the *Standards and Guidelines*. A comparative analysis will assist in finding any differences or gaps in the proposed guidelines from the ISA, as opposed to the required best practices and best available science.

The paper will proceed as follows. The first section will provide an overview of seabed mining, the *Mining Code*, and sustainable development, including the obligation to apply the precautionary approach. The paper will then summarize and review the draft *Standards and Guidelines*. This review will provide a gap analysis, highlighting areas where the *Standards and Guidelines* are incomplete or incompatible with one another and sustainable development. The final section will provide a gap analysis of two important requirements, insurance and closure plans, under the *Draft Exploitation Regulations*, which have not been translated into Standards or Guidelines. The paper will conclude with recommendations on how the ISA can improve the *Standards and Guidelines* to be consistent with best environmental practices, international environmental law, and international law.

Background

Article 140 of UNCLOS outlines the common heritage of mankind for all activities in areas beyond national jurisdiction by stating, "activities in the Area shall, as specifically provided for in this Part, be carried out for the benefit of mankind as a whole."[9] Should seabed mining exploitation commence, equitable sharing can only be achieved if seabed resources are utilized while balancing all interests and considerations.[10] Yet, there is no clear consensus on what would thus constitute shared value from mining.[11] Further, parties wishing to pursue

[8] The remaining standards are scientific, financial and engineering based, and thus outside the scope of this paper. Further research should investigate these standards, especially the financial standards.
[9] UNCLOS, *supra* note 2 at Article 140.
[10] Marie Bourrel, Torsten Thiele & Duncan Currie, 'The Common Heritage of Mankind as a means to assess and advance equity in deep sea mining' (2018) 95 *Marine Policy* 311–316 at 313.
[11] LFE Goldie, "A note on some diverse meanings of 'the common heritage of mankind.'" (1983) 10:1 Syracuse J Int Law Commer 69; Peter Holcombe Henley, "Minerals and mechanisms: the legal significance of the notion of the

activities in the Area must apply to the ISA, and when a plan of work is approved, this takes the form of a contract sponsored by a member state.[12] Sponsoring States are members of the ISA that provide sponsorship for contractor applicants as their nationals or under their effective control.[13] Ascribing responsibility and effective control is a question of who should ultimately be held liable for damage arising from a particular activity among the many parties involved. Issues of control are still being debated at the ISA.[14]

The ISA is developing a *Mining Code* to help build a consensus on the common heritage of mankind and other rules for seabed mining. The "*Mining Code*" refers to the comprehensive set of rules, regulations and procedures issued by ISA to regulate the prospecting, exploration, and exploitation of marine minerals in the Area[15] and includes recommendations, standards, and guidelines. The ISA has promulgated three sets of exploration regulations.[16] Completing the *Draft Exploitation Regulations* and the necessary *Standards and Guidelines* enables the ISA to consider and award exploitation contracts. Premised on the exploration regulations, as of July 2021, thirty-one (31) exploration contracts have been awarded by the ISA.[17] No exploitation contracts are yet awarded.

Seabed mining is governed by UNCLOS, the *1994 Agreement*, the *Mining Code*, and international law.[18] This includes international environmental law. Terrestrial or land-based

---

'common heritage of mankind' in the advisory opinion of the Seabed Disputes Chamber" (2011) 12:2 Melb J Int Law 373; Peter B Payoyo, *Cries of the sea : world inequality, sustainable development and the common heritage of humanity* (The Hague, Netherlands: Martinus Nijhoff, 1997); Rakhyun E Kim & Klaus Bosselmann, "Operationalizing Sustainable Development: Ecological Integrity as a Grundnorm of International Law" (2015) 24:2 Rev Euro Comp Int Env Law 194–208.

[12] *UNCLOS*, *supra* note 2 at Article 153(2–3), Annex III, Article 3; 1994 *Agreement supra* note 2, s 1(6).

[13] Joanna Dingwall, *International Law and Corporate Actors in Deep Seabed Mining* (Oxford University Press, 2021); Pradeep A Singh, "The two-year deadline to complete the International Seabed Authority's Mining Code: Key outstanding matters that still need to be resolved" (2021) 134 Mar Policy 104804.

14 *Draft regulations on exploitation of mineral resources in the Area Part I, Part II (Regulation 5), Part V, Part VIII (Appendix II*). Prepared by the Co-Facilitators, Ambassador Georgina Guillén-Grillo (Costa Rica) and Ambassador Constanza Figueroa (Chile) of the Informal Working Group on Institutional Matters ISBA/27/C/IWG/IM/CRP.1/Rev.1 (21 October 2022) at para 4; ISA "Draft agenda for workshop on Effective Control" online: https://www.isa.org.jm/proposals-submitted-octobernovember-2022-iwg-im-part-3/.

[15] ISA, "The Mining Code" online: https://www.isa.org.jm/mining-code.

[16] *Decision of the Council of the International Seabed Authority relating to amendments to the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area and related matters*, by ISA, ISBA/19/C/17 (2013) (2013); *Decision of the Assembly of the International Seabed Authority relating to the regulations on prospecting and exploration for polymetallic sulphides in the Area*, ISBA/16/A/12/Rev1 2010; *Decision of the Assembly of the International Seabed Authority relating to the Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area*, ISBA/18/A/11 2012.

[17] ISA, "Exploration Contracts" online: https://www.isa.org.jm/exploration-contracts.

[18] UNCLOS, *supra* note 2 at Article 304.

mining activities typically cause negative environmental impacts on land, water, and the climate.[19] As a trade off, mining can foster economic development by providing employment opportunities, business development, and increased fiscal revenues.[20] Many minerals on the sea floor are potentially the building blocks of low-carbon technologies, infrastructure, and energy systems. However, transitioning to a cleaner energy system may cause unintended environmental problems due to increased mining activities. Tensions may arise where commercial interests run contrary to sustainability.[21] Small island developing states are examples of this tension. Small island states will be negatively impacted by climate change. [22] Yet, several small island nation-states (Nauru, Tonga, Kiribati, Jamaica, and the Cook Islands) are at the forefront of developing seabed mining. On the other hand, the small island state of Tuvalu cancelled its sponsorship due to environmental concerns.[23] Moreover, small island states such as Fiji call for a moratorium on seabed mining until better environmental safeguards are implemented.[24]

The ISA has yet to set environmental thresholds beyond which the adverse impacts of seabed mining would be determined unacceptable.[25] The ISA Council has begun to develop binding environmental threshold values and to set measurable requirements concerning the

[19] Columbia Center on Sustainable Investment, *Mapping Mining to the Sustainable Development Goals: An Atlas* (UNDP, 2016) at 5.
[20] Sara Seck & Anna Dolidze, 'ITLOS Case No. 17 and the Evolving Principles for Corporate Accountability under International Law' in *Responsibilities of Non-State Actors in Armed Conflicts* (Leiden: Brill, 2015) 235.
[21] Lakshman Guruswamy, 'Energy, poverty, justice and women' in Sumudu Atapattu, Carmen Gonzalez and Sara Seck [eds] *The Cambridge Handbook of Environmental Justice and Sustainable Development* (Cambridge, 2022) at 379; Jaeckel, Kristina M Gjerde & Jeff A Ardron, 'Conserving the common heritage of humankind – Options for the deep-seabed mining regime' (2017) 78:C *Marine Policy* 150–157 at 151.
[22] Pacific Islands Forum Secretariat, Fiftieth Pacific Islands Forum (13 – 16 August 2019) online: https://www.forumsec.org/wp-content/uploads/2019/08/50th-Pacific-Islands-Forum-Communique.pdf at paras. 24, 25. Nauru, Tonga, Cook Islands, Kiribati and Jamaica are sponsoring states. See ISA, "Exploration Contracts" online: https://www.isa.org.jm/exploration-contracts/.
[23] Alberto Pecoraro, "Tuvalu cancels its sponsorship: the role of international law" DSM Observer (2 May 2022) online: https://dsmobserver.com/2022/05/tuvalu-cancels-its-sponsorship-the-role-of-international-law/. (accessed 31 May 2022).
[24] Government of Fiji, "Fiji Supports Moratorium on Deep Sea Mining" (26 June 2022) online: https://www.fiji.gov.fj/Media-Centre/News/FIJI-SUPPORTS-MORATORIUM-ON-DEEP-SEA-MINING; Reuters, "Not worth the risk': Palau, Fiji call for deep-sea mining moratorium" (27 June 2022) online: https://www.reuters.com/business/environment/not-worth-risk-palau-fiji-call-deep-sea-mining-moratorium-2022-06-27/.
[25] V. Tunnicliffe et al, 'Strategic Environmental Goals and Objectives: Setting the Basis for Environmental Regulation of Deep Seabed Mining"' (2020) 114 *Marine Policy* 103347; A. Jaeckel, *The Implementation of the Precautionary Approach by the International Seabed Authority*, ISA Discussion Paper No. 5, (ISA, 2017) at 3.

maximum level of harm from activities in the Area that can be considered acceptable.[26] Further, the quality and quantity of baseline environmental information are scarce, and the cumulative environmental impacts from mining the seafloor over an extended period are of particular concern.[27] Deep seabed mineral exploitation may lead to the mortality of fauna, fragmentation and modification of habitats, potentially resulting in the extinction of endemic and rare species.[28]

Thus, the rules of the ISA should include environmental and social protections consistent with the UN *Sustainable Development Goals*.[29] SDG14, *Life Below Water*, attempts to enhance the conservation and sustainable use of oceans and their resources. The ISA announced seven voluntary commitments to advance the 2030 SDGs.[30] Further, the *United* Nations has proclaimed a *Decade of Ocean Science for Sustainable Development* (2021-2030) to support efforts to reverse the decline in ocean health and gather ocean stakeholders behind a common framework to ensure improved conditions for the sustainable development of the ocean.[31] This Ocean Decade includes the development of a sustainable blue economy. A sustainable blue economy "provides social and economic benefits for current and future generations; restores, protects and maintains renewable energy and circular material flows."[32] The ISA asserts that it supports and aligns with this initiative by identifying six priority areas to advance marine scientific research.[33] Key areas include advancing scientific knowledge of deep-sea ecosystems, standardizing and innovating biodiversity assessment, facilitating technology development,

---

[26] ISA, *Draft decision of the Council of the International Seabed Authority relating to the development of binding environmental threshold values Submitted by the delegation of Germany*, ISBA/27/C/L.4 (27 September 2022); ISA, *Decision of the Council of the International Seabed Authority relating to the development of binding environmental threshold values* ISBA/27/C/42 (11 November 2022).

