



DISCUSSION PAPER

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1. Introduction

This paper discusses a range of measures that would contribute to the implementation of the precautionary approach by the International Seabed Authority (ISA). The precautionary approach is a key tool to address the environmental protection challenges posed by deep seabed mining, both at a regulatory and at a management level. At its core, the precautionary approach requires adequate environmental protection through the taking of early action in response to risks of environmental harm, even in the context of scientific uncertainty. As early as 2003, the UN General Assembly called upon actors, such as the ISA, to investigate how they can integrate precautionary biodiversity protection into their work, calling on:

‘the relevant global and regional bodies, in accordance with their mandates, to investigate urgently how to better address, on a scientific basis, including the application of precaution, the threats and risks to vulnerable and threatened marine ecosystems and biodiversity in areas beyond national jurisdiction.’¹

The Exploration Regulations adopted by the ISA specifically oblige all actors (the ISA, sponsoring states, and mining operators) to apply the precautionary approach.² Moreover, in its landmark Advisory Opinion in 2011, the Seabed Disputes Chamber supported the precautionary approach and identified it as an element of the general obligation of due diligence by sponsoring states.³ However, the challenge lies in translating the abstract obligation of the precautionary approach into meaningful practical actions.

This paper seeks to contribute to the discussion about how the ISA can give effect to the precautionary approach, both during the exploration phase and, in particular, in the context of developing the future regulations for mineral exploitation. This paper is based on the findings of a larger research project that examined whether, and in what manner and to what extent, the ISA has implemented the precautionary approach during the mineral exploration phase. This serves to highlight successes but also gaps and lacunae in the application of precaution as well as mechanisms and means through which precautionary management of deep seabed mining can be better implemented in the future. The detailed findings of the study are discussed in: Aline L. Jaeckel, *The International Seabed Authority and the Precautionary Principle - Balancing Deep Seabed Mineral Mining and Marine Environmental Protection* (Brill, Feb 2017), <http://www.brill.com/products/book/international-seabed-authority-and-precautionary-principle>.

This paper first provides a brief summary of what the implementation of the precautionary approach entails (section 2), including the question around the burden of proof (section 3). Section 4 then summarises the extent to which the ISA has implemented the precautionary approach. Finally, section 5 provides a list of potential measures that would contribute to the implementation of the precautionary approach in practice.

¹ UN Doc A/RES/58/240 (23 December 2003), paragraph 52.

² Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area, ISBA/6/A/18 (13 July 2000), amended by ISBA/19/C/17 (22 July 2013), ISBA/19/A/12 (25 July 2013), and ISBA/20/A/9 (24 July 2014) (*Nodules Exploration Regulations*), regulations 2(2), 5(1), 31(2) and (5); Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area, ISBA/16/A/12/Rev.1 (15 November 2010), amended by ISBA/19/A/12 (25 July 2013) and ISBA/20/A/10 (24 July 2014) (*Sulphides Exploration Regulations*), regulations 2(2), 5(1), 33(2) and (5); Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area, ISBA/18/A/11 (27 July 2012), amended by ISBA/19/A/12 (25 July 2013) (*Crusts Exploration Regulations*), regulations 2(2), 5(1), 33(2) and (5).

³ *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area* (Advisory Opinion) (Seabed Disputes Chamber, Case No 17, 1 February 2011), paragraphs 131–132.

2. Three Dimensions of Implementing the Precautionary Approach

Although the precautionary approach is widely accepted, the challenge lies in translating it into practice. The rich literature and numerous guidelines, policy documents, and international instruments on the precautionary approach offer various interpretations as to what its implementation entails.⁴ From these interpretations, three dimensions can be identified that are involved in the implementation of the precautionary approach: the procedural and institutional dimensions, as well as the taking of protective measures.

2.1. Procedural Dimension

The precautionary approach includes an important procedural dimension, namely the decision-making process about potentially harmful activities, such as deep seabed mining. This encompasses assessments of the environmental risks and impacts,⁵ including cumulative and long-term impacts, of seabed mining. It also includes assessment of the effectiveness and proportionality of potential protective measures as well as any potential counter-effects of these measures.⁶

Precautionary decision-making includes not only the consideration of scientific knowledge but also the identification and examination of uncertainties.⁷ Indeed, because of the limited scientific knowledge about the deep oceans, deciding on precautionary measures comprises three broad considerations: scientific knowledge (*what are the known facts?*), uncertainties (*where is the limit of our knowledge, can it be extended, and which assumptions are made?*), and value considerations (*how safe do we want to play?*). Because of the latter, subjective values, public participation should be ensured, as this allows administrative bodies to capture the various concerns and viewpoints on perceptions of risk and acceptability of harm.⁸ This is especially relevant for the ISA as it is required to act on behalf of humankind.⁹ Moreover, ensuring transparent decision-making assists in the balancing of potentially competing interests by mining operators, civil society, states, regulators etc.¹⁰

However, the identification of uncertainties as well as transparency and public participation have posed challenges in the ISA context. First, applicants for exploration contracts are not required to identify the uncertainties inherent in their project design and assessments, and to demonstrate how these uncertainties are addressed in the plans of work. Similarly, the Legal and Technical Commission (LTC) is not required to communicate any uncertainties to the Council when issuing its recommendations as to whether or not to approve an application. Because the main risks of deep seabed mining arise during the exploitation phase, it would be necessary for the future regulations

⁴ For a detailed discussion, see Arie Trouwborst, *Precautionary Rights and Duties of States* (Martinus Nijhoff, 2006), chapters 7-9; Aline L. Jaeckel, *The International Seabed Authority and the Precautionary Principle - Balancing Deep Seabed Mineral Mining and Marine Environmental Protection* (Brill, 2017), chapter 2.

