

Eighth Report of the CODE PROJECT

Enhancing Scientific Expertise at the ISA

12 April 2023

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The Code Project is a cooperative enterprise of over 19 scientists and legal scholars from 10 nations. Its mission is to provide analyses of the regulatory framework for deep-sea mining under development at the ISA with a view to developing precautionary and environmentally sound regulations that would ensure the protection of the marine environment from the effects of mining.

Enhancing Scientific Expertise at the ISA

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EXECUTIVE SUMMARY

The International Seabed Authority (ISA) takes decisions on mining activities that have the potential to cause significant harm to the marine environment and thus needs to rely heavily on scientific advice. The deep-sea ecosystems that will be affected by mining activities are poorly understood, and there remain many knowledge gaps¹. Hence, seeking Best Available Scientific Evidence (BASE) requires a broad range of scientific expertise and is critical to informing ISA decisions.

The ISA's technical and scientific advisory body, the Legal and Technical Commission (LTC), has an overwhelming workload and does not possess adequate environmental expertise within its membership to adequately discharge its varied duties. Organizational and structural issues of transparency and accountability within the LTC's working methods compounds issues of legitimacy of ISA decisions taken based on the recommendations of the LTC. While issues regarding the LTC's composition and working methods can be improved to an extent, it is difficult to conceive of any structure that will endow a limited membership, all-volunteer body with sufficient expertise to make evidence-based recommendations for a nascent industry in a poorly understood environment, such as the deep-sea. Reforming the LTC's composition and working methods is one method to expand the ISA's access to BASE. A complementary approach would be to encourage the LTC's solicitation and incorporation of external expert advice. This note analyses mechanisms and models for the integration of external independent scientific advice into the ISA's decision making.

One option would be the creation of a subsidiary body of the ISA Council, a dedicated Scientific or Environment Commission, to exclusively perform environmental tasks currently assigned to the LTC. This Commission or Committee would comprise of individuals with specialized expertise and training in environmental sciences and its primary purpose would be the implementation of the environmental measures and principles set out in the ISA's regime. A second option would be the creation of an independent expert panel that the LTC and the Council could draw advice from on an ongoing and as needed basis, and which would be comprised of individuals with specialised expertise in environmental sciences. A third option would be to seek advice on matters under consideration by the LTC or Council from existing established scientific networks and advisory bodies like [GESAMP](#), [ICES](#) or [DOSI](#).

The paper assesses the desirability and feasibility of each of the options; noting that regardless of the mechanism utilized, the ISA needs to discuss the issue of enhancing independent scientific advice and expertise into its decision making as a matter of priority.

As the ISA moves from regulating exploration activities to potentially governing commercial exploitation of deep-sea minerals, it is crucial for its credibility that it seek and incorporate the expertise of best available scientific information to inform its decision making.

¹ Amon et al., 2022 Assessment of scientific gaps related to the effective environmental management of deep-seabed mining <https://doi.org/10.1016/j.marpol.2022.105006>

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Introduction

The International Seabed Authority (ISA) is the body through which member States of the ISA organize and control mineral exploration and exploitation in the Area on behalf of humankind (UNCLOS Art 153) and for the benefit of humankind (UNCLOS Art 140). The ISA takes decisions on mining activities that have the potential to cause significant harm to the marine environment and thus needs to rely heavily on scientific advice. The deep-sea ecosystems that will be affected by mining activities are poorly understood, and there remain many knowledge gaps². With the ISA looking to transition from exploration activities to potential exploitation activities, new science- and evidence-based rules, regulations and procedures are required for the ISA to discharge its duties responsibly. Mechanisms to integrate independent and best scientific information to the work of the ISA and its organs must be urgently considered in the context of the ongoing negotiations on the exploitation regulations.

Hence, obtaining Best Available Scientific Evidence (BASE) is critical to informing ISA decisions and requires a broad range of scientific expertise. Best practices are being improved constantly and it is important that the ISA adapts its environmental management regime continually in response to BASE.

Indeed, the ISA has the legal responsibility to ensure the effective protection of the marine environment from the harmful effects of mining-related activities that it permits in the Area (UNCLOS Art 145). In its regulations adopted to date (for exploration activities), the organs of the ISA are required to apply ‘best environmental practices’, and the ISA’s technical body, the Legal and Technical Commission (LTC), is specifically mandated to base its determinations on ‘best available scientific and technical information’, and to develop procedures to access this³. The Exploitation Regulations, currently under negotiation, rely throughout on requirements for ISA contractors, member States and ISA organs to apply ‘Best Available Techniques’, ‘Best Environmental Practices’, and ‘Best Available Scientific Evidence (BASE)’ in the environmental management of deep-sea mining^{4,5}. The ISA, through its supreme body, the Assembly, is committed in its strategic environmental planning to progressively develop, implement and keep under review an adaptive, practical and technically feasible regulatory framework, based on best environmental practices (Strategic Direction 3.1)⁶.