[27] Lisa A Levin et al, 'Defining 'serious harm' to the marine environment in the context of deep-seabed mining' (2016) 74:C *Marine Policy* 245–259; Malcolm R Clark, Jennifer M Durden & Sabine Christiansen, 'Environmental Impact Assessments for deep-sea mining: Can we improve their future effectiveness?' (2020) 114 Mar Policy; Keith MacMaster, 'Environmental Liability for Deep Seabed Mining in the Area: an Urgent Case for a Robust Strict Liability Regime' (2019) 33:1 *Ocean Yearbook Online* 339.

[28] Xiangxin Xu & Guifang (Julia) Xue, 'The Environmental Compensation Fund: Bridging Liability Gaps in the Deep Seabed Mining Regime' (2021) *Coast Manag* 1–18 at 559.

[29] *Transforming Our World: The 2030 Agenda for Sustainable Development*, 69th Sess UN Doc A70L1 2015; *Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition*, by World Bank Group (Washington, DC, 2020).

[30] *Implementation of the Strategic Plan for the International Seabed Authority: Draft Performance Indicators for the 2019-2023 period*, by ISA (2019) at 3.

[31] *United Nations Decade of Ocean Science for Sustainable Development* (2021-2030) (website): <https://en.unesco.org/ocean-decade>.

[32] *Rising Tide: Mapping Ocean Finance for a New Decade*, by UNEP FI, Sustainable Blue Economy Finance Initiative (UNEP, 2021).

[33] Michael Lodge and the ISA, *Action Plan for Marine Scientific Research in Support of the United Nations Decade of Ocean Science for Sustainable Development* (ISA, 2021) at 2.

including ocean monitoring, enhancing knowledge of environmental impacts, promoting sharing of scientific data and increasing deep-sea literacy, and strengthening the scientific capacity of ISA member states, in particular developing states.[34]

Seabed Mining and Precaution

The precautionary approach indicates that actions to protect the environment may be required before scientific proof of harm is provided.[35] The paucity of quantitative and qualitative environmental data, including baseline data, means high uncertainty concerning potential adverse impacts, and long-term adverse effects could result in irreversible ecosystem-wide destruction.[36]

UNCLOS and the *1994 Agreement* do not make express provisions for the precautionary approach, as it predates the rise of the precautionary approach in international law. Nonetheless, the precautionary approach is a tenet of the Law of the Sea.[37] The 2011 International Tribunal on the Law of the Sea's ("ITLOS") *Seabed Advisory Opinion* declares that the precautionary approach is integral to the due diligence obligation.[38] More recently, the *South China Sea Arbitration* concurs on the obligation to adopt appropriate rules and measures and a certain level of vigilance in their administration and enforcement.[39] The *Mining Code*'s *Draft Exploitation Regulations* require that the ISA apply the precautionary approach to assess and manage the risk of harm to the marine environment.[40]

Additionally, there is evidence for this in the domestic context. Trans-Tasman Resources Ltd.'s proposal to mine iron sand within New Zealand's exclusive economic zone and continental shelf was granted by the Environmental Protection Authority in 2014.[41] In late 2021, the New

---

[34] *Ibid* at 11.
[35] Robert Makgill, Aline Jaeckel & Keith MacMaster, "Implementing the precautionary approach for deep seabed mining: a review of state practice" in Virginie Campanella, [ed], *Routledge Handbook of Seabed Mining* (Paris: Routledge, 2022); Aline L Jaeckel, *The International Seabed Authority and the Precautionary Principle: Balancing Deep Seabed Mineral Mining and Marine Environmental Protection* (Boston: Brill Nijhoff, 2017).
[36] D. Jones et al, 'Mining deep-ocean mineral deposits: what are the ecological risks?' (2018) 14 *Elements* 325; B. Christiansen et al., 'Potential Effects of Deep Seabed Mining on Pelagic and Benthopelagic Biota' (2020) 114 *Marine Policy* 103442.
[37] Jaeckel, supra note 35 at 311; *Vienna Convention on the Law of Treaties, Vienna (*23 May 1969*)* UNTS, vol. 1155.
[38] *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area (Advisory Opinion)*, [2011] ITLOS Case No 17 at para 131.
[39] *The South China Sea Arbitration (the Philippines v the People's Republic of China)* (2016) PCA Case No 2013-19.
[40] *Draft Regulations on Exploitation of Mineral Resources in the Area (2019)*, ISBA/25/C/WP1 at Draft RegulatiI2(e)(ii), Regulation 44.
[41] *Trans-Tasman Resources Ltd Marine Consent Decision, Environmental Protection Authority, 17 June 2014*.

Zealand Supreme Court stated that the application did not meet the sustainable management purpose of the *Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act* by stating that if the environment cannot be protected from material harm through regulation, discharge or dumping must be prohibited.[42] The Court observed that the paramount importance of UNCLOS is establishing the fundamental obligation of all state parties to protect and preserve the marine environment.[43] The Court reasoned that environmental protection has priority over economic development because UNCLOS Article 193 provides that states can exploit resources "in accordance with" their duty to protect and preserve the environment.[44] Protection is a separate and additional consideration to whether the sustainable management goal is achieved. The New Zealand Supreme Court stated that assessing whether there is material harm requires qualitative, longitudinal, quantitative, spatial, and cumulative effects to be considered. They added, "economic benefit considerations to New Zealand may also have the potential to affect the decision-maker's approach to remediation timeframes, but only at the margins."[45] Thus, the New Zealand Supreme Court clarified that environmental protection trumps economic development and that t applicants for discharge consents are required to establish that there will be no material harm from a proposed discharge activity.[46]

The precautionary approach administratively and judicially applies to all stages of seabed mining. It applies to states and the ISA when determining the rules and regulations for seabed mining, including the precautionary measures that should be imposed. Applicants must implement precaution when undertaking work supporting an application for exploration or exploitation, including establishing environmental baseline information and preparing environmental impact assessments of the proposal's potential environmental effects.[47] With this background, the next section reviews the *Standards and Guidelines* in the context of environmental protection.

---

[42] *Trans-Tasman Resources v Taranaki-Whanganui Conservation Board [2021]* NZSC 127, at para 3.
I*Ibid* at para 88; Makgill, Jaeckel & MacMaster, *supra* note 35.
[44] Trans-Tasman, *supra* note 42 at para 93.
[45] *Ibid* at para 4.
[46] Elizabeth Macpherson et al., "Trans-Tasman Resources v Taranaki Whanganui Conservation Board [2021] NZSC 127: A New "High-Water Mark" for Seabed Mining (2021) New Zealand Journal of International Law" 277 at 282, 283; Deep Sea Conversation Coalition, 'New Zealand's Supreme Court says 'no' to Seabed Mining' (2021) online: <http://www.savethehighseas.org/2021/09/30/new-zealand-supreme-court-puts-the-brakes-on-seabed-mining/#:~:text=New%20Zealand%E2%80%99s%20Supreme%20Court%20has%20denied%20seabed%20miners%2C,tonnes%20of%20material%20dumped%20back%20into%20the%20ocean>.
[47] Makgill, Jaeckel & MacMaster, *supra* note 35.

Standards and Guidelines

While *UNCLOS, the 1994 Agreement, and the Mining Code* contain environmental and social protection provisions, the *Standards and Guidelines* should contain detailed contractor obligations.[48] The *Draft Exploitation Regulations* explicitly note the need for *Standards and Guidelines*, especially for protecting and preserving the marine environment.[49] Guidelines guide technical and administrative matters issued by the ISA and must be updated and reviewed periodically based on improved knowledge or information.[50] Standards are technical standards and protocols, including performance and process requirements, qualitative and quantitative standards, methods, processes or required implementation technologies.[51] Standards are legally binding for contractors and the ISA and may be revised at least every five years from their adoption or revision date.[52] Guidelines will not be binding but have an impact based on the policy goals they assert. The *Standards*, thus, have the force of law.