⁵ Nicolas De Sadeleer, *Environmental Principles: From Political Slogans to Legal Rules* (Oxford University Press, 2002), pages 202-211.

⁶ Rosie Cooney, 'A Long and Winding Road? Precaution from Principle to Practice in Biodiversity Conservation' in Elizabeth Fisher, Judith Jones, and René von Schomberg (eds), *Implementing the Precautionary Principle: Perspectives And Prospects* (Edward Elgar Publishing, 2006) 223-244, pages 236-238.

⁷ Jacqueline Peel, *The Precautionary Principle in Practice: Environmental Decision-Making and Scientific Uncertainty* (Federation Press, 2005), pages 156-159; E Fisher, 'Precaution, Law and Principles of Good Administration' (2005) 52 *Water Science and Technology* 19-24, page 19.

⁸ Joyeeta Gupta, 'Glocalization: The Precautionary Principle and Public Participation' in David Freestone and Ellen Hey (eds), *The Precautionary Principle and International Law: the Challenge of Implementation* (Kluwer Law International, 1996) 231-246, page 246; David Vanderzwaag, 'The Precautionary Principle and Marine Environmental Protection: Slippery Shores, Rough Seas, and Rising Normative Tides' (2002) 33 *Ocean Development & International Law* 165-188, page 175.

⁹ *United Nations Convention on the Law of the Sea*, (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3, article 137(2).

¹⁰ Peel (n 7), pages 156-157, 225.

to address this lacuna, in order to facilitate precautionary decision-making.

Second, regarding the value considerations inherent in assessing an application for its environmental safety, the current decision-making process would benefit from greater transparency. At present, no conservation objectives have been agreed and the LTC has no guidance about how to respond to scientific uncertainties. Conservation objectives would require a discussion about what levels of harm are deemed acceptable. This would enable the LTC to determine whether the expected harm of a project reaches an unacceptable level. Similarly, the LTC has no guidance about how to determine whether a new application provides 'for effective protection and preservation of the marine environment' as required by the Exploration Regulations.¹¹ Third, the ISA's decision-making process has been criticised for its relative lack of transparency and public participation,¹² although the stakeholder surveys conducted in 2014,¹³ 2015,¹⁴ and 2016¹⁵ are an encouraging sign.

Balancing scientific advice and subjective values can, for example, be aided through what Walker calls 'science policies', that is 'decision rules about the way in which risk assessment scientists should proceed when they encounter specified types of uncertainties.'¹⁶ This can allow expert bodies to conduct risk assessment and make decisions over risk management in a principled way, taking into account value decisions reached by political bodies, in close consultation with the scientific community, the public, and other stakeholders.

2.2. Institutional Dimension

The precautionary approach is applied by institutions, in this case the ISA, which require the institutional capacity and competencies to provide for precautionary decision-making, facilitate risk assessment and risk management, adopt protective measures, and ensure their monitoring and enforcement. Institutional measures include building the capacity to enforce protective measures and amend existing measures if new knowledge is acquired.

The UN Convention on the Law of the Sea ('Convention' or UNCLOS) equips the ISA with far-reaching competencies in this respect, including regulatory, enforcement, inspection, and oversight powers.¹⁷ However, the ISA currently has limited human and financial resources to provide for precautionary decision-making. In particular, the ISA would need to have the capacity to effectively monitor compliance by the contractors. Moreover, the ISA would need to acquire detailed and comprehensive expertise to discharge its numerous environmental tasks, including performing cumulative and regional environmental assessments.¹⁸ As the review committee, for the review of the Area regime under article 154 of the Convention, noted: '[...] the suggested increase in the levels of expertise in both the Legal and Technical Commission (LTC) and the Secretariat, required to incorporate applicable standards for the protection and preservation of the marine environment,

¹¹ Nodules Exploration Regulations, regulation 21(4)(b); Sulphides and Crusts Exploration Regulations, regulation 23(4)(b).

¹² Michael Bothe, 'The Protection of the Marine Environment Against the Impacts of Seabed Mining: An Assessment of the New Mining Code of the International Seabed Authority' in Peter Ehlers, Elisabeth Mann Borgese, and Rüdiger Wolfrum (eds), *Marine Issues* (Kluwer, 2002) 221–231, page 226; Jeff A Ardron, Transparency in the operations of the International Seabed Authority: An initial assessment (2016) *Marine Policy* (in press).

¹³ ISA, *Developing a Regulatory Framework for Mineral Exploitation in the Area: Stakeholder Engagement* (February 2014), <http://www.isa.org.jm/files/documents/EN/Survey/ISA-SSurvey.pdf>.

¹⁴ ISA, *Developing a Regulatory Framework for Mineral Exploitation in the Area: Report to Members of the Authority and All Stakeholders*, ISBA/Cons/2015/1 (March 2015), <https://www.isa.org.jm/files/documents/EN/Survey/Report-2015.pdf>.

¹⁵ ISA, *Developing a Regulatory Framework for Mineral Exploitation in the Area*, ISBA/Cons/2016/1 (July 2016), https://www.isa.org.jm/files/documents/EN/Regs/DraftExpl/Draft_ExplReg_SCT.pdf.

¹⁶ Vern R Walker, 'The Myth of Science as a Neutral Arbiter for Triggering Precautions' (2003) 26 *Boston College International and Comparative Law Review* 197–228, page 214.

¹⁷ See e.g. UNCLOS, articles 137(2), 145, 153, 157, 160(2), 162(2).