The issue of whether the ISA receives sufficient scientific advice, particularly regarding environmental decisions, has been raised for some time. In 2016, an independent review of the ISA noted that interviewed stakeholders ‘*suggested the Authority should put more effort into developing a better scientific basis to understand the impact of potential exploitation so that it can develop adequate protection and conservation measures*’; and some called for the establishment of “*a Scientific Committee and an Environmental*

² Amon et al., 2022 Assessment of scientific gaps related to the effective environmental management of deep-seabed mining <https://doi.org/10.1016/j.marpol.2022.105006>

³ ISBA/19/C/17 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

⁴ ISBA/27/C/WOW/CRP.1 President’s text Draft regulations on exploitation of mineral resources in the Area

⁵ ISBA/27/C/IWG/ENV/CRP.1/Rev.1 Draft regulations on exploitation of mineral resources in the Area Parts IV and VI and related Annexes

⁶ ISBA/24/A/10 The Strategic Plan of the International Seabed Authority for the Period 2019-2023

*Committee [...] to deal specifically with: 1) the regulation, monitoring and control of the environmental impacts of seabed mining, and 2) wider marine scientific issues”.*⁷

In 2019, the ISA Secretariat presented to the ISA Council issues arising in relation to the assessment of contractors’ environmental plans and performance assessments. The paper proposed the creation of a roster of independent competent experts to support the review of environmental plans and performance assessments.⁸ Even if that proposal had been implemented, the challenge of insufficient scientific expertise remains.

This paper offers a brief discussion of different options to increase the level of scientific advice available to the ISA.

⁷ Seascope Consultants. Periodic Review of the International Seabed Authority pursuant to UNCLOS Article 154 Final report. [Online], 2016 <<https://www.isa.org/jm/files/documents/EN/Art154/Rep/ISA154-FinalRep-30122016.pdf>>

⁸ ISBA/25/C/10 Consideration of a mechanism and process for the independent review of environmental plans and performance assessments under the regulations on exploitation of mineral resources in the Area, 11 January 2019

Areas where scientific input is needed

There are many areas where scientific advice is needed by the ISA. Some examples are listed below.

- Establishing ISA rules, regulations, standards and procedures, including environmental provisions, to manage mining activities.
- Developing specific policies e.g. environmental objectives.
- Preparing draft Regional Environmental Management Plans (REMPs) - e.g. ISBA/27/C/L.5 states “Reaffirming that it is essential that regional environmental management plans be developed in a transparent manner, following a coherent, science-based and coordinated approach, under the auspices of the Authority”.
- Advising on LTC Recommendations for Guidance to Contractors relating to exploration activities (such as Environmental Impact Assessment and Environmental Baseline Studies) (obligation of LTC under UNCLOS Art 165(2)(d).
- Developing binding environmental threshold values (ISBA/27/C/42).
- Providing the scientific knowledge and understanding of deep-sea ecosystems, their biodiversity and ecosystem functioning.
- Advising on best available technologies and best environmental practices, in the action plan for the ISA’s program in support of the UN Decade of Ocean Science for Sustainable Development (ISBA/26/A/4, ISBA/26/A/25, ISBA/27/A/4) and the ISA’s Sustainable Seabed Knowledge Initiative (SSKI), but not restricted to mapping, taxonomy and video surveys.
- Assessing whether test mining impact studies are adequate, including existing baseline data, and proposed sampling intensity and longevity (ISBA/26/A/4 and ISBA/27/A/4).
- Monitoring the Deep-Data database, paying particular attention to quantity, quality and variety of data submitted by individual contractors and collectively (ISBA/26/A/4 and ISBA/27/A/4).
- Advising the ISA Secretariat on the promotion of cooperation and coordination of multidisciplinary and multinational research teams between contractors, the scientific community, governmental and nongovernmental institutions, including capacity building with developing nations (ISBA/26/A/4 and ISBA/27/A/4).
- Providing the Secretariat, LTC and Council with foresight of new challenging areas of scientific endeavour such as environmental DNA and ecosystem restoration studies, their possible utility and timescale to being operational (ISBA/26/A/4 and ISBA/27/A/4).

Note: Scientific input to monitoring, inspection and compliance activities are not addressed in this note.

Reasons to improve access to specialised scientific advice at the ISA

As the body tasked to represent and act in the interest of humankind as a whole, it is essential that the ISA takes decisions that are underpinned by science. The legitimacy of such decisions is key, given the varying interests and differing positions among ISA members (167 states and the EU), and considering the difficulties of decision-making in circumstances of scientific uncertainty (and the application of the precautionary principle) and knowledge asymmetry between the regulated and the regulator.

Indeed, it is pivotal for the ISA to provide a rational scientific basis for its decisions, including to demonstrate that it has effectively relied on best available knowledge and implemented ‘best environmental practices’ (which, being areas of potential legal challenge, means the ISA should take utmost efforts to ensure best scientific content and procedures). As decisions taken by member States today will bear significant and long-term repercussions, there is an urgent need to improve the flow of scientific advice at the ISA.

Deep-sea mining (DSM) is a particularly novel and complex field and will operationally be very different to land-based mining. Polymetallic nodule and cobalt crust mining will directly impact large areas of the Earth’s surface, whilst seafloor massive sulphides are found in close association with rare hydrothermal vent ecosystems that could be harmed. All DSM will produce plumes that will impact organisms distant from the mine sites. None of the seabed ecosystems that may be impacted are well understood and all are potentially vulnerable or have vulnerable components.