Financial requirements work in conjunction with environmental requirements. Parties shall cooperate to identify and develop best practices and improve existing standards, protocols and market-based instruments, to support and enhance environmental performance beyond legal requirements.[53] Environmental standards for deep sea mining must include environmental quality objectives, biodiversity status, plume density and extent, sedimentation rates, monitoring procedures, and mitigation measures.[54] Standards shall consider the views of experts, stakeholders and existing internationally accepted standards, including standards relating to the conservation of marine resources, protection of the marine environment, and environmental effects of exploitation activities, which still indicates significant leeway in how the ISA proceeds.[55]

Guidelines should help determine the financial capability of an applicant.[56] Moreover, the Guidelines should help assist in the determination of whether the applicant has or will have the necessary technical and operational capability to carry out the proposed Plan of Work, can

[48] UNCLOS, *supra* note 2 at Articles 162, 165; Draft Exploitation Regulations, *supra* note 43 at Regulations 65, 95.
[49] *Draft Exploitation Regulations, supra note 40* at Regulation 95.
[50] *Ibid* at Regulation 95.
[51] *Ibid* at Regulation 94.
[52] *Ibid* at Regulation 95(3).
[53] *Ibid* at Regulation 3.
[54] *Ibid* at Regulation 45.
[55] *Ibid* at Regulation 94.
[56] *Ibid* at Regulation 13(1).

comply with the terms of the Environmental Management and Monitoring Plan and the Closure Plan (defined below), have the technical capability to monitor key environmental parameters, and have established a risk assessment process to implement the proposed Plan of Work effectively.[57] A contractor must have the financial and technical capacity to undertake a mining project which mitigates environmental impacts, including an Emergency Response Contingency Plan outlined in the Draft Guideline on Environment Management Systems.[58] Questions remain as to whether the ISA's ten draft standards use best environmental practices and the precautionary approach and whether the absence of certain mandated guidelines negatively affects environmental protection.

Plans of Work

The purpose of a Plan of Work is for the applicant contractor to demonstrate that its proposed exploitation activities will comply with UNCLOS, the 1994 *Agreement*, the *Mining Code* (which includes the *Draft Exploitation Regulations*, related *Standards and Guidelines)*, national laws, regulations and administrative measures of the sponsoring and processing state(s), and the terms of the contract with the ISA.[59] The Plan of Work includes guidance regarding the publication and public consultation on Environmental Plans (Environmental Impact Statement, Environmental Management and Monitoring Plan, and Closure Plan).[60] Plans of Work must be demonstrated by a Pre-Feasibility Study or Feasibility Study showing the technical and economic viability of the proposed project.[61] Such studies must demonstrate that extraction is financially, technically, and environmentally justified and must be prepared following Good Industry

[57] *Ibid* at Regulation 13(2), (3). Note that the ISA will have to work in conjunction with international shipping law and the International Maritime Organization and other vessels to respond to any catastrophic damage to either vessel or marine environment.
[58] *Ibid* at Regulation 13; Tara Davenport, *Responsibility and Liability for Damage Arising Out of Activities in the Area: Attribution of Liability*, CIGI Report 4 (CIGI, 2019); Tara Davenport, *Responsibility and Liability for Damage Arising Out of Activities in the Area: Potential Claimants and Possible Fora*, CIGI Liability Series for Deep Seabed Mining - Report 5 (2019).
[59] *Draft guidelines on the preparation and assessment of an application for the approval of a Plan of Work for exploitation* ISBA/27/C/3 (21 March 2022) para 2; *Draft Exploitation Regulations, supra note 40* at Regulation 7.
[60] *Ibid* at Annex I, s. IV (21).
[61] *Recommendations for the guidance of contractors on the content, format and structure of annual reports*, by ISA, ISBA/21/LTC/15 (Kingston, Jamaica: ISA, 2015).

Practice and Guidelines.[62] In other words, a Plan of Work is a set of documents to provide the regulator with all the necessary information to approve an exploitation contract.

A pre-feasibility study is a study of a range of options for the technical and economic viability of a mineral project that has advanced to a stage where a preferred mining method is established, and an effective method of mineral processing is determined.[63] It includes a financial analysis and evaluates other factors to determine if further analysis is warranted.[64] A pre-feasibility study is at a lower confidence level than a feasibility study as it involves lower cost, effort and detail. A feasibility study is a comprehensive technical and economic study based on parameters of similar projects and is necessary to establish the presence of reserves on a property.[65] It includes detailed assessments of operational and financial factors necessary to demonstrate that extraction is justified.[66] Feasibility studies may serve as the basis for a final decision by a proponent or financial institution to finance the project's development.

Projects are normally only commissioned after a feasibility study is finalized and reserves have been proved.[67] Only after a completed feasibility study is the ISA permitted to consider whether any changes are required to the Plan of Work.[68] Currently, no feasibility studies exist for seabed mining in the Area, and only recently have pre-feasibility studies been attempted by the contractor for Nauru.[69] The Metals Company, the parent company contractor for Kiribati,

---

[62] IMVAL, *International Mineral Property Valuation Standards Template 4th ed* (IMVAL, 2021) at Part 7; CRIRSCO, *International Reporting Template for the public reporting of Exploration Targets, Exploration Results, Mineral Resources and Mineral Reserves* (ICMM, 2019); CIMM, *CIMVAL Code for the Valuation of Mineral Properties*, (2019).

[63] *Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Report and Related Consequential Amendments NI 43-101*, NI 43-101 2011, s 1.4; *CIM Definition Standards for Mineral Resources & Mineral Reserves*, by CIM (CIM Standing Committee on Reserve Definitions, 2014); CRIRSCO, *supra* note 66.

[64] *Ibid*.

[65] *Technical Report Summary, Initial Assessment of the NORI Property, Clarion-Clipperton Zone for Deep Green Metals Inc. made in accordance with the requirements of SEC Regulation S-K (subpart 1300)*, by AMC Consultants Pty Ltd, AMC Project 321012 (London, 2021); *Capital Cost Estimating for Mineral Processing Plants*, by AMEC Mining and Minerals (University of British Columbia, 2018); Michael Seeger, *Mining Capital* (Switzerland: Springer, 2019).

[66] *IMVAL, supra note 62*; CRIRSCO, *supra* note 62, CIMVAL, *supra* note 62.

[67] National Association of Certified Valuators and Analysts, *Mineral Asset Valuation and its uses, 2021 Webinar*, online: http://www.geologicalsociety.org.zw/sites/default/files/news-attachments/Mineral%20Asset%20Valuation%20and%20its%20Uses%20-%20Gambiza.pdf at 8.

[68] *2019 Draft Exploitation Regulations*, *supra* note 40 at Regulation 25.

[69] Sustainable Opportunities Acquisition Corp, "Amendment No. 3 to FORM S-4 Registration Statement under the Securities Act of 1933 Filed Pursuant to Rule 424(b)(3) Registration No. 333-260126" (28 July 2021), online: <https://www.sec.gov/Archives/edgar/data/0001798562/000121390021039153/fs42021a4_sustainableoppo.htm>; Klaas Willaert, "Effective Protection of the Marine Environment and Equitable Benefit Sharing in the Area: Empty Promises or Feasible Goals?" (2020) 51:2 Ocean Dev Int Law 175–192; Makgill, Jaeckel & MacMaster, *supra* note

Nauru and Tonga, adds, "there are no Mineral Reserve estimates for the NORI Property. The potential viability of the Mineral Resources has not yet been supported by detailed mine design or optimization processes nor a pre-feasibility study or a feasibility study."[70] This is problematic given the trigger of the two-year rule in section 1(15) of the *1994 Agreement*.[71] There is potential for *the Draft Exploitation Regulations* and the *Standards and Guidelines* to become "final" under the two-year rule without approval by the ISA and its members, meaning that applications for contracts would need to be considered against the July 2023 draft of the exploitation regulations and standards and guidelines.

The *Plan of Work Guidelines* should be drafted to determine if the applicant can commit or raise sufficient financial resources to cover all costs of exploitation activities. These include the estimated costs of implementing the Environmental Management and Monitoring Plan, the Closure Plan, and maintaining the appropriate insurance, among other costs.[72] As exploitation has not yet begun, there are no comparable transactions to use as a baseline for financial assumptions.[73] As described below, including an insurance guideline would help operationalize the precautionary approach.

The 26th session of the ISA first discussed guidelines on Plans of Work.[74] The 27th session introduced the *Draft guidelines on the preparation and assessment of an application for*

35; MacMaster, *supra* note 27; Deep Sea Mining Campaign, "Nautilus Machines Will Wreak Havoc | Deep Sea Mining: Out Of Our Depth", online: <http://www.deepseaminingoutofourdepth.org/nautilus-giant-seabed-mining-machines-will-wreak-havoc/>.

[70] Securities Exchange Commission, "TMC Form 10-Q for quarter ending 30 September 2022" (14 November 2022) online: https://www.sec.gov/Archives/edgar/data/1798562/000110465922118680/tmc-20220930x10q.htm; AMC Consultants Pty Ltd, *supra* note 65; *Technical Report NORI Area D Clarion Clipperton Zone Mineral Resource Estimate Deep Green Metals Inc.*, by AMC Consultants, AMC Project 318010 (Brisbane: Australia, 2019).

[71] *Agreement relating to the Implementation of Part XI supra note 2* at Annex s. 1(15)(b); Pradeep A Singh, "The Invocation of the 'Two-Year Rule' at the International Seabed Authority: Legal Consequences and Implications" (2022) 37:3 Int J Mar Coast Law 375–412.

[72] The ISA is mandated to create Insurance Guidelines, see *Draft Exploitation Regulations, supra* note 40 at Regulation 36. However, at the date of writing, has not done so. This may be conducted for Phase 2 standards. However, insurance needs to be in place before any exploitation occurs and thus, insurance guidelines should have been included in phase 1. See ISA, "Workshop Report, Development of Standards and Guidelines in the Area" Unedited Advance Text (Pretoria: 13 May 2019) at 7, 22, 36.