¹⁸ UNCLOS, articles 145, 165(2)(d); ISA, *Environmental Management Plan for the Clarion-Clipperton Zone*, ISBA/17/LTC/7 (13 July 2011), paragraph 37.

merits particular consideration.’¹⁹

2.3. Protective Measures

Finally, the precautionary approach also incorporates the most obvious category of measures, those that are in themselves protecting the environment.²⁰ Without specific policy and management measures, the precautionary approach would have little effect.²¹ These measures must be determined on a case-by-case basis. Common examples of include restricting certain activities or substances,²² establishing safety margins,²³ or using the best available technology,²⁴ but also include scientific and economic research to enhance knowledge of long-term management options.²⁵ Determining suitable measures requires considering the situation at large including possible counter-effects that protective measures might trigger.²⁶ The goal is to find measures that are both *effective* in reaching the conservation objective but also *proportionate* to it, i.e. no more restrictive than necessary (see Figure 1).

¹⁹ ISA, *Periodic Review of the International Seabed Authority Pursuant to UNCLOS Article 154: Comments by the Review Committee*, ISBA/22/A/CRP.3(2) (25 May 2016), <https://www.isa.org.jm/document/isba22acrp3-2>, paragraph 11.

²⁰ Commission of the European Communities, *Communication from the Commission on the precautionary principle*, COM(2000) 1 final (2 February 2000), pages 15-20; Cooney (n 6), pages 232-233; James Cameron and Juli Abouchar, ‘The Status of the Precautionary Principle in International Law’ in David Freestone and Ellen Hey (eds), *The Precautionary Principle Conservation and International Law: the Challenge of Implementation* (Kluwer Law International, 1996) 29-52, pages 50-51.

²¹ Rosie Cooney and Barney Dickson, ‘Precautionary Principle, Precautionary Practice: Lessons and Insights’ in Rosie Cooney and Barney Dickson (eds), *Biodiversity and the Precautionary Principle: Risk, Uncertainty and Practice in Conservation and Sustainable Use* (Earthscan, 2005) 287-298, page 301.

²² David Freestone and Ellen Hey (eds), *The Precautionary Principle and International Law: the Challenge of Implementation* (Kluwer Law International, 1996), pages 249-268; Trouwborst (n 4), pages 165-169; Rosie Cooney, *The Precautionary Principle in Biodiversity Conservation and Natural Resource Management: An Issue Paper for Policy-Makers, Researchers and Practitioners* (IUCN, 2004), page 30.

²³ Cooney (n 22), page 30; Trouwborst (n 4), pages 169-170.

²⁴ Trouwborst (n 4), pages 172-174.

²⁵ Ellen Hey, ‘The Precautionary Concept in Environmental Policy and Law: Institutionalizing Caution’ (1992) 4 *Georgetown International Environmental Law Review* 303–318, page 311; Trouwborst (n 4), pages 174-177.

²⁶ Cooney (n 6), pages 231-233.