To understand fully the impacts, scientific knowledge is required in ISA decision-making on a wide variety of topics including physical oceanography, sediment characteristics, particle sinking velocities, particle aggregation, sediment geochemistry, toxic discharges, chemical contamination, biological studies from microbes to mammals and from the sea surface to the sub-seabed, studies of biodiversity, taxonomy, genetic connectivity, ecosystem functioning, the value of ecosystem services, hydrodynamic plume modelling, noise and light hazards⁹. The expertise requirements are therefore varied, niche and specialised, and unlikely to be found comprehensively within the LTC itself.

Current scientific expertise and gaps: The role of the LTC

A permanent subsidiary organ of the ISA, the LTC is tasked with various functions relating to activities in the Area and is the primary technical and scientific advisory body to the Council. The core functions of the LTC include:

- review of applications for plans of work for exploration and future exploitation activities,
- review of environmental impact assessments for proposed activities,
- supervision of exploration or mining activities (including review of annual reports submitted by ISA contractors),
- development of regional environmental management plans,
- assessment of the environmental implications of activities in the Area, and
- formulation, development and review of the ISA’s rules, regulations and procedures.

The current cycle of the LTC (2023-2027) is comprised of 41 members, elected for a period of five years. Members of the LTC are not ISA staff, instead serving on a volunteer basis and in their personal capacities.

⁹ Billett D.S.M., Jones D.O.B., Weaver P.P.E. (2019) Improving Environmental Management Practices in Deep-Sea Mining. In: Sharma R. (eds) Environmental Issues of Deep-Sea Mining. Springer, International Publishing AG, Switzerland pp 403-446

The LTC is “the source [...] which most of the Authority’s work emanates from, and most outputs produced by the Authority bear indelible marks that are traceable to the LTC”.¹⁰ Hence, the contribution of the LTC to the work of the ISA is crucial. Recommendations made by the LTC to the Council should include scientific assessments and should be based on best available scientific evidence and techniques; however, its membership presently includes only a handful of environmental scientists. The composition of, and election of members to, the LTC have been the subject of debate and political gridlock in recent years¹¹. While the LTC’s composition is important, it is difficult to conceive of any combination that would endow a limited membership and all-volunteer body with sufficient expertise to make evidence-based recommendations for a nascent industry in a poorly understood deep-sea environment.

Additionally, there are structural and organizational issues with the LTC and its capacity to provide scientific advice:

- **Workload**

The workload being managed by the LTC has multiplied greatly in the last few years, as the number of ISA contracts have increased, and as contractors progress towards the exploitation stage. Many of the LTC’s tasks require environmental input – see section 2 for a list. Indeed, the Chair of the LTC reported on major achievements of the LTC over the past six years in his report in 2022¹² and it is clear from his report that three LTC members with environmental expertise contributed to 9 of the 11 major achievements listed by the ISA Secretary General. These achievements included reviewing three new applications for programmes of work, all nine applications for contract extensions and 8 of the 10 sets of draft standards and guidelines listed in documents ISBA/27/C/3 to 12. This is a phenomenal workload.

The LTC now meets in-person twice a year for a total of 4 weeks and carries out an increasing number of tasks intersessionally through working groups made up of its own members. Given that many of its members have full-time occupations, this additional workload places a considerable burden on each of them. Those LTC members with the more specialized skills and greatest demand on those skills, especially in environmental matters, carry the highest workloads.

Despite the considerable time and resource investment by its members, the LTC is sometimes unable to respond in a timely way to Council’s requests for advice and information. For example, since 2010, the Exploration Regulations have required the LTC to develop procedures for determining if exploration activities will have serious harmful effects on vulnerable marine ecosystems (VMEs) and if so to manage

¹⁰ Reference: Singh (2020), Commentary, <https://dsmobserver.com/2020/05/commentary-latest-developments-in-the-election-of-members-of-the-ltc/>

¹¹ See *ibid.* Apart from the theme of necessary expertise required for the LTC to carry out its responsibilities, equitable geographic representation in the nomination and election of LTC members and the size of the LTC has been among the subjects of intense discussions over the years. Although a long-term solution is yet to be in place, short-term compromises have been made by Council member states in constituting the LTC over the years.

¹² ISBA/27/C/16/Add.1 Report of the Chair of the Legal and Technical Commission on the work of the Commission at the second part of its twenty-seventh session

such activities to prevent serious harmful effects or to not authorise such exploration activities.¹³ Nonetheless, the LTC has not yet actioned this workstream.

● Transparency

The LTC “occupies a central role in the ISA’s decision-making” and is the body “where most of the technical, detailed work of the ISA is undertaken”¹⁴. Transparency of scientific advice is key for the public to have trust in the ISA’s work, as discussed by Ardron et al (2018)¹⁵. Whilst it is understood that the LTC may deal with confidential matters relating to, for example, commercially sensitive information, it also deals with many non-confidential issues such as development of regulations, Environmental Impact Assessments (EIAs), establishing Regional Environmental Management Plans (REMPs) for specific areas, environmental matters relating to contractors’ annual reports, among others. However, current practice is for all matters to be dealt with in closed meetings, and with little or no record of the discussions that take place.