[73] Financing and costs from Solwara 1 are the closest comparators to DSM in the Area. However, this project never materialized due to financial and legal problems.

[74] ISA, *Report of the Chair of the Legal and Technical Commission on the work of the Commission at the first part of its twenty-sixth session*, ISBA/26/C/12 (9 March 2020); ISA, *Report of the Chair of the Legal and Technical Commission on the work of the Commission at the second part of its twenty-sixth session*, ISBA/26/C/12/Add.1 (25 September 2020).

the approval of a Plan of Work.[75] Instead of creating integrated policy guidance to assist contractors, the ISA proposed a checklist to be read in conjunction with *the Draft Exploitation Regulations*, identifying the elements that should be part of an application. This would assist the applicant in ensuring that all required information and documents are included. Annex I contains a checklist for preparing an application to approve a Plan of Work for exploitation. Annex II contains an approval flowchart.[76]

The lack of required financial information is problematic as environmental impacts could add significant costs to an operator.[77] The Financing Plan contained within Annex III of the Draft Exploitation Regulations requires full details and costing of mining techniques regulatory requirements, capital expenditures, expected revenues, and cash flows.[78] However, no further assistance is provided in the plan of work, The Belgian contractor Global Sea Resources NV, a contractor sponsored by Belgium, acknowledges that there is a need for additional research on critical metrics and key cost drivers, such as project phases (pre-feasibility, feasibility, construction), mine life, nodule content, and metal extraction scenarios.[79] In other words, alignment is required between the financial and environmental requirements. As TMC succinctly states, "there are no environmental provisions due to the absence of a regulatory framework. In conclusion, the affected area cannot be quantified yet."[80] *Plan of Work Guideline* improvements are required to assist in feasibility studies, environmental protection, and alignment with the other *Standards and Guidelines*.[81]

---

[75] ISA, *Draft guidelines on the preparation and assessment of an application for the approval of a Plan of Work I exploitation* ISBA/27/C/3 (21 March 2022) at para 2.
[76] *Ibid*, Annex I, Annex II.
[77] Sustainable Opportunities Acquisition Corp, "Amendment No. 3 to Form S-4 Registration Statement under the Securities Act of 1933 Filed Pursuant to Rule 424(b)(3) Registration No. 333-260126" (28 July 2021).
[78] *2019 Draft Exploitation Regulations*, *supra* note 40 at Annex III.
[79] *DSM System Operational Expense Variables*, by Global Sea Mineral Resources, Deep Seabed Mining Payment Regime Workshop #2: Developing a Financial Modeling Framework (London, 2017).
[80] *Technical Report Summary, Initial Assessment of the NORI Property, Clarion-Clipperton Zone for Deep Green Metals Inc. made in accordance with the requirements of SEC Regulation S-K (subpart 1300)*, by AMC Consultants Pty Ltd, AMC Project 321012 (London, 2021)
[81] Sustainable Opportunities Acquisition Corp, "Amendment No. 3 to FORM S-4 Registration Statement" (28 July 2021), online: https://www.sec.gov/Archives/edgar/data/0001798562/000121390021039153/fs42021a4_sustainableoppo.htm.

Environmental Assessments, Statements, and Procedures

An Environmental Assessment ("EA") or Environmental Impact Assessment ("EIA") is a process, the breadth, depth, and analysis of which depend on the proposed project's nature, scale, and potential environmental impact. An EA should evaluate a project's potential environmental risks and impacts, examine project alternatives, and identify ways to improve project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental enhancing positive impacts.[82] The primary goal of these assessments is to inform decisions on whether and under what conditions to approve proposed new activities and under what conditions.[83] EIAs help operationalize integrating a diversity of natural and social impacts, and public participation, two sustainable development principles.[84]

An Environmental Impact Statement ("EIS") is a document intended for decision and policymakers to establish if the project should be permitted based upon the assessment of impacts presented throughout the EIA. This is intended to document the EIA process, provide a holistic assessment of all potential environmental impacts, and function as a neutral, scientifically driven standard.

EIAs also often mandate a cumulative effects analysis. Cumulative impacts with regards to an EIA should look at the direct impacts of several parallel mining operations on the environment, including impacts on habitat, biodiversity, ecological connectivity, and food webs, as well as the interaction between mining operations and other stressors, such as climate change and fisheries, where applicable. Cumulative impact assessment is particularly important in a deep-sea mining context. Many areas proposed to be mined, including in the proximity of hydrothermal vent ecosystems, are particularly fragile and remain unexplored regarding potential mining impacts.[85]

---

[82] Alex Oude Elferink, "Environmental Impact Assessment in Areas beyond National Jurisdiction" (2012) 27:2 *Int J Mar Coast Law* 449–480.
[83] Meinhard Doelle & Gunnar Sander, "Next Generation Environmental Assessment in the Emerging High Seas Regime? An Evaluation of the State of the Negotiations" (2020) 35:3 *Int J Mar Coast Law* 498–532; Meinhard Doelle & A John Sinclair, *The next generation of impact assessment: a critical review of the Canadian Impact Assessment Act* (Toronto: Irwin Law, 2021); David V Wright & Meinhard Doelle, "Social Cost of Carbon in Environmental Impact Assessment" (2019) 53:3 *UBC Law Rev*.
[84] Johanna Aleria P Lorenzo, "International law-making in the field of sustainable development and an emerging droit commun among international financial institutions" (2018) 7:2 *Camb Int Law* J 327–353 at 339.
[85] Collins, Patrick Colman et al, 'A Primer for the Environmental Impact Assessment of Mining at Seafloor Massive Sulfide Deposits' (2013) 42 *Marine Policy* 198-209.

The carrying out of an EIA is a general obligation under international law.[86] It is also required for seabed mining.[87] A Plan of Work includes assessing the proposed activities' potential environmental impacts.[88] The *Seabed Advisory Opinion* stresses the importance of marine protection over economic outputs. ITLOS reinforced the need for an EIA, noting, "the sponsoring state is under a due diligence obligation to ensure compliance by the sponsored contractor with its obligation to conduct an EIA.".[89] The tribunal added that the obligation to conduct an EA is a direct obligation for all states and an aspect of the sponsoring state's obligation to assist the ISA.[90]

Despite being labelled as environmental, an EIA often addresses social and socioeconomic issues.[91] Robust EIA guidelines emphasize evaluating alternatives and including diverse perspectives throughout the process. Current scholarship often refers to this process as Impact Assessment ("IA") to holistically capture the social impacts of proposed projects.[92] IAs create an evaluative framework at the planning stage to allow for projects to be stopped prior to commencement. This allows for collecting additional baseline data or updating a previous EA. For example, the Canadian *Impact Assessment Act* emphasizes the importance of public and indigenous participation throughout the impact assessment process, beginning from the planning and scoping stage, emphasizing and defining 'meaningful' public participation.[93] The legislation considers impacts on the biophysical environment and social, cultural, health, and economic impacts for indigenous communities, local communities, and the general public.[94] After the completion of an impact assessment, the federal government must consider whether the project is "in the public interest," which includes consideration of which impacts are identified, how they

[86] *Pulp Mills on the River Uruguay (Argentina v Uruguay)* [2010] ICJ Rep 71 [*Pulp Mills*].
[87] *UNCLOS*, *supra* note 2 at Articles 165(2) d, f, h and s 206; Clark, Durden & Christiansen, *supra* note 28.
[88] UNCLOS, *supra* note 2 at Annex 1, ss. 2, 7, Seabed Advisory Opinion, supra note 38 at paras 141, 217.
[89] Seabed Advisory Opinion, supra note 38 at para 236.
[90] *Ibid* at para 75; *UNCLOS*, *supra* note 2 at Article 153(4), 206.
[91] Lorenzo, *supra* note 84 at 339.
[92] Marla Orenstein, Erica Westwood & Susan Dowse, "Effect characterization in social impact assessment: a scan of current practice" (2019) 37:1 *Impact Assess* 48; Suzy Nikièma, *Legal Framework of Environmental and Social Impact Assessment in the Mining Sector* (Intergovernment Forum on Mining, Minerals, Metals and Sustainable Development, 2019); *The Social Dimension of Sustainable Development and the Mining Industry*, by Lise-Aurore Lapalme (Natural Resources Canada, 2003).
[93] *Impact Assessment Act* S.C. 2019, c.28.; Meinhard Doelle & A John Sinclair, *The next generation of impact assessment : a critical review of the Canadian Impact Assessment Act* (Toronto: Irwin Law, 2021).
[94] Doelle & Sinclair, supra note 93.

are to be mitigated, impacts on indigenous communities, impacts on Canada's climate commitments, and how the project contributes to or impacts sustainability.[95]

New Zealand's legislation explicitly enables decision-making where resource development proposals have cross-boundary effects.[96] The legislative principles of a sustainable management approach require decision-makers to consider any uncertainty or inadequacy in the information. They must favour caution and environmental protection if the information is uncertain or inadequate.[97] If favouring caution and environmental protection means an activity is likely to be refused, the decision-maker must first consider whether an adaptive management approach would allow the activity to be undertaken.[98] Adaptive management facilitates risk management by enabling an activity to review, refine, amend, or stop as information emerges.[99] Adaptive management may include commencing on a small scale for a short period so that effects can be monitored or allowing an activity to be undertaken so that its effects can be assessed and continued or discontinued based on those effects.[100] However, under New Zealand law, adaptive management is not available for activities that could cause marine pollution, which includes seabed mining.[101]

There is a growing interest in including Life Cycle Analysis within the EIA framework and process to evaluate follow-up and ongoing risks once the project is completed.[102] Life Cycle Analysis is a quantitative process considering all upstream and downstream impacts and activities, allowing for a relatively equal comparison of project alternatives within an EIA

---

[95] *Ibid*.