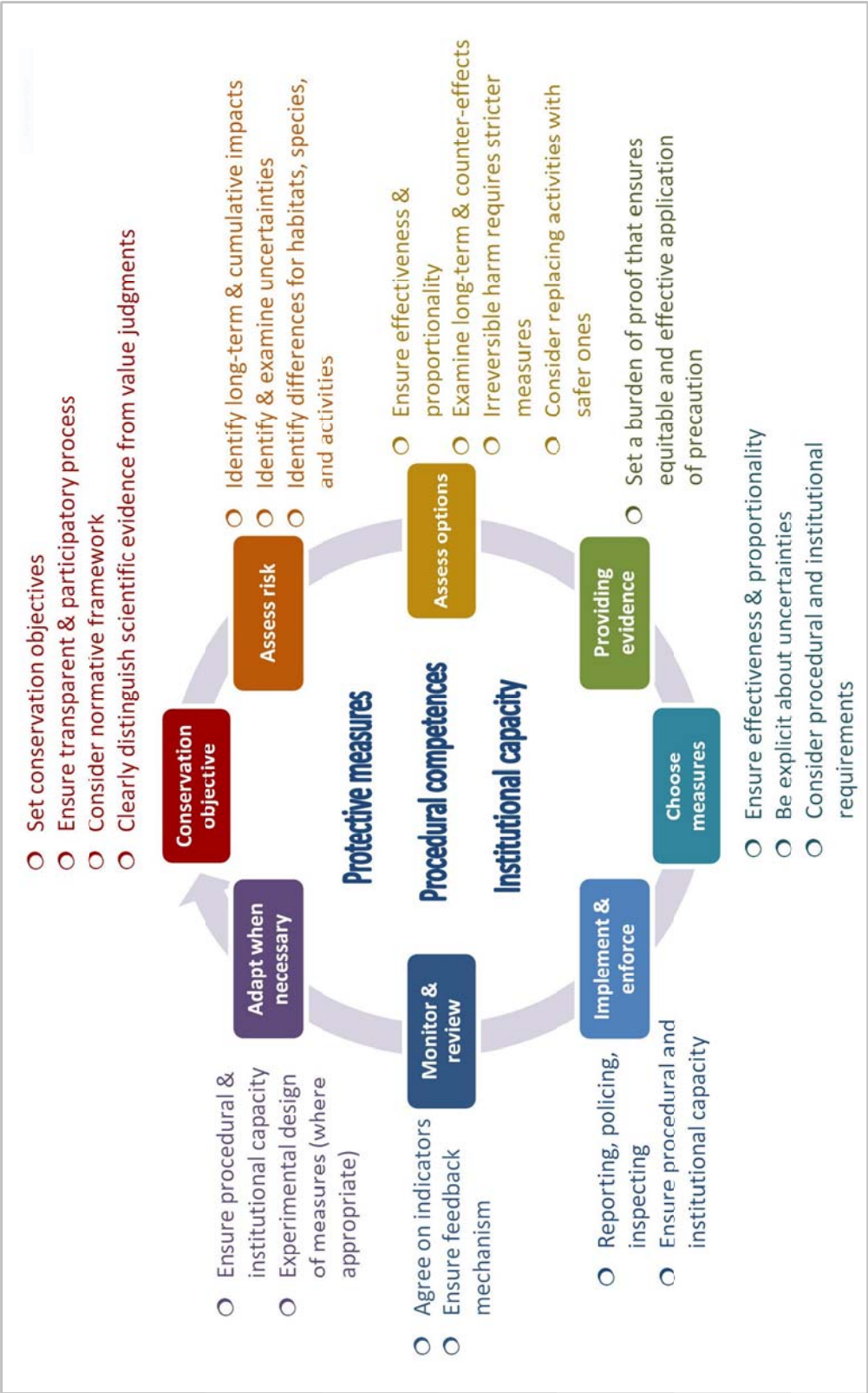


Figure 1: Steps required to implement the precautionary approach. These steps are non-exhaustive and not necessarily linear so their order and direction is merely a broad indication. Source: Jaeckel (n 4).

3. The Burden of Proof

Reversing the burden of proof is not a necessary requirement of the precautionary approach.²⁷ It may be applied in individual circumstances, yet only if it is proportionate. Numerous cases exist in which the burden has specifically been reversed,²⁸ for example, with respect to large-scale pelagic driftnet fishing by the UN General Assembly,²⁹ cockle fishing in the Wadden Sea by the EU,³⁰ and bottom fishing in areas with certain cold-water corals, seeps and vents, and sponges in the area managed by regional fisheries management organisation, such as the *South Pacific Regional Fisheries Management Organisation*.³¹ It has also been suggested for marine protected areas in areas beyond national jurisdiction.³² Thus, reversing the onus of proof for selective sites or activities can be a means to implement the precautionary approach, where it is proportionate.

In any event, the setting of the burden of proof must ensure an effective and equitable application of the precautionary approach.³³ The latter refers to the fact that it can be inequitable to place the burden of proof on the party that does not have access to the information about the environmental effects of an activity. Judge Weeramantry in his dissenting opinion in the case *Request for an Examination of the Situation in the Nuclear Tests Case* phrased it as follows:

‘Where a party complains to the Court of possible environmental damage of an irreversible nature which another party is committing or threatening to commit, the proof or disproof of the matter alleged may present difficulty to the claimant as the necessary information may largely be in the hands of the party causing or threatening the damage.’³⁴

As such, in deciding who to burden, it is important to consider who proposes an activity, who benefits from it, who bears the environmental costs, and who has access to information and resources.³⁵

In the ISA context, the burden of proof is currently not reversed in a strict sense³⁶ but a presumption of harm is integrated into the legal framework. Both UNCLOS and the Mining Code recognise that seabed mining could cause environmental damage.³⁷ The LTC is required to only recommend approval of an application for an exploration contract, if it is satisfied that the application provides ‘for effective protection and preservation of the marine environment.’³⁸ While proof of an absence of risk is not required, the focus is on demonstrating that environmental protection is ensured. This

²⁷ *Pulp Mills on the River Uruguay (Argentina v. Uruguay)* (Judgment) [2010] ICJ Rep 71, paragraphs 162-164; Trouwborst (n 4), pages 222-227.

²⁸ Trouwborst (n 4), pages 201-219.

²⁹ UN Doc A/44/225 (22 December 1989), paragraph 4.

³⁰ *Landelijke Vereniging tot Behoud van de Waddenzee and Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij* (C-127/02) [2004] ECR I-7405, paragraphs 44-45, 59, 67; See also Elen R Stokes, ‘Liberalising the Threshold of Precaution - Cockle Fishing, the Habitats Directive, and Evidende of a New Understanding of “Scientific Uncertainty”’ (2005) 7 *Environmental Law Review* 206-214.

³¹ SPRFMO, ‘Conservation and Management Measure for the Management of Bottom Fishing in the SPRFMO Convention Area’ (CMM 4.03, 29 April 2016), <https://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/CMM-4.03-Bottom-Fishing-2016-4Mar2016.pdf>, paragraph 22.

³² UN Doc A/61/65 (20 March 2006), annex I paragraph 61.

³³ Cooney (n 6), page 234.

³⁴ *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court’s Judgment of 20 December 1974 in the Nuclear Tests (New Zealand v. France) Case* [1995] ICJ Rep 1995 (Dissenting Opinion of Judge Weeramantry), page 342.

³⁵ Rosie Cooney and Barney Dickson, ‘Appendix: Guidelines for Applying the Precautionary Principle to Biodiversity Conservation and Natural Resource Management’ in Rosie Cooney and Barney Dickson (eds), *Biodiversity and the Precautionary Principle: Risk, Uncertainty and Practice in Conservation and Sustainable Use* (Earthscan, 2005) 299-306, page 303.

³⁶ See e.g. UNCLOS, article 162(2)(x).

³⁷ UNCLOS, article 145; Nodules Exploration Regulations, regulation 31; Sulphides and Crusts Exploration Regulations, regulation 33; 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/19/LTC/8 (1 March 2013).

³⁸ Nodules Exploration Regulations, regulation 21; Sulphides and Crusts Exploration Regulations, regulation 23.

could amount to a moderate form of precaution, if a number of criteria were met, which are currently not satisfied:

- (a) defining what effective environmental protection means;
- (b) establishing criteria for the LTC to assess the environmental performance of the proposed work;
- (c) detailed and transparent environmental impact assessments for the proposed work; and
- (d) detailed and transparent description of how the proposed project aims to protect the marine environment.

These criteria would need to be addressed in order to facilitate precautionary decision-making in the deep seabed mining context.