Where external input has been sought by the LTC in the past, the procedure and criteria for selection of experts has been somewhat ad hoc. For example, a technical working group of experts was established in 2019 to work on some of the first-draft phase 1 Standards and Guidelines, but not for others. The identities and terms of reference of those working group members have never been disclosed, despite Council members specifically asking for this information to be made public¹⁶. There have also been questions raised about how workshop participants are selected, for events feeding into LTC work products (e.g. REMPs).

The ISA Council and Assembly have repeatedly requested greater transparency in the work of the LTC particularly in respect to environmental matters, as reflected in Annex I to this paper.

The establishment of a formal process for provision of scientific advice, which is acknowledged as non-confidential and made publicly available, would enable an important component of the work of the ISA to be fully transparent.

● Objectivity and impartiality

While ensuring that decisions are taken based on scientific advice, it is equally important to ensure the objectivity and impartiality of such advice. With the high financial stakes of DSM and the potential politicization of decisions that are involved, it is important to ensure that the nature and flow of scientific

¹³ See eg ISBA/16/A/12/Rev.1, Regulations on prospecting and exploration for polymetallic sulphides in the Area, 15 November 2010, regulation 33(4); ISBA/19/C/17, Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area, 22 July 2013, regulation 31(4).

¹⁴ Aline L. Jaeckel, *The International Seabed Authority and the Precautionary Principle: Balancing Deep Seabed Mineral Mining and Marine Environmental Protection* (Leiden: Brill Nijhoff, 2017)

¹⁵ Ardron, Ruhl and Jones (2018) Incorporating transparency into the governance of deep-seabed mining in the Area beyond national jurisdiction. *Marine Policy* 89, 58-66

¹⁶ ISBA/27/C/44 Decision of the Council of the International Seabed Authority relating to the reports of the Chair of the Legal and Technical Commission

advice is independent. In this respect, persons that provide advice to the ISA must not have any financial interest in activities relating to exploration and exploitation in the Area, and that requirement is enshrined in UNCLOS¹⁷.

Yet, some LTC members appear to be directly employed by ISA contractors (or Governments whose national policy is to seek financial benefit from deep-sea mining in the Area). There does not seem to be any information ever provided to Council or the public about LTC member conflict-of-interest declarations, nor how those conflicts are managed. This potential lack of objectivity may affect public trust and confidence in the LTC, and in ISA decisions more widely.

Likewise, there is currently a relatively small pool of experts in this field, which can make conflict of interest management difficult. Widening the group that can be accessed for expertise can serve to dilute conflicts and increase independence. In addition, this could also provide a watchdog function, and also can help the relevant information reach a wider circle, which can, in turn, build capacity and diversify the pool of expertise available.

Best practice requirements for a scientific advisory process

Scientific advice is provided routinely to governments and international bodies. A recent paper outlined the key principles that should form the basis of this advice¹⁸. These principles are relevant to advice sought by the ISA as shown below:

- **Independence:** to be independent and uninfluenced by political considerations or financial gain.
- **Relevance:** to supply depth and range of specialist knowledge.
- **Diversity:** to provide geographical representation and broad geographical knowledge. Consideration could also be given to younger generations, gender, global south, and societal-scientific interactions.
- **Legitimacy:** to be open and transparent in terms of selection of experts, operational procedure, advice given and how that advice is used by the LTC and Council, as well as to provide advice that is consistent.

In addition, the ISA would need to ensure any mechanism is able to -

- be capable of meeting the requisite workload efficiently.
- be adequately and predictably funded.

Whatever mechanism is used, it should be guided in its work by clear, published constitutional and procedural rules. It should also include a process by which the ISA decision-maker(s) explain what advice has been accepted and/or what has been rejected, and the rationale. This is important to support legitimacy of ISA decision-making.

¹⁷ UNCLOS Article 163(8) for the LTC and other ISA commissions, also Article 168(2) for the Secretariat.

¹⁸ Gluckman, P., Quirion, R., Denis, M. and Allen, K. 2022 Principles and Structures of science advice: An outline International Science Council https://council.science/wp-content/uploads/2020/06/Science-advice_ISC_INGSA-updated-24022022.pdf

Potential for strengthening the capacity of the LTC

Strengthening the capacity of the LTC may be the most straightforward mechanism to improve access to scientific advice. It would not require the establishment of new bodies or agreements with external organisations. The current structure of the LTC could be enhanced to include more environmental science expertise within the body. This could be mandated through Council decisions during the LTC election and nomination cycle such that a percentage of the LTC would have to include a set number of environmental specialists. The Council could identify objective criteria for recruitment that set out more specifically the level of expertise and types of specialism sought.

A dedicated sub-group of LTC members with environmental expertise could be permanently established to analyze and assess those scientific and/or environmental tasks which require a more considered approach. Instead of relying on ad hoc working groups and calls for external consultancies, this dedicated subunit of the LTC could provide transparent and accessible advice to the wider LTC.

However, despite considerable effort over the last few years it has not been possible to increase the numbers of experts with environmental backgrounds on the LTC and even if numbers were increased the breadth of environmental knowledge may still fall short of what could be achieved by other methods. This route would also not reduce the demands on time of members of the LTC.