[96] *Resource Management Act 1991 No. 69* (RMA). *Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 No.* 72 (EEZ Act); R. Makgill, K. Dawson, & N. de Wit, "The Exclusive Economic Zone and Continental Shelf (Environmental Effects) Bill" (2012) *Resource Management Journal* 1 at 5.

[97] *Resource Management Act 1991 No. 69 (RMA)* at s. 61(1)(c). *Ibid* at s. 61(2).

[98] *Ibid* at s. 61(3).

[99] R. Somerville, "Policy Adjudication, Adaptive Management and the Environment Court" (2013) 9 *Resource Management Theory and Practice* 1 at 12.

[100] Makgill, Jaeckel & MacMaster, *supra* note 35.

[101] *Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act* 2012 No. 72, s. 64, *Sustain Our Sounds Inc v New Zealand King Salmon Company Ltd* (2014) NZSC 40, 17 ELRNZ 520; *Trans-Tasman Resources v Taranaki-Whanganui Conservation Board* [2021] NZSC 127; Makgill, Jaeckel and MacMaster, *supra* note 37.

[102] Angus Morrison-Saunders et al, "Reflecting on, and revising, international best practice principles for EIA follow-up" (2021) 89 *Environ Impact Assess Rev* 106596; M Erkayaoğlu & N Demirel, "A comparative life cycle assessment of material handling systems for sustainable mining" (2016) 174 *J Environ Manage* 1–6; Antonio Pedro et al, "Towards a sustainable development licence to operate for the extractive sector" (2017) 30:2 *Miner Econ Raw Mater Rep* 153–165; John Williams, "International Best Practice in Mining: Who Decides and How Does it Impact Law Development?" (2008) 39:4 *Georget J Int Law* 693.

framework.[103] A comprehensive EIA should include an independent review with experts who understand environmental sustainability within the context of the proposal.[104] Public participation and knowledge of the EIA should be included throughout the process through media outlets and publicity campaigns to create public awareness and space to voice opinions and concerns.[105] Canada's legislation prioritizes expert review throughout the process, beginning with the project's approval after the completion of the planning phase and continuing until the project is operational with the formation of monitoring committees.[106] These experts make recommendations, but the ultimate decision rests with the government official.

Seabed Mining and ISA EA Recommendations

The *Draft Exploitation Regulations* define an EIA as the process to identify, predict, evaluate, and mitigate the proposed mining operation's biophysical, social, and other relevant effects.[107] The EIA should include an environmental risk assessment to describe and predict environmental effects and manage such effects within acceptable levels, including through the development and preparation of an Environmental Management and Monitoring Plan. It includes a screening and scoping process, which identifies and prioritizes environmental impacts, as detailed in the Environmental Impact Statement.[108] Although expert input is recommended throughout the EIA process, guidelines put forth by the ISA to date lack an explicit expert review process and fail to identify how experts are assigned.

The *Draft Exploitation Regulations* also provide for an EIS. The EIS is to provide the ISA, sponsoring states, stakeholders, and applicant contractors with "unambiguous documentation of the potential Environmental Effects on which the ISA can base its assessment, and any subsequent approval that may be granted."[109] The EIS shall include a prior environmental risk assessment, be based on the results of the EIA, be completed per the

[103] A. Manuilova, et al., "Should Life Cycle Assessment be part of the Environmental Impact Assessment? Case study: EIA of CO2 Capture and Storage in Canada" (2019) 1:1. Energy Procedia 4511 at 4518.
[104] Jennifer Durden et al, 'Environmental Impact Assessment Process for Deep-Sea Mining in "the Area"' (2018) 87 *Marine Policy* 194; Canada's *Impact Assessment Act*, *supra* note 98 ss. 36, 51.
[105] Patrick Collins et al, 'A Primer for the Environmental Impact Assessment of Mining at Seafloor Massive Sulfide Deposits' (2013) 42 *Marine Policy* 198.
[106] *Impact Assessment Act*, *supra* note 93 at ss. 13, 23, 33(b), 85, 100, 157
[107] *Draft Exploitation Regulations*, *supra* note 40 at Regulation 47.
[108] *Ibid* at Regulation 47.
[109] *Draft guidelines for the preparation of environmental impact statements ISBA/27/C/5 (22 January 2022) at* Appendix 1.

objectives and measures of the relevant regional environmental management plan, and be prepared in accordance with the applicable Guidelines.[110]

The *Draft Exploitation Regulations* also provide a template for an EIS.[111] The EIS shall be prepared in plain language and provide the necessary information per the relevant exploitation regulations, *Standards and Guidelines*.[112] Such effects shall be discussed in proportion to their significance. Where an applicant considers an effect to be of no significance, there should be sufficient information to substantiate such conclusion, or a brief discussion as to why further research is not warranted.[113] These methodologies and thresholds may be developed as *Standards and Guidelines* to support the regulations.[114]

The ISA, in 2022, released its updated *Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area (the "*EA Recommendations*").*[115] The EA Recommendations define the marine environment's biological, chemical, geological, and physical elements that should be measured and how to acquire adequate baseline and monitoring data throughout the exploration process, stressing that "the best available technology and methodology for sampling should be used in establishing baseline data."[116] While not legally mandatory, the EA Recommendations add additional requirements for collecting baseline data for fragile or sensitive environments, including polymetallic nodules, polymetallic sulphides, and cobalt-rich ferromanganese crusts.[117] This guidance is consistent with academic literature outlining the extreme fragility and uncertainty regarding these specified deep-sea environments. However, it is lacking in terms of integration with the *Standards and Guidelines*.[118] While these recommendations do not have the force of the law, they provide enhanced and specific technical details and should be integrated into the *Standards and Guidelines*, specifically for the EIA process and EIS.

---

[110] *Draft Exploitation Regulations, supra* note 40 at Regulation 47.
[111] *Ibid* at Annex IV.
[112] *Ibid* at Annex IV, Regulation 47.
[113] *Ibid*.
[114] *Ibid* at Annex IV.
[115] ISA, *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/Rev.2 (8 July 2022). Ihis document updates the previous recommendations set out in 2020.
[116] *Ibid* at 6, para 17.
[117] *Ibid*.
[118] Collins et al., supra note 105, Durden et al., supra note 104, Marla Orenstein, Erica Westwood and Susan Dowse, "Effect Characterization in Social Impact Assessment: A Scan of Current Practice" (2019) 37(1) *Impact Assessment and Project Appraisal* 48.

EIA Standard

The *Draft Standard and Guidelines for environmental impact assessment process ("Draft EIA Standard")* create requirements that an applicant contractor must comply with in undertaking an EIA and preparing an EIS.[119] Social and socioeconomic issues should thus be present.[120] This document is subdivided into the draft standard (Appendix I) and the draft guidelines (Appendix II).

The Appendix I standard provides a general overview of the required steps to be completed throughout the EIA process. Appendix II guidelines provide a more in-depth description of each step taken, how to complete them, and the expected outcomes through this nine-step process. The process outlined in this document is that of a traditional environmental impact assessment.[121]

There is a notable discrepancy between the Draft EIA Standard and the one set out in the *Draft Guidelines for the preparation of environmental management and monitoring plans* AM *("Draft EMMP Standard")*. While the Draft EIA Standard emphasizes calculating and minimizing risks while balancing trade-offs of the proposed project, the Draft EMMP Standard establishes that the precautionary approach, as defined in Principle 15 of the *Rio Declaration*, shall be used throughout environmental management and monitoring, which encompasses establishing baseline environmental conditions which falls within the EIA process.[122] This approach prioritizes environmental preservation, even with a lack of full scientific knowledge of consequences. Thus, the approach contradicts the mitigation guidelines within these draft guidelines, where mitigation is defined as the "examination of alternatives to establish the most technically and economically feasible, safe, and environmentally sound approaches for achieving the project objectives."[123] The precautionary approach is mentioned at the scoping stage; however, it is framed as a method of accounting for uncertainties present in this stage rather than as a guiding principle throughout the process.[124]

---

[119] *Draft standard and guidelines for the environmental impact assessment process* ISBA/27/C/4 (31 January 2022) at 1.
[120] Lorenzo, *supra* note 84 at 339.
[121] *Draft EIA process standard*, *supra note 119.*
[122] *Ibid* at 2.
[123] *Ibid* at Appendix I at 1, 4. See also Principle 15 of the *Rio Declaration*, A/CONF.151/26.
[124] *Ibid* at 4.

Furthermore, the Draft EIA Standard guideline does not specify which impacts should be measured beyond broad psychochemical, biological, and socioeconomic categories. Within these categories, an explanation as to what should be included is found in the *Draft Guidelines for the preparation of an environmental impact statement.* The lack of integration regarding guiding principles across the draft standard and guideline documents makes them difficult to use and compare and allows for the potential introduction of loopholes. While the lack of integration may be a matter of different drafters not coordinating their activities, the ISA still has a role in ensuring that the regulatory system is coherent and does not conflict with other rules and regulations.