Interestingly, the draft regulations developed by the Preparatory Commission in 1990, applied a reversed burden of proof and provided that '[a]ctivities in the Area shall only take place if they do not cause serious harm to the marine environment.'³⁹

A parallel regime, which also includes a presumption of harm rather than a reversal of the burden of proof, is the 1995 *Fish Stocks Agreement*. However, in contrast to the seabed mining regime, it sets a clear conservation objective, namely to 'maintain or restore stocks at levels capable of producing maximum sustainable yield.'⁴⁰ The agreement requires states parties to determine 'stock-specific reference points and the action to be taken if they are exceeded.'⁴¹ As Freestone notes:

'[...] instead of the burden of proof being on those arguing for conservation to prove definitively that stocks are threatened before conservation measures are put in place (as has been the situation in the past), a number of stock management parameters are established ab initio and if these are exceeded then conservation measures will automatically become applicable.'⁴²

A similar conservation objective could be set by the ISA. However, an important distinction between fisheries and deep seabed mining must be borne in mind. While fisheries are renewable resources, which can recover from excessive exploitation if managed within thresholds, recovery times for seamount fauna are very long⁴³ and ecosystem recovery from nodules mining is likely to require 'many decades to millions of years (for nodule regrowth)'.⁴⁴

4. Implementation of the Precautionary Approach by the ISA

Against the background of the discussion in the previous sections, about what the implementation of the precautionary approach entails, this section examines whether the ISA has been implementing the precautionary approach during the exploration phase. This serves to highlight further measures and issues that would need to be addressed in the development of the future exploitation regulations. As noted at the outset, the discussion is a brief summary of a larger study,

³⁹ Preparatory Commission for the International Sea-bed Authority and for the International Tribunal for the Law of the Sea, *Draft Regulations on Prospecting, Exploration and Exploitation of Polymetallic Nodules in the Area*, LOS/PCN/SCN.3/WP.6/Add.5 (8 February 1990), article 105.

⁴⁰ *Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks*, (adopted 4 August 1995, entered into force 11 Dec 2001) 2167 UNTS 3, article 5(b), annex II paragraph 2.

⁴¹ *Ibid*, article 6(3)(b).

⁴² David Freestone, 'Implementing Precaution Cautiously: The Precautionary Approach in the Straddling and Highly Migratory Fish Stocks Agreement' in Ellen Hey (ed), *Developments in International Fisheries Law* (Kluwer Law International, 1999) 287-325, page 293.

⁴³ F Althaus et al, 'Impacts of bottom trawling on deep-coral ecosystems of seamounts are long-lasting' (2009) 397 *Marine Ecology Progress Series* 279-294; C R Smith et al, 'The near future of deep seafloor ecosystems' in N Polunin (ed), *Aquatic Ecosystems: Trends and global prospects* (Cambridge University Press, 2008) 334-351.

⁴⁴ Adrian G Glover and Craig R Smith, 'The Deep-Sea Floor Ecosystem: Current Status and Prospects of Anthropogenic Change by the Year 2025' (2003) 30 *Environmental Conservation* 219-241, page 219.

in which the detailed research supporting these conclusions can be found.

The ISA has implemented some aspects of the precautionary approach, yet significant shortcomings and lacunae remain, in particular regarding the establishment of a procedural framework that enables effective risk assessment and adjustment of risk management measures as well as a timely implementation of protective measures. While the ISA's limited resources undoubtedly play a role, these challenges may also be linked to the absence of an environmental management strategy. The following paragraphs offer a brief discussion of the key challenges and successes.

4.1. Conservation Objective

An important shortcoming in the current regulatory framework is the absence of specific a conservation objective. As a result, it is not possible to assess whether a protective measure, even if adopted specifically to give effect to the precautionary approach, is *effective* in and *proportionate* to precautionary management aims. (Effectiveness and proportionality are the two key criteria to select precautionary measures.⁴⁵)

This in turn has institutional implications. At present, the LTC is required to determine whether an application for an exploration contract provides for 'effective protection and preservation of the marine environment including, but not restricted to, the impact on biodiversity.'⁴⁶ In the absence of a conservation objective, it is unclear what *effective protection* means.

4.2. Uncertainties, Transparency, and Public Participation

Precautionary decision-making requires the identification of scientific knowledge and remaining uncertainties in a transparent manner. This would enable the selection of protective measures that can meet conservation objectives, and which reflect public opinion about the acceptability of risk as well as the values placed on seafloor minerals, marine biodiversity, and deep ocean ecosystems. At present, this is hindered by an absence of both a conservation objective and requirement to identify uncertainties, as well as remaining difficulties regarding transparency and public participation with respect to decision-making by the ISA.

4.3. Central Role for Scientific Advice

The existence of the LTC represent a precautionary method: It institutionalises a central role for scientific information in the decision-making process. This can ensure that decisions are based on scientific advice, in line with the precautionary approach. However, the LTC faces an 'overwhelming workload'⁴⁷ and the expertise it represents may need to be expanded to incorporate comprehensive and detailed expertise over environmental impact assessments and environmental management.⁴⁸

4.4. Procedural Challenges for Environmental Impact Assessments and Adaptive Management

Although the regulatory framework for the Area incorporates the substantive obligation to carry out environmental impact assessments (EIAs), and the LTC has issued guidance for contractors regarding EIAs,⁴⁹ significant *procedural* challenges remain. First, the current procedural framework incorporates neither the detailed requirements of EIAs, such as independent reviews, nor

⁴⁵ Commission of the European Communities (n 20), pages 17-18; Simon Marr, *The Precautionary Principle in the Law of the Sea: Modern Decision-making in International Law* (Martinus Nijhoff, 2003), pages 35-37; Ronnie Harding and Elizabeth Fisher, 'Introducing the Precautionary Principle' in Ronnie Harding and Elizabeth Fisher (eds), *Perspectives on the Precautionary Principle* (Federation Press, 1999) 2-25, page 12.