Possible mechanisms to provide independent scientific advice

The organizational framework envisaged by UNCLOS and the Agreement relating to the Implementation of Part XI (1994 Agreement) anticipates that institutional set-ups within the ISA would follow an evolutionary approach. Such an approach would include the establishment of new organs and subsidiary bodies which would follow and take into account “the functional needs of the organs and subsidiary bodies concerned in order that they may discharge effectively their respective responsibilities at various stages of the development of activities in the Area”¹⁹. With the ISA looking to transition from exploration activities to potential exploitation activities, new science- and evidence-based rules, regulations and procedures are required for the ISA to discharge its duties responsibly. Mechanisms to integrate independent and best scientific information to the work of the ISA and its organs must be urgently considered in the context of the ongoing negotiations on the exploitation regulations.

One possible approach to expand the ISA’s access to scientific expertise would be to encourage the LTC’s solicitation and incorporation of external expert advice. Indeed, Article 165 (2) (e) of UNCLOS directs the LTC to make recommendations to the Council on matters related to the protection of the marine environment “taking into account the views of recognized experts in the field”. Similarly, Article 163(13) provides that the LTC may solicit external advice where necessary, and to “consult another commission, any competent organ of the United Nations or of its specialized agencies or any international organizations

¹⁹ Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, A/RES/48/263, Annex, Section 1: Costs to States Parties and Institutional Arrangements

with competence in the subject-matter of such consultation”²⁰. Actively soliciting and incorporating external scientific expertise into its work is not only possible under existing treaty provisions but is required of the LTC in matters related to the protection of the marine environment.

To this end, the authors suggest that ISA member states consider the following mechanisms (or a combination thereof).

1. Scientific Committee or Environment Commission

A permanent independent organ could be established within the ISA exclusively to perform environmental tasks currently assigned to the LTC. This Commission or Committee would comprise of individuals with specialized expertise and training in marine conservation and ecology, environmental management, environmental impact assessment, adaptive management, and environmental law. Its primary purpose would be the implementation of the environmental measures and principles set out in the ISA’s regime, with its recommendations either feeding directly into the Council, or back to the LTC for a formal recommendation.

The proposed Environmental Commission could be established as a subsidiary body to the Council, alongside the LTC, pursuant to UNCLOS Articles 158 and 162(2)(d). Indeed, an ISA Technical Study in 2013 had similarly recommended that a permanent body be formed “to address the clear and urgent need to rationalize and incorporate past and present environmental rules, regulations and requirements with, and within, the evolving exploitation frameworks for [polymetallic nodules] and other metal resources within the Area.²¹”. Is it helpful to note that the final Article 154 report noted that some of the stakeholders surveyed also raised a proposal that “...the Assembly should establish a Scientific Committee and an Environmental Committee in parallel with the development of the rules, regulations and procedures relating to exploitation in the Area”. These committees would be able to deal specifically with 1) the regulation, monitoring and control of the environmental impacts of seabed mining, and 2) wider marine scientific issues. More recently, the establishment of a scientific or environmental committee, has been identified as one of the numerous key outstanding matters that should be urgently incorporated into the ongoing negotiations of the exploitation regulations²².

Advantages and Challenges of an Environment Commission:

- The ISA and LTC’s ever increasing list of environmental obligations necessitates a permanent body to assume these responsibilities and provide consistent and rigorous advice on environmental matters to Council. Such a body would (a) offer relief from the LTC’s unmanageable workload, (b) ensure in-house environmental expertise to advise the Council, and (c) work transparently. The competences of such a body would need to be clearly demarcated from the competences of the LTC to avoid overlap. This might be reasonably straightforward as the LTC is known to separate into

²⁰ Article 169 also permits the ISA to consult and cooperate with international and non-governmental organizations on matters of the ISA in which such organizations might have added expertise and could support the work of the relevant ISA organs.

²¹ ISA Technical Study 11 Towards the development of a regulatory framework for polymetallic nodule exploitation in the area.

²² <https://www.sciencedirect.com/science/article/abs/pii/S0308597X21004152>

sub-groups, one of which deals with environmental concerns. As such, a degree of demarcation already exists. There might also be procedural concerns about overlap in mandate of the LTC and the Environment Commission and how the two organs would interact with each other.

- Establishing a new permanent subsidiary organ of the ISA might be challenging and even with substantial in-house expertise, it will likely be necessary to consult external scientific experts from time to time to account for the diversity of expertise required to manage DSM. It is also likely that the same contentious issues pertaining to the nomination and election of LTC members would also apply here.

2. Independent expert panel

An independent expert panel (could be termed expert panel, independent advisory group on science and environment, advisory board or environmental sub commission) could be created, with explicit terms of reference for how panel members would be selected, how and to whom they would report, how differences in opinion would be recorded, how their advice would be published, and how justified acceptance or rejection of their advice to the ISA would be published. This body could comprise a fixed number of experts chosen with a broad geographic reach and covering a range of expertise including environmental management and environmental science. Members could sit for a fixed term and be chosen based on expertise and qualification in the relevant field. The LTC currently utilizes consultants, external working groups, advice from the Secretariat, and invites external experts to various LTC sub committees in an ad hoc manner. A recent decision to establish expert panels for deciding on the development of binding environmental threshold values for deep-sea mining called for nominations by members and stakeholders of the Authority to engage in the expert group, which does not necessarily ensure that the best scientific advice will be drawn upon²³. Consistent and accountable procedures are required for the selection of these individuals to ensure transparency regarding publicising who is involved and how they were selected.