Discussion of cumulative impacts is critical in understanding the potential long-term environmental effects. However, cumulative impacts must be properly integrated into the environmental management and monitoring plans, feasibility studies, and closure plans to mitigate these impacts effectively. Cumulative impact analysis is explored in both the *Standards and Guidelines* on the EIA process and EIS, noting the importance of cumulative evaluations of temporal accumulation, spatial accumulation, perturbation type, the process of accumulation, functional effects, and structural effects.[125] Cumulative and regional effects consider how the proposed project may have a regional impact biologically, socially, and economically. However, there remains a lack of discussion as to how upscaling of impacts should be standardized across proposals that may aid the ISA in data and proposal sharing prior to the collection of primary data to help ensure the accuracy of measurements of regional or cumulative impacts and to mitigate research in potentially fragile environments.

Table 1 below compares the EA Recommendations and the Draft *Standards and Guidelines*. The main differences lie in the lack of rigour within the *Standards and Guidelines* regarding collecting environmental baseline data compared to the EA Recommendations.

[125] *Ibid.*

	EA Recommendations	***Standards and Guidelines***	***Canada's Impact Assessment Act***
Environmental Baseline Studies	• Guidelines regarding what baseline data should be collected and how, regarding physical oceanography, chemical oceanography, geological properties, and biological communities (p.5-7 & Annex 1). • Similar methodological techniques are found in both EA Recommendations and Standards and Guidelines documents • Includes specific guidance for fragile or sensitive environments, including polymetallic nodules, polymetallic sulphides, and cobalt-rich ferromanganese crusts • Missing socioeconomic impacts in baseline environmental data	• *Draft Guidelines for the establishment of baseline environmental data* state in detail what data must be collected and specific methodologies that must be used. • Similar methodological techniques are found in EA Recommendations and documents • Notably lacks specific information for polymetallic seafloor massive sulphides and cobalt-rich ferromanganese crusts (p.2).	• Baseline studies should include information on the environmental, health, social, and economic conditions relevant to the proposed project • Baseline studies should disaggregate impacts based on factors of gender-based analysis.
Data collection, reporting and archival	• Specific details regarding data collection and submission to the authority • Lacking details as to data management within the ISA and how this data is archived	• *Draft Exploitation Regulation 38* details the reporting regulations for all activities. There is guidance regarding how data should be collected and archived during the EIA process in the *Standards and Guidelines*.	• Data collection must be specific enough to corroborate the validity and accuracy of the information collected
Cooperative research	• Emphasizes the importance of cooperative research programmes and knowledge sharing to reduce the repetition of experiments and improve understanding across the field of the baseline environmental conditions in the region of study or experimentation.	• *Draft Exploitation Regulation 3* details a duty to share and exchange information and knowledge collected in exploitation endeavours. However, this is seldom acknowledged within the *Standards and Guidelines.*	• Focus on collaborative and cooperative research with Indigenous populations and those who are disproportionately vulnerable and disadvantaged

Environmental impact assessment during exploration	• Provides examples of activities which do and do not require an environmental impact assessment. • Details of what should be observed as a part of the environmental impact assessment • Missing socioeconomic impacts	• The *Draft Standards and Guidelines* on EIS and EIA provide detailed instructions on the specific processes for environmental impact assessment during exploration. • Comprehensive guidance is detailed throughout both documents as to the expectations of the contractor.	• An evaluative framework for the planning stage allows for projects to be stopped prior to collecting baseline data in a fragile or unknown environment

Table 1: Comparison of Recommendations included in the ISA's *Recommendations for contractors' guidance to assess the possible environmental impacts* versus the draft *Standards and Guidelines.*
Source: Author's creation.

Environmental Impact Statement

The *Draft Guidelines for the preparation of an environmental impact statement* ("Draft EIS Guidelines") assist the reporting process followed during the implementation of the EIA and provide an impact assessment for the environmental and other effects identified.[126] The *Draft EIS Guidelines* emphasize the importance of considering the project context from a legal, policy, psychochemical, biological, and socioeconomic perspective.[127] Specifics are given for each of these contexts, including, for example, a comprehensive list of known species in the marine environment at the surface, midwater, and benthic depths and how potential impacts would affect their habitat and food chain.[128] Action plans for accident responses are also required, yet the guidelines lack details, specifically on cleanup and ongoing monitoring in the case of an accident.[129] Consultation with stakeholders is encouraged throughout every process step and is to be documented in the EIS.[130] Preventing and minimizing impacts is stressed throughout these guidelines, which provide relatively comprehensive guidance as to how to create an EIS.

Despite including socioeconomic perspectives within the EIS, the examples provided (tourism, fisheries, marine traffic, economic climate, and sites of archeological or historical significance) overlook the social climate and community in the proposed project area.[131] The socioeconomic concerns are centred on Western epistemologies and value systems, even though this guideline is intended to represent project impacts under international jurisdiction. There is no mention within the *Draft EIS Guideline*, nor the others, about including Indigenous rights and perspectives in the EIA process. Principle 22 of the *Rio Declaration* states that Indigenous people and their communities, and other local communities, have a vital role in environmental management. States have to enable their effective participation in achieving sustainable development.[132] Including Indigenous perspectives within an impact assessment not only provides baseline due diligence for understanding and potentially mitigating impacts but also allows for gathering valuable and relevant information on the baseline environmental conditions

[126] *Draft guidelines for the preparation of environmental impact statements ISBA/27/C/5 (*31 January 2022) at 1.
[127] *Ibid.*
[128] *Ibid* at Appendix 1.
[129] *Ibid.*
[130] *Ibid.*
[131] *Ibid.* Social climate refers to the behaviours, customs, and attitudes of a specific region or community.
[132] Rio Declaration, *supra* at Principle 22. See also *United Nations Declaration on the Rights of Indigenous Peoples* 61/295. (2008). Canada has enacted UNDRIP, *United Nations Declaration on the Rights of Indigenous Peoples Act* (S.C. 2021, c. 14).

of the proposed project area through an understanding of traditional ecological knowledge[133]. In both the *Draft EIA Standard* and the *Draft EIS Guidelines*, there is a lack of thorough consideration of Indigenous land use, local cultural considerations, and overall impacts on communities.[134] From Canada's experience, co-governance with Indigenous communities and active participation and implementation of traditional ecological knowledge in the assessment and decision-making processes should be critical components of any EIA. Governance should prioritize the diversity of the impacted communities and recognize the varying individual impacts a project may have based on personal identity factors, including gender, which is incorporated into Canada's legislation by including a gender-based assessment requirement for all impact assessments.[135] Consideration for the intersectionality of impacts based on gender and other social factors is neglected throughout the *Standards and Guidelines*, which focus predominantly on uniform social, biophysical, and economic impacts. Women often find themselves excluded from decision-making processes, underrepresented in the mining workforce, and facing discrimination and gender-based violence in and around mine sites.[136]

The *Draft EIA Standard* and the *Draft EIS Guidelines* include a comprehensive overview of risk matrix structures and hierarchies, utilizing standardized methodologies to assess the risk of potential impacts based on severity and probability (or likelihood and consequence). However, there is a lack of detail regarding the methodology for collecting robust data or thresholds for when environmental damages may be too severe that may be resource-and-site specific, given the current paucity of data to support a detailed understanding of ecological relationships and impacts associated with deep-sea mining.[137]

---

[133] Katharina Ruckstuhl, Michelle Thompson-Fawcett and Hauauru Rae, "Māori and Mining: Indigenous Perspectives on Reconceptualising and Contextualising the Social Licence to Operate" (2014) 32:4 Impact Assessment and Project Appraisal 304

[134] *Draft EIS guidelines, supra note 126*.

[135] *Ibid at* s. 22; D. Hoogeveen, et al., "Sex, mines, and pipelines: Examining Gender-based Analysis Plus in Canadian impact assessment resource extraction policy" (2021) 8:3 *The Extractive Industries and Society* 100921.

[136] For a review of gender issues in mining, see Keith MacMaster and Sara Seck, Mining for Equality, Soft Targets and Hard Floors for Boards of Directors?, in in Oonagh E. Fitzgerald, ed, *Corporate Citizen: New Perspectives on the Globalized Rule of Law* (CIGI Press, 2020); ILO, *Women in Mining, Towards gender equality* (2021) online: https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_821061.pdf; ICMM, "Growing Skills to Advance Gender Governance in Mining in 90 Countries" online: https://www.igfmining.org/impactstory/gender-governance-in-mining/#:~:text=Evidence%20suggests%20women%20are%20disproportionately,social%20norms%20and%20economic%20inequalities.

[137] *Harmful Marine Extractives: Understanding the risks & impacts of financing non-renewable extractive industries*, by UNEP FI (Geneva: UNEP FI, 2022) at 9.