⁴⁶ Nodules Exploration Regulations, regulation 21(4)(b); Sulphides and Crusts Exploration Regulations, regulation 23(4)(b).

⁴⁷ See e.g. ISA, *Statement of the President of the Council of the International Seabed Authority on the work of the Council during the nineteenth session*, ISBA/19/C/18 (24 July 2013), paragraph 9.

⁴⁸ See also ISBA/22/A/CRP.3(2) (n 19), paragraph 11; David Johnson et al, *Periodic Review of the International Seabed Authority pursuant to UNCLOS Article 154 - Interim Report* (ISA, 2016)

https://www.isa.org.jm/files/documents/EN/22Sess/Art154/Art154_InterimRep.pdf, pages 64, 75-76.

⁴⁹ ISBA/19/LTC/8 (n 37).

consequences that must be taken if an EIA identifies risks of unacceptable levels of harm. A conservation objective could help to determine what level of harm is deemed acceptable.

Second, the efficacy of EIAs, as well as adaptive management, is uncertain in the current procedural framework. This is because full EIAs are required during the course of exploration work, that is once the ISA has granted a 15-year exploration contract. In order for EIAs to have a practical effect, the ISA would need to be in a position to act upon the assessments. In other words, the ISA would need to be able to require contractors to adjust their operations based on new information, such as those generated by EIAs. Similarly, adaptive management would require the ISA to continuously adjust environmental standards and management measures in response to new information. However, the current procedural framework fails to provide an effective mechanism through which the ISA can amend environmental standards during the lifetime of an exploration contract.⁵⁰

As a result, at present, the risk is that EIAs might be considered an administrative formality rather than a crucial step in identifying the risks and uncertainties of seabed mining, in order to ensure their minimisation in accordance with the ISA's mandate. In addition, adaptive management is difficult, if not impossible, under the current procedural framework.

This goes to the heart of the challenge to implement the precautionary approach. The ISA develops its environmental standards incrementally. As more information becomes available, the ISA could, and to some degree has, adjusted the environmental parameters of seabed mining. However, the procedural framework does not provide an adequate avenue to require such adjustments once an exploration contract has been granted.

The future exploitation regulations may need to address this lack of regulatory control. For example, EIAs could be fully integrated into the decision-making processes and accompanied by regulatory and management control by the Authority. The relevant mandate is provided by the Convention. Article 153(1) tasks the ISA to organise, carry out, and control activities in the Area⁵¹ and article 162(2)(l) requires the Council to 'exercise control over activities in the Area'.⁵² Moreover, when applying for an exploration contract, applicants have to submit written undertakings accepting control by the ISA over the exploration activities.⁵³ Additionally, the sponsoring state has a due diligence obligation to ensure the contractor meets its contractual obligations.⁵⁴ The ISA Technical Study No. 11 summarised the implications with respect to the future exploitation regulations:

'In short, the ISA will need to reserve for itself substantial power and authority to manage, regulate and oversee the exploitation regime based upon the principles of:

1. High sensitivity to environmental concerns and use of the precautionary principle.
2. Highly technical and as yet unknown challenges associated with successful deep ocean mining.
3. Obligation to preserve and to direct benefit flows to the developing world.
4. Actively demonstrating good governance.
5. Maintaining the reputation of the UN as a fair, independent and competent regulator.⁵⁵

It will be important for the future exploitation regulations to protect contractors from discriminatory or arbitrary obligations. To avoid that, environmental standards could, for example, be applied equally to all contractors that face similar environmental challenges.

⁵⁰ For a detailed discussion, see Aline Jaekel, 'Deep Seabed Mining and Adaptive Management: The Procedural Challenges for the International Seabed Authority' (2016) 70 *Marine Policy* 205–211.

⁵¹ UNCLOS, article 153(1)

⁵² UNCLOS, article 162(2)(l).

⁵³ UNCLOS, annex III articles 3(4), 4, 6; *Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea* (adopted 28 July 1994, entered into force 28 July 1996) 1836 UNTS 3 (1994 Implementing Agreement), annex section 1(6); Nodules Exploration Regulations, regulation 14; Sulphides and Crusts Exploration Regulations, regulation 15.

⁵⁴ 2011 Advisory Opinion (n 3), paragraph 242.

⁵⁵ Allen L Clark, Jennifer Cook Clark, and Sam Pintz, *Towards the Development of a Regulatory Framework for Polymetallic Nodule Exploitation in the Area (Technical Study: No. 11)* (ISA, 2013), page 20.

4.5. Procedural Safeguards to Ensure Establishment of Environmental Baselines

A related issue concerns the procedural integration of baseline work. As the ISA's Recommendations for contractors note: baseline data 'documenting natural conditions prior to test mining *are essential* in order to monitor changes resulting from test mining impacts and to predict impacts of commercial mining activities.'⁵⁶ The Mining Code requires contractors to gather baseline data for their contract areas.⁵⁷ Yet, despite this requirement, the ISA 'is currently operating in a data deficient environment, particularly as regards resource data and environmental data.'⁵⁸ The lack of baseline data not only affects the efficacy of EIAs⁵⁹ but also the development of future regulations for mineral exploitation, as noted by the Nii Allotey Odunton in 2013:

'One of the most important responsibilities the Authority has is to develop rules, regulations and procedures for the protection of the marine environment from adverse impacts of mining. In order to do this, we need first to understand the characteristics of the deep ocean environment and second to understand and evaluate the long-term impacts of mining. We can only do this with the cooperation of exploration contractors, who are required under the terms of their contracts to provide the Authority with extensive environmental baseline data to enable us to build up a better understanding of the environmental characteristics of the ocean floor and its biodiversity.'⁶⁰

One option to address this situation would be to incorporate procedural safeguards into the Mining Code, in order to ensure environmental baseline data is collected. Although the current Exploration Regulations include a substantive requirement for contractors to gather such data, they do not stipulate any consequences for contractors failing to do so. Filling this lacuna could ensure that the exploration phase results in sufficient baseline data and knowledge to enable the development of the future exploitation regulations. The remaining difficulty is to determine which level of baseline data is sufficient.