This body could report directly and publicly to the (1) ISA Council, (2) LTC or (3) Secretary General and the Secretariat. In order that the independent scientific advice is open and transparent, and to ensure the active participation of senior and respected scientists, a direct connection to the ISA Council would appear to be the most appropriate.

Advantages and Challenges of an Independent Expert Panel:

- A formalized independent expert panel would help create a predictable and more diverse system of knowledge for the Council and LTC to draw upon.
- Selection criteria for panel members and length of membership might be subject to political debate and could delay the setting up of such a mechanism. A panel might not be seen as fully independent depending on the selection procedure and if it is seen to be influenced or controlled by the LTC or ISA Secretariat. It also might not reduce the overall LTC workload, if the LTC has to review their report and then make its own review and recommendations. Consistency of advice could also be

²³ ISBA/27/C/42 Decision of the Council of the International Seabed Authority relating to the development of binding environmental threshold values)

compromised if membership is ad hoc and changing. This mechanism may therefore not meet the independence and legitimacy requirements listed above.

3. Advice from existing bodies

In order to achieve a more formalized approach to the selection of experts referred to above, the ISA may consider utilizing existing bodies of scientific experts to advise on matters referred to them by the Council, LTC and Secretariat, with all such references and reports made public to ensure transparency. The scientific expert bodies could advise on, for instance, 1) key scientists to engage in relation to specific environmental policies, recommendations, guidelines and thresholds, 2) determine ‘Best Available Techniques’, ‘Best Environmental Practices’, and ‘Best Available Scientific Evidence (BASE)’, 3) monitor the quantity, quality and variety of data in the ISA Deep-Data database, 4) promote cooperation and coordination of multidisciplinary and multinational research teams and 5) provide foresight of new environmental management tools and approaches.

The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP)

GESAMP is “a group of independent scientific experts that provides advice to the UN system on scientific aspects of marine environmental protection.” At present GESAMP is jointly sponsored by ten UN organizations with responsibilities relating to the marine environment, and they utilize GESAMP as a mechanism for coordination and collaboration among them. The ISA has been one of the 10 sponsoring organisations since 2017²⁴. GESAMP functions are to conduct and support marine environmental assessments, to undertake in-depth studies, analyses, and reviews of specific topics, and to identify emerging issues regarding the state of the marine environment. GESAMP currently consists of 19 experts, drawn from a wide range of relevant disciplines, who act in an independent and individual capacity. Studies and assessments are usually carried out by dedicated working groups, most of whose members are not sitting members of GESAMP but part of the broader GESAMP network.

The Working Groups are set up to carry out individual studies and assessments requested by one or more of its Sponsoring Organizations. These groups are made up of leading global experts of which there are currently over 500 from 50 countries. This broadens the GESAMP network activities and allows Working Group expertise to be tailored to specific projects.

GESAMP has already engaged with the ISA through its submission to the invitation for stakeholder comments on the draft regional environmental management plan for the Area of the northern Mid-Atlantic Ridge²⁵.

Advantages and Challenges of GESAMP:

²⁴ <http://www.gesamp.org/about/history>

²⁵ <https://isa.org.jm/files/files/documents/GESAMP.pdf>

- GESAMP has been providing independent scientific advice on marine issues for 50 years. Through its working groups it can cover a broad range of topics engaging the most appropriate experts in the field. It can address specific issues, such as input to developing regulations and could probably establish a working group to deal with EIAs, Plans of work etc. The ISA joined GESAMP as a UN Sponsoring Organization in 2017 and so already has a working relationship with them²⁶. As such it should be able to meet the full set of requirements for an independent advisory process as listed above, subject to contract with the ISA.
- If using GESAMP, (or other organisation) a clear remit would need to be established such as including members with knowledge of biology (including very different deep-sea habitats, such as hydrothermal vents, rocky substrates, ocean ridges, seamounts, sediments and the pelagos), environmental management expertise including EIAs. To avoid conflicts of interest, a robust selection process would need to be implemented for ISA-specific advice.

The International Council for the Exploration of the Sea (ICES)

ICES is an intergovernmental marine science organization, meeting societal needs for impartial evidence on the state and sustainable use of our seas and oceans. The goal of ICES is “to advance and share scientific understanding of marine ecosystems and the services they provide and to use this knowledge to generate state-of-the-art advice for meeting conservation, management, and sustainability goals”. It operates as a network of nearly 6000 scientists from over 700 marine institutes in its 20 member countries and beyond and includes a dedicated Secretariat providing logistical, administrative, scientific and data handling support to its network. Over 2500 scientists participate in its activities annually²⁷. **PICES** - the North Pacific Marine Science Organization is the sister organization to ICES in the North Pacific, but has a more limited programme of activities.

Science cooperation agreements are in place with more than 20 global and regional organizations including with UN bodies like the UN Intergovernmental Oceanographic Commission (IOC) and the Food and Agriculture Organization (FAO).

The work of ICES is accomplished by scientists working together in expert groups, workshops, and committees. The Science Committee (SCICOM) oversees all aspects of the scientific work, whilst the Advisory Committee (ACOM) provides advice to clients on fisheries and marine ecosystem issues. Working under both are expert groups, workshops, steering groups, advice drafting groups, and review groups.