Environmental Management and Monitoring Plans

Contractors and sponsoring states must cooperate with the ISA to establish monitoring programmes to evaluate the ongoing marine environmental impact of seabed mining.[138] Monitoring activities are a matter of customary international law, as set out in the *Pulp Mills* case and obligations under the Mining Code.[139] Outlined in the *Draft Exploitation Regulations*, contractors shall, "consistent with the relevant Guidelines, carry out exploitation under an exploitation contract with reasonable regard for other activities in the marine environment in accordance with UNCLOS Article 147 and the approved Environmental Management and Monitoring Plan and Closure Plan and any applicable international rules and standards established by competent international organizations."[140]

The purpose of an Environmental Monitoring and Management Plan ("EMMP") is to ensure that environmental effects meet the environmental quality objectives and standards for the mining operation.[141] The EMMP will set out commitments and procedures on implementing mitigation measures, monitoring the effectiveness of such measures, management actions to these results, and adopting and implementing reporting systems. They shall be prepared in accordance with the applicable Guidelines and consistent with other regulations, including the Closure Plan.[142] Thus, the EMMP requires a Guideline and a separate Closure Plan Standard, which, as described below, has not been created as of the date of writing. A contractor shall monitor and report annually on the environmental effects of its activities and manage all such effects as set out in the Standards.[143] Additionally, a contractor must implement all applicable mitigation and management measures to protect the marine environment and conduct performance assessments as set out in the Standards while maintaining the currency and adequacy of the EMMP during the term of its exploitation contract in accordance with Best Available Techniques, Best Environmental Practices, and taking into account the relevant Guidelines.[144] *Draft Exploitation Regulation,* Annex IV, links the EIS with the Environmental

[138] Seabed Advisory Opinion, *supra* note 38 at para 143.
[139] 2010 *Pulp Mills*, *supra* note 86 at paras 176, 197, 205, 266.
[140] *2019 Draft Exploitation Regulations*, *supra* note 43 at Regulations 31 and 48.
[141] *Draft Guidelines for the preparation of environmental management and monitoring plans ISBA/27/C/6 (31 January 2022) at* 1, para 2.
[142] *2019 Draft Exploitation Regulations*, *supra* note 40 at Regulation 48.
[143] *Ibid* at Regulations 38, 45.
[144] *Ibid* at Regulation 51, 52.

Management and Monitoring Plan, stating that the EIS must include information on environmental management, monitoring, and reporting.[145]

The *Draft Guidelines for preparing environmental management and monitoring plans* ("Draft EMMP Guideline") contain a brief introduction and an Appendix. Appendix I to the *Draft EMMP Guideline* contains non-prescriptive details for contractors regarding formulating an environmental management and monitoring approach.[146] The *Draft EMMP Guideline* requires adaptive management and a precautionary approach consistent with Principle 15 of the *Rio Declaration.* [147] The largest discrepancy lies in the rigour of environmental policy objectives—the latter mandates using the precautionary approach. At the same time, the former merely describes that the plan should include environmental objectives based on the seabed's status and should seek to minimize impacts identified in the EIA process." This is further addressed below.

The *Draft EMMP Guidelines* explore the role of adaptive environmental management within the context of proposed deep-sea mining activities. This approach should be considered viable and necessary across the draft *Standards and Guidelines*. In simple terms, adaptive management must be calibrated against clear thresholds that can be monitored to determine whether an activity should be adjusted or stopped altogether. However, there is controversy regarding adaptive management for seabed mining. In New Zealand, an adaptive management approach is prohibited where the application is for marine discharge consent (i.e., pollution).[148] For example, in *Sustain Our Sounds Inc v New Zealand King Salmon Company Ltd*, the New Zealand Supreme Court observed that international guidelines on applying the precautionary principle included adaptive management guidelines.[149]

A Monitoring Program should identify necessary parameters to evaluate environmental effects, including the proposed environmental monitoring/sampling methodology, standards, protocols, methodologies, and procedures for collecting, analyzing, and interpreting data. It should include details of the proposed monitoring stations across the project area, name the

[145] *Ibid* at Annex IV, s. 11, Annex VII.
[146] *Draft EMMP Guidelines supra note 141* at Annex, para 3.
[147] *Ibid at* s. 26.
[148] *Ibid*. at s. 61(4)(a)(ii).
[149] *Ibid*.at Guideline 12; International Union for Conservation of Nature, *Guidelines for applying the precautionary principle to biodiversity conservation and natural resource management*, 67th meeting of IUCN, (May 2007); *Sustain Our Sounds Inc v New Zealand King Salmon Company Ltd (2014) NZSC 40, 17 ELRNZ 520* at para 95.

performance standards incorporated by reference, and provide the risk assessment and management techniques, including adaptive management techniques (process, procedure, response), if appropriate, needed to achieve the desired outcomes; and review and reporting requirements and quality control standards.[150] The *Draft EMMP Guidelines* mention the need for three phases of monitoring throughout the process; validation monitoring prior to the project, compliance monitoring during the project, and long-term monitor following the completion of the project.[151] Although mentioned that validation monitoring should "validate assumptions made in the baseline/EIA/EIS phase of the project,"[152] it remains unclear when and how long this validation monitoring will be conducted. Furthermore, clear guidance on proceeding if assumptions are invalid is an essential and missing component of the *Draft EMMP Guidelines.* The most comprehensive list of items to be included in baseline monitoring remains in the *Draft EIA Standard*.[153] Furthermore, there is a lack of inclusion of criteria throughout the *Draft EIA Standard and EIS Guidelines* regarding compliance and long-term monitoring plans, despite these being included in the *Draft EMMP Guideline* and considered critical aspects of a complete EIA.[154] The *Draft EMMP Guideline* further does not contain any requirement to have insurance or financing in place for any environmental damage.

Environmental Management Systems

Draft Exploitation Regulation 46 states that a contractor shall implement and maintain an Environmental Management System ("EMS"), considering the relevant Guidelines. The EMS is part of the overall management system applied by a contractor that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining environmental policy, goals and environmental performance, including in the case of environmental emergencies.[155] The EMS must deliver site-specific environmental objectives and standards, be capable of

[150] Draft EMMP Guidelines, supra note 141 at 6.
[151] *Ibid* at 7.
[152] *Ibid* at 7.
[153] *Draft EIS guidelines, supra*.
[154] J M Harrington & Larry W Canter, "Planning environmental monitoring programs within the environmental impact assessment process" (1998) 55:4 *Int J Environ Stud* 305–331.
[155] ISA, *Draft standard and guidelines on the development and application of Environmental Management Systems ISBA/27/C/7 (31 January 2022)* at Annex I, para 1.

independent auditing by recognized and accredited organizations and permit effective environmental performance reporting.[156]

The *Draft standard and guidelines on the development and application of Environmental Management Systems* is designed to assist in developing an EMS for seabed mining.[157] An EMS's key ingredients include leadership by senior management, the environmental policy, assigning roles and responsibilities, and the scope of baseline data.[158] Further, the contractor applicant shall ensure that the EMS delivers site-specific environmental outcomes consistent with the Environmental Management and Monitoring Plan, allowing for the prevention and control of pollution of the marine environment from mining operations, and apply recognized standards and systems, including the International Organization for Standardization ("ISO") standards and guidance, in particular, ISO 31000 (Risk management), ISO 14001 (Environmental Management Systems), and ISO 19011 (Guidelines for auditing management systems).[159] As part of environmental mitigation measures, a contractor shall undertake four key steps; identifying and understanding key issues of the operation that may have an impact on the marine environment, ensuring operations are planned and carried out in a systematic and controlled manner to minimize or eliminate harmful effects, monitoring activities to evaluate whether the results achieved, and identifying areas for improvement.[160]

ISO 14001 is a standard that recognizes environmental management systems to improve environmental practices and organizational effectiveness.[161] Literature shows an improvement in the rigour and effectiveness of environmental practices due to adopting the best environmental practices, better employee commitment, and improved management system follow-up through regular audits.[162] However, ISO has drawbacks. ISO 14001 is not prescriptive: it does not impose a precise set of objectives or strategies for achieving them, nor does it confine the

---

[156] Draft Exploitation Regulations, *supra* note 40 at Regulation 46.
[157] *Draft EMS Standard and guidelines, supra note 155* at Annex II, at para 3.
[158] *Ibid* at paras 9, 10, 15, 20.
[159] *Ibid*.
[160] *Ibid at* paras 3, 4.
[161] Weiqian Zhang, Weiqiang Wang & Shoubing Wang, "Environmental performance evaluation of implementing EMS (ISO 14001) in the coating industry: case study of a Shanghai coating firm" (2014) 64 *Journal of cleaner production* 205; Haitao Yin & Peter Schmeidler, "Why do standardized ISO 14001 environmental management systems lead to heterogeneous environmental outcomes?" (2009) 18:7 *Business strategy and the environment* 469.
[162] Olivier Boiral et al, "Adoption and Outcomes of ISO 14001: A Systematic Review" (2018) 20:2 I*nternational journal of management reviews: IJMR* 411–432; Javier González-Benito & Óscar González-Benito, "Operations management practices linked to the adoption of ISO 14001: An empirical analysis of Spanish manufacturers" (2008) 113:1 *International journal of production economics* 60–73.

objectives to a purely environmental and operational perspective.[163] They are obligations of result, not an obligation of means. Adopting ISO can lead to different outcomes unrelated to the Standard but dependent on a diverse implementation approach based on unique organizational and managerial aspects.[164] ISO 14001 lacks performance measurability and strategic vision. Further, no real consensus exists on measuring environmental performance based on different and non-comparable indicators.[165] It is a management tool that aids any firm, irrespective of size, sector or type, in identifying and controlling the impact of its activities, products, and services on the environment.[166] Organizations can adopt ISO 14001 to meet certification process requirements and comply with external pressures without implementing the means or internal measures needed to improve their environmental performance.[167]