4.6. Lack of an Environmental Management Strategy

At present, the ISA lacks a strategic plan for the environmental management of seabed mining. The review of the Area regime under article 154 of the Convention could lead to a change in this respect.

Currently, protective measures are adopted on an *ad hoc* basis and environmental standards are set incrementally. Although there is some merit in an incremental approach, it would need to be accompanied by a conservation objective and strategic plan to ensure that precautionary decision-making and management will be followed, even if commercial pressure to commence the exploitation phase increases. What is more, it would need to be supported by a procedural framework that allows for the continuous adjustment of environmental standards.

Under Article 145 UNCLOS as well as the 1994 Implementing Agreement, the effective protection of the marine environment is a core obligation of, and indeed a priority task for, the ISA.⁶¹ Nonetheless, the ISA has not yet adopted an environmental management strategy.⁶² Similarly, the regulatory framework does not yet include strategic environmental assessments (SEAs). SEAs can be procedural tools to scale up environmental assessments to a regional and global level and integrate cumulative effects. Although both the ISA's Recommendations for contractors as well as the Environmental

⁵⁶ ISBA/19/LTC/8 (n 37), paragraph 14 (emphasis added).

⁵⁷ Nodules Exploration Regulations, Regulation 18(b), 32; Sulphides and Crusts Exploration Regulations, Regulation 20(1)(b), 34; All Exploration Regulations, annex II, section 24(b) and annex IV, section 5.3.

⁵⁸ ISBA/Cons/2015/1 (n 14), page 41; Seascope Consultants Ltd, *Review of Implementation of the Environmental Management Plan for the Clarion-Clipperton Zone - Report to the International Seabed Authority*, (20 May 2014) <http://isa.org.jm/files/documents/EN/20Sess/LTC/CCZ-EMPR.pdf>, page 10.

⁵⁹ ISBA/19/LTC/8 (n 37), paragraph 19.

⁶⁰ Nii Allotey Odunton, 'Statement of the Secretary-General at the Launching of UK Seabed Resources (14 March 2013), <http://isa.org.jm/files/documents/EN/SG-Stats/NAO-Statement.pdf>.

⁶¹ 1994 Implementing Agreement, annex section 1(5)(g).

⁶² Aline Jaeckel, 'An Environmental Management Strategy for the International Seabed Authority? The Legal Basis' (2015) 30 *The International Journal of Marine and Coastal Law* 93-119.

Management Plan for the Clarion-Clipperton Zone foreshadow the assessment of regional and cumulative impacts,⁶³ these assessments are not integrated into the current procedural framework.

4.7. Timely Action

The precautionary approach requires protective measures at an early stage, in spite of remaining uncertainties. However, the lack of an environmental management strategy, coupled with an incremental approach to standard setting, makes it difficult for the deep seabed mining regime to meet this temporal requirement.

Three specific concerns can be raised here: First, although the LTC is required to make recommendations to the Council on the application of the precautionary approach,⁶⁴ the only such recommendation to date was to adopt the Environmental Management Plan for the Clarion-Clipperton Zone (EMP-CCZ). Second, the LTC is required to develop and implement procedures for determining whether proposed *exploration* activities in the Area would have serious harmful effects on vulnerable marine ecosystems, ‘in particular those associated with seamounts and cold-water corals’ as well as hydrothermal vents.⁶⁵ If this is the case, the LTC must ensure ‘those activities are managed to prevent such effects or not authorized to proceed.’⁶⁶ However, despite repeated calls for action from the UN General Assembly,⁶⁷ the ISA has not yet acted upon this obligation. Meanwhile, 11 applications for contracts to explore for sulphides and crusts have been approved.

Third, the EMP-CCZ is perhaps the single most important protective measure taken by the ISA. However, it also demonstrates that the effectiveness of spatial management, and thus also its value in serving as a precautionary measure, depends on timely action. When the EMP-CCZ was adopted in 2012, the location of the nine Areas of Particular Environmental Interest (APEI) was adjusted to avoid conflict with existing contract areas.⁶⁸ This resulted in ‘substantial modifications to the spatial location of the science-based recommendations for the proposed [protected area] network.’⁶⁹ Thus, the effectiveness of the APEIs was compromised in order to avoid changes to existing exploration contracts. Given that *early* action and *effectiveness* of a protective measure in reaching the conservation goal are core elements of the precautionary approach, this relocation of the APEIs compromised the contribution of the EMP-CCZ towards implementing precaution.

4.8. Role of the ISA in Marine Scientific Research

Scientific research is an integral element of the precautionary approach. Although the Mining Code requires contractors to gather environmental baseline data, it is silent with respect to the ISA’s role in conducting targeted research projects, in line with its mandate under Article 143 of UNCLOS, to coordinate, promote, and even carry out marine scientific research in the Area. Nonetheless, the ISA has been active in supporting contractors to use standardized taxonomy for species they discover.⁷⁰

Interestingly, although the ISA has collaborated in some scientific projects to generate new biodiversity data, these were not necessarily driven by the Authority itself, no doubt due to a lack of funding. Examples are the ISA’s collaboration with the Census of Marine Life and its contribution to

⁶³ ISBA/19/LTC/8 (n 37), paragraph 16; ISBA/17/LTC/7 (n 18), paragraphs 34, 37, 40(b), 43, 51.