The core of ICES work is accomplished through Expert Groups and workshops. Steering Groups manage the expert groups, of which there are currently 150, and the workshops portfolio. Several working groups may be relevant to the ISA including WGDEC (Working Group on Deep-water Ecology), WGBEC (Working Group on Biological Effects of Contaminants), MCWG (Marine Chemistry Working Group), WGMPS (Working Group on Marine Protected Areas and other Spatial Conservation Measures).

²⁶ ISBA/A/27/4 - Paragraph 20

²⁷ <https://www.ices.dk/about-ICES/who-we-are/Pages/Who-we-are.aspx>

Advantages and Challenges of ICES

- ICES provides continuous advice to RFMOs such as NEAFC on environmental issues related to fishing impacts and its independent members are backed by a secretariat. It is therefore very familiar with the demands of multilateral bodies that operate similarly to the ISA and has structures designed to supply needs such as theirs. A new working group related to specific mining issues would be required. The model should be able to meet the full set of requirements for an independent advisory process as listed above, subject to contract with the ISA.
- It has the disadvantage that it is currently mainly focussed on fisheries in the North Atlantic, Arctic and Mediterranean. It is possible that ICES could adapt and expand their activities to cover deep-sea mining and the global ocean, though this would need a period of consultation with the ISA.

Deep Ocean Stewardship Initiative (DOSI)

DOSI is a global network of experts which seeks to integrate science, technology, policy, law and economics to advise on ecosystem-based management of resource use in the deep ocean and strategies to maintain the integrity of deep-ocean ecosystems within and beyond national jurisdiction.

The DOSI network comprises over 2800 experts from over 100 different countries who practice deep ocean science, governance and other activities, although predominantly deep-sea ecology. It was born from collaborations formed during the Census of Marine Life (2000-2010) and the desire among several deep ocean scientists to make their research count at the policy level. This network formed to develop new ideas for sustainable use and management of deep ocean resources. The DOSI Core Team serve on a voluntary basis in their personal capacity. The team is made up of 6 Executive Board Members, 16 Advisory Board Members and 23 Topic (Working Group) Leads who collectively oversee, guide and support the work of DOSI. DOSI has an active deep-sea minerals Working Group.

Advantages and Challenges of DOSI

- Should be able to meet the full set of requirements for an independent advisory process as listed above, subject to contract with the ISA. DOSI connects particularly well with the scientific community, many of whom are keen to provide advice on ecosystem management. It consciously aims for diversity of membership, and elevating the voices of the global south and early career professionals, among others. It also includes and is run by world-recognised leaders in deep-sea science, and is already actively engaged with ISA processes. LTC scientists are also often members of DOSI.
- DOSI is not part of the UN family, nor does it have a track record of providing commissioned advice. It does not have a permanent secretariat and if selected may need to establish a secretariat to manage its advice and ensure consistency. DOSI's members are dominated by scientists with some legal experts, however, there appears to be a shortage of marine managers. There is no nomination or qualification process, or expertise threshold, to become a DOSI member, and its membership may include some persons who work on ISA contracts, as well as some persons who work for anti-DSM campaigns. DOSI may prefer to remain unconflicted where it will be freely able to comment on scientific advice given by other bodies as well as maintain its current function as an independent scientific observer to ISA proceedings.

Recommendations

The ISA could expand its access to scientific knowledge through either: 1) establishing a dedicated scientific committee/commission under the Council or 2) creating an independent expert panel from which it draws advice from on an ongoing basis. Both options would enable more experts with environmental expertise to engage and advise the LTC and the Council within a formalized and transparent process.

The ISA could also look into seeking advice from existing bodies like GESAMP, DOSI or ICES which would meet all the requirements for a scientific advisory process listed above. Many of these bodies are already primed to provide advice to multilateral bodies and have an established network of experts well suited to feed into ISA processes. Seeking formalized advice from existing bodies might be more politically feasible requiring simpler modalities to incorporate such networks into ISA structures. For example, LTC commissioners would retain their preeminent advisory authority under UNCLOS, including advising the Council on applications for a Plan of Work or the content of the ISA's rules, regulations and procedures. But Commissioners would also become the leaders and custodians of the network that would assist in specific aspects of its decision-making. In this capacity, Commissioners could, for example: (i) evaluate applications for experts seeking to join the advisory network; (ii) create the network's committee structure and chair various committees or working groups; and (iii) present analysis or findings from the expert network to the rest of the Commission. The net effect would reduce the workload of the Commission by giving them tools to synthesize and summarize technical inputs received, including detailed stakeholder comments.

Given the breadth of requirements for environmental advice at the ISA, a combined approach may be desirable, in which an independent expert panel is established to report to the LTC or Council. Some of the work of this body could be outsourced to an international body such as one of those described above. The expert panel could then develop a close working relationship with the external body. This arrangement might provide the highest level of consistency in its advice which is critical to the maintenance of confidence in the ISA's ability to deal with environmental issues as its work rapidly expands. Any of the above options could assist the ISA have recourse to a larger pool of more varied experts. To achieve the 'best practice' hallmark of legitimacy, it is recommended that, for whichever option is selected, the advice of the independent experts is published in full, and the LTC and other ISA organs are required to explain in their decision-making what account they have taken of the advice, and if they have varied from it, why.