Information theory helps guide this analysis.[168] The ISO 14001 standard and improved environmental management depend less on technical and managerial impacts and more on implementing practices to improve environmental performance.[169] While implementing an EMS can indicate good management, the existence of an EMS in itself is insufficient to ensure compliance with environmental or social requirements.[170] Moreover, ISO 14001 should be read in conjunction with the entire ISO 14000 family of standards, including ISO 14002, 14004, and ISO 14007 (Guidelines for determining environmental costs and benefits).[171]

Instead, Eco-Management and Audit Scheme regulations are of more strategic value in achieving financial objectives and customer satisfaction and confidence in a supplier's EMS.[172] The Eco-Management and Audit Scheme is a better strategy for improving financial objectives

---

[163] Andrea Chiarini, "Setting Strategies outside a Typical Environmental Perspective Using ISO 14001 Certification" (2017) 26:6 *Bus Strategy Environ* 844–854.
[164] Boiral et al, supra note 162 at 420.
[165] *Ibid*.
[166] ISO, *ISO 14000 Family, Environmental Management*, online: https://www.iso.org/iso-14001-environmental-management.html, ISO Standards, "Standards Guide" online: https://www.isostandardsguide.com/iso-14001/.
[167] Olivier Boiral & Jean-François Henri, "Modelling the impact of ISO 14001 on environmental performance: A comparative approach" (2012) 99 *J Env Manage* 84–97 at 85.
[168] Marco Sartor et al, "ISO 14001 standard: Literature review and theory-based research agenda" (2019) 26:1 *Qual Manag J* 32–64.
[169] Boiral & Henri, *supra* note 167 at 85.
[170] IFC, *Managing Contractors' Environmental and Social Performance* (Washington, DC, 2017) at 3.
[171] ISO, *ISO 14002-1:2019 Environmental management systems — Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area — Part 1: General*, ISO, *ISO 14004:2016 Environmental management systems — General guidelines on implementation*, online: https://www.iso.org/standard/60856.html, ISO, *Environmental management — Guidelines for determining environmental costs and benefits*, online: https://www.iso.org/standard/70139.html?browse=tc.
[172] Chiarini, *supra* note 163.

as it allows measurability of environmental performance, including consumption and resource savings.[173]

Overall, there is a lack of consistency between the *Draft EMS Standard* and those outlined in the *Draft EMMP Guidelines*. The largest discrepancy lies in the rigour of environmental policy objectives—the latter mandates using the precautionary approach. At the same time, the former merely describes that the plan should include environmental objectives based on the seabed's status and should seek to minimize impacts identified in the EIA process.[174] While the *Draft EMS Standard* states the importance of delivering site-specific environmental outcomes to complement the Environmental Management and Monitoring Plan, there is no further guidance on what physical, geological, biological, chemical, or sediment properties should be measured. Detailed guidance regarding what properties should be measured and how they are provided within the *Draft EMMP Guidelines* while defining the scope of site-specific environmental goals is left unclear within the EMS.[175] Further, there is no mention of including the ISO 14040 series of assessments, which are the life cycle ISO standards.[176] Integrating the two standards into one coherent document would improve environmental monitoring. Moreover, the lack of a guideline on Closure Plans in either document means that environmental monitoring and management guidelines are incomplete. Incorporating guidelines for closure plans from the *Draft Exploitation Regulations* would allow applicants to create a comprehensive environmental monitoring plan for a project's entire lifespan.

Standards Not Included – Insurance and Closure Plans

There are several standards not included in Phase 1. These include *Standards and Guidelines* for insurance and closure plans. A contractor is obliged to obtain and thereafter, at all times, maintain and cause its subcontractors to obtain and maintain, in full force and effect, insurance with financially sound insurers satisfactory to the authority, of such types, on such terms and in such amounts in accordance with applicable international maritime practice,

---

[173] *Ibid* at 850.
[174] *Draft EMMP Guidelines supra note 141* at para 79-84; ISA, *Draft EMS standard*, *supra note 155*.
[175] *Draft EMMP Guidelines supra note 141* at line 347.
[176] ISO, ISO 14042: *Environmental management: Life cycle impact assessment*, ISO 14042:2000 (International Organization for Standardization, Geneva, Switzerland, 2000), ISO, Environmental management: *Life cycle interpretation*, ISO 14043:2000(E) (International Organization for Standardization, Geneva, Switzerland), ISO, Life cycle assessment: *Goal and scope definition and inventory analysis*, ISO 14040:1997, (International Organization for Standardization, 1997).

consistent with Good Industry Practice and as specified in the relevant Guidelines.[177] This obligation under an exploitation contract to maintain insurance as specified in the Guidelines is a fundamental contract term. The Secretary-General shall issue a compliance order if a contractor fails to maintain the insurance required under these regulations.[178]

The *Draft Exploitation Regulations* are vague in assessing liabilities for environmental damage. The issues of remoteness and other legal definitions, such as "wrongful acts," are neither defined nor explained. The lack of knowledge on the extent of environmental and compensable damage from seabed mining poses serious challenges without insurance requirements.[179] Any negligence or liability claim may not have sufficient legal grounds to warrant a finding of guilt on the contractor or sponsoring state.[180] The Interoceanmetal Joint Organisation stated:

> [I]t should be carefully analyzed because actual suspension of mining operations in the area, taking into account the risks associated, predicted structure of the operational costs and cash flow regime may likely result in real life in the mining termination with little chances for recovering the production and all risks associated are included, including environmental…. Insurance cost should be recognized for the proper considerations of contractor's economic models ongoing now in the authority. Probably, common insurance conditions valid for all contracts should be proposed in further regulations. It is not clear if there is a market for such kind of insurance.[181]

The failure of the ISA to have an insurance guidance document jeopardizes the health of the marine ecosystem should a contractor have insufficient funds, become insolvent, or have an inadequate closure plan. New Zealand's approach to insurance in the *Trans-Tasman* case would prove a useful comparator for the ISA to begin to develop an insurance standard. Trans-Tasman was required to hold insurance to the sum of not less than $500,000,000 NZD for any claim arising from giving consent to cover the costs of environmental restoration a.[182] This insurance is separate from any environmental bond (or performance guarantee) that might be required. A multifaceted stakeholder consultation process comprised of insurance companies, environmental

---

[177] *Draft Exploitation Regulations, supra note 40* at Regulation 36.
[178] *Ibid* at Regulation 103.
[179] MacMaster, *supra note 27*; Guifang Xue, *The Use of Compensation Funds, Insurance and Other Financial Security in Environmental Liability Schemes*, CIGI Report 6 (CIGI, 2019).
[180] MacMaster, *supra note 27*; Neil Craik, *Determining the Standard for Liability for Environmental Harm from Deep Seabed Mining Activities*, CIGI Liability Series Report 2 (CIGI, 2018); Neil Craik, *Legal Liability for Environmental Harm: Synthesis and Overview*, CIGI Liability Series Report 1 (CIGI, 2018).
[181] Interoceanmetal Joint Organization, "Comments to Draft regulations on exploitation of mineral resources in the Area" (22 November 2017) online: https://www.isa.org.jm/files/documents/EN/Regs/2017/Contr/IOM.pdf .
[182] *Trans-Tasman Resources v Taranaki-Whanganui Conservation Board [2021]* NZSC 127, at paras 215, 285.

non-governmental organizations, academic leaders, and financial institutions could create a robust insurance requirement that could be adopted by the ISA.

Guidelines on Closure Plans are also mandated.[183] A Closure Plan shall set out the responsibilities and actions of a contractor for the decommissioning and closure of activities, including temporary suspension of mining, post-closure management and monitoring of residual and natural environmental effects.[184] The contractor shall conduct a final performance assessment and submit a final performance assessment report per the Guidelines to ensure that the closure objectives described in the final Closure Plan have been met. The closure plan shall include details regarding who will conduct post-closure monitoring and areas for remediation or mitigation of residual negative environmental impacts.

The Draft *Standards and Guidelines* cannot be complete without these items added. Further, having ten separate guidelines and standards should provide for ten robust, complete standards. However, they are not fully aligned or synchronized with each other. The Phase I Draft *Environmental Performance Guarantee Guideline* only works with environmental management, monitoring, and closure plans. To address these issues, the *Draft EMS Standard and EMMP Guidelines* can be merged and integrated into one document, focusing on sustainable development and precaution. Principles and results-based performance metrics need to be included. For the *Standards and Guidelines* to make sense, they must be integrated to provide a holistic perspective on environmental protection. This integration begins with consistency among definitions and guiding principles across the guidelines and a *Plan of Work Guideline*, which centers on how all *Standards and Guidelines* interact.

Conclusion

The precautionary approach must be applied to seabed mining until science closes the information gaps concerning the receiving environment, the range of potential adverse effects, and the impact assessment measures (including cumulative effects) necessary to address those effects. Extracting non-renewable marine resources such as seabed mineral deposits poses a significant risk to the ocean and cannot be considered sustainable. Tuvalu cancelling its sponsorship of Circular Metals Ltd. is prudent until the Draft Standards and Guidelines are improved.

---

[183] *Draft Exploitation Regulations, supra note 40* at Regulation 61.
[184] *Ibid* at Regulation 59.

The ISA must create a comprehensive and practical set of *Standards and Guidelines* to prioritize sustainable ocean development. Gaps exist in the environmental impact analysis guidelines. Despite the critical importance of including expert review, and social and life-cycle impacts in the EIA process, these aspects are lacking within current seabed mining EIA requirements. There is a lack of integration of plans of work and mineral asset valuation codes and problems with environmental monitoring and management systems. Closure and insurance standards are absent. These must be addressed before exploiting mineral resources in our oceans.