⁶⁴ Nodules Exploration Regulations, regulation 31(3); Sulphides and Crusts Exploration Regulations, regulation 33(3).

⁶⁵ Nodules Exploration Regulations, regulation 31(4); Sulphides and Crusts Exploration Regulations, regulation 33(4).

⁶⁶ *Ibid.*

⁶⁷ UN Doc A/Res/67/78 (11 December 2012), paragraphs 190-191; UN Doc A/RES/68/70 (9 December 2013), paragraphs 206-207; UN Doc A/RES/69/245 (29 December 2014), paragraphs 221-222.

⁶⁸ ISBA/17/LTC/7 (n 18), paragraph 26; ISA, *Proposal for an environmental management plan for the Clarion-Clipperton Zone - Note by the Secretariat*, ISBA/17/LTC/2 (6 April 2011), paragraphs 17, 22.

⁶⁹ L M Wedding et al, ‘Managing Mining of the Deep Seabed’ (2015) 349 *Science* 144–145.

⁷⁰ For information about the ISA workshops on taxonomy, see : <https://www.isa.org.jm/workshop-standardise-megafaunal-taxonomy-exploration-contract-areas-clarion-clipperton-fracture-zone>, <https://www.isa.org.jm/workshop/workshop-taxonomic-methods-and-standardization-macrofauna-clarion-clipperton-fracture-zone>, <https://www.isa.org.jm/workshop/workshop-taxonomic-methods-and-standardization-miiofauna-clarion-clipperton-zone-dec-2015>.

the Kaplan project, which resulted in the recommendation to establish no-mining areas in the Clarion-Clipperton Zone. Collaborations should be welcomed to maximize efficiency and source detailed expertise from the scientific community. However, the lack of a strategic research agenda can lead to the ISA relying, to a degree, on the scientific research community carrying out projects relevant to seabed mining.

5. Potential Ways Forward

As this discussion paper has sought to demonstrate, although the ISA has given effect to some aspects of the precautionary approach, significant shortcomings and gaps remain. The key to implementing precaution is to act early, even if some scientific uncertainties remain. The Area regime is in a privileged position vis-à-vis most global commons in that a competent organisation with a far-reaching mandate has been established well before commercial deep seabed mining is a reality. The following statement from 1990, made during the work of the Preparatory Commission, captures this opportunity and responsibility:

‘It was pointed out that given the current prospects for deep sea-bed mining the Special Commission should take the required time to develop adequate precautionary measures to preserve the marine environment and that it was a credit to the authors of the United Nations Convention on the Law of the Sea that they had placed such emphasis on environmental considerations at that time when such issues were not yet in the forefront.’⁷¹

There is currently a window of opportunity, before the commencement of mineral exploitation, for the states and the ISA to put in place the institutional, procedural, and substantive components of precautionary environmental management. Indeed, the 1994 Implementing Agreement requires the ISA to focus inter alia on the adoption of ‘rules, regulations and procedures incorporating applicable standards for the protection and preservation of the marine environment,’⁷² before the exploitation phase begins.

The following is a summary table of some of the suggestions that could better align the ISA’s regulatory framework with the requirements of the precautionary approach. These measures could support the development of a strategic environmental management framework for the ISA, in order to move beyond *ad hoc* measures and give effect to the environmental mandate of the ISA.

⁷¹ Preparatory Commission for the International Sea-bed Authority and for the International Tribunal for the Law of the Sea, *Statement to the Plenary by the Chairman of Special Commission 3 on the Progress of Work in that Commission*, LOS/PCN/L.84 (29 August 1990), paragraph 8.

⁷² 1994 Implementing Agreement, annex section 1(5)(g).

Potential Measures to Strengthen the Implementation of Precaution
Protective Measures
Commission strategic marine scientific research studies to increase the quality, quantity, and verifiability of environmental baseline data
Ensure environmental management plans and marine protected areas are established before numerous exploration sites are allocated within a region
Ensure measures for the protection of vulnerable marine ecosystems are adopted before exploration work is authorized which may harm them
Procedural Measures
Determine conservation objectives in line with best scientific advice and public opinion regarding the acceptability of risks
Conduct strategic environmental assessments regarding the impacts of deep seabed mining on regional scales
Require applicants to identify the uncertainties inherent in their project design and assessments and to demonstrate how these are addressed in their plans of work
Require the LTC and Council to specify which uncertainties as well as scientific, technical, and value considerations inform a particular decision
Establish criteria to evaluate whether an application for an exploration contract provides for 'effective protection and preservation of the marine environment including, but not restricted to, the impact on biodiversity' ⁷³
Provide detailed guidance regarding the requirements for and content of (a) preliminary EIAs required at the time of application for exploration contracts, (b) EIAs required prior to specific exploration work, and (c) EIAs required at the time of application for future exploitation contracts
Establish procedural safeguards to ensure sufficient environmental baseline and monitoring data is supplied to the ISA
Set out steps to follow if EIAs indicate the risk of failing to meet the conservation objectives
Ensure the ISA retains the power to amend environmental requirements placed on contractors once a contract is in force. A staged approach to mineral exploitation could be one option to help retain such control ⁷⁴
Increase transparency, e.g. by publishing environmental baseline and monitoring data, EIA and SEA reports, meeting reports and/or minutes
Improve public participation e.g. through further stakeholder surveys, an Ombudsperson for present and future generations, or utilizing external surveys that capture public opinions regarding the acceptability of risks and the values placed on minerals, biodiversity, and ecosystem services
Institutional Measures
Ensure the institutional capacity to assess and manage environmental risks and monitor compliance

⁷³ Nodules Exploration Regulations, regulation 21(4)(b); Sulphides and Crusts Exploration Regulations, regulation 23(4)(b).

⁷⁴ Clark, Cook Clark, and Pintz (n 55).