In the interim, we recommend that the LTC should review its own practices and procedures against the principles laid out in the 'Requirements for any scientific advisory process' section above (independence, relevance, diversity, and legitimacy) and make any necessary changes to bring them within those principles. This exercise could be premised on recent issues raised by the Council in the recent November 2022 session, and we suggest considering the following themes:

- Reform of the current LTC's Rules of Procedure, approved by Council.
- Allowing observers or livestreaming into some LTC meetings
- Fuller records of LTC meetings, deliberations, and decisions.
- Increased use by the LTC of stakeholder consultations, following formalised procedures.
- Better operationalisation of conflict-of-interest mechanisms within the LTC.

As the regulatory regime for activities in the Area progresses, the need for more scientific expertise and advice at the ISA cannot be overstated. Negotiations on the exploitation regulations and concurrently the growing responsibilities of the LTC, need to be underpinned by efforts to increase the scientific capacity of the ISA. Member States like Belgium²⁸ and Jamaica²⁹ have proposed mechanisms to do this, as has the ISA Secretariat³⁰. It is time for this issue to be formally addressed at the Council and Assembly level. If the LTC does not implement mechanisms to ensure access to best available science in its deliberations, then the ISA risks failing to meet its duty to apply best environmental practices and could expose its decisions to legal challenge.

ANNEX I

Calls for transparency in LTC working methods by the ISA Council and Assembly:

In 1997, Council requests the LTC to open its meetings to observers (ISBA/3/C/11)	Para 3. The Legal and Technical Commission met during the first week of the session and continued work on the provisional text of the draft Mining Code prepared by the Commission
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²⁸ Non-paper: Strengthening Environmental Scientific Capacity of the ISA, <https://www.isa.org.jm/files/files/documents/belgium-capacity.pdf>.

²⁹ In 2019, Jamaica proposed that a new Annex XI should be introduced in the exploitation regulations to outline a process for identifying independent experts

³⁰ ISBA/25/C/10 Consideration of a mechanism and process for the independent review of environmental plans and performance assessments under the regulations on exploitation of mineral resources in the Area

	<p>during the first part of this session. At the 16th meeting of the Council, on 18 August 1997, the representative of Brazil, on behalf of the Group of 77, reminded the Council of the request made by him to the Council at the end of the first part of the third session to open the meetings of the Commission to participation by observers. This request was supported by several other delegations, who noted the need for transparency in the discussions relating to the draft Mining Code. A number of delegations noted that the Commission was an expert body and reminded the Council that, in their discussions on the matter during the first part of this session, the members of the Commission had unanimously agreed that observers should not be permitted to attend their meetings.</p> <p>Para 4. Following informal consultations between interested delegations and the Chairman of the Legal and Technical Commission an understanding was reached whereby the Commission saw the possibility for the presence of a limited number of observers at its meetings relating to discussions on the draft Mining Code. It was agreed that the presence of observers would be on a first come, first served basis and normally should not exceed 15. Seats for observers would be clearly defined and observers would not participate in the discussions.</p>
<p>In 2014, Council requests the Commission to increase transparency in its work (ISBA/20/C/31)</p>	<p>Para 11: Requests the Commission to continue to explore initiatives to increase transparency and dialogue on the development of its work, in particular on issues of general interest to member States and other stakeholders of the Authority;</p>
<p>In 2017, the Article 154 periodic review of the ISA recommends actions towards transparency (ISBA/23/A/3)</p>	<p>Recommendation 14: The Legal and Technical Commission should be encouraged to continue its practice of setting up working groups dealing with particular areas of expertise. In this context, the establishment of a working group dealing with environmental issues should be considered.</p> <p>Recommendation 18: Non-confidential information, such as that relating to the protection and preservation of the marine environment, should be shared widely and be readily accessible.”</p>
<p>Need to add: The Assembly took a a decision calling on the LTC to hold open meetings, based on recommendations of Art 154 review.</p>	
<p>The Strategic and High level Action Plan of the ISA (2019-2023) commits to greater transparency within the organization.</p>	<p>Strategic direction 9.2 states “Ensure access to non-confidential information”</p>

<p>In 2021, Council notes the importance of transparency in the environmental management of the Area, (ISBA/26/C/57)</p>	<p>Para 14: Notes the importance of transparency in the environmental management of the Area, and requests the Commission to review document ISBA/25/LTC/6/Rev.1 and ISBA/25/LTC/6/Rev.1/Corr.1 on recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area to ensure greater consistency in the process of consultation, including the publication of all consultation responses, the publication of the contractor's response to the comments received during the consultation process and the publication of the revised environmental impact statement to be submitted to the Commission, and also to refine those recommendations to develop an appropriate framework for the review of activities with potential significant adverse environmental impacts that are proposed for incorporation into a plan of work for exploration;</p>
<p>In 2022, following debate in the Council about the LTC's approval of a test mining environmental impact statement (EIS)³¹, Council requests transparency from the LTC (ISBA/27/C/44)</p>	<p>18. Urges the Commission to hold open meetings, where appropriate, and to allow for greater transparency in its work;</p> <p>19. Requests the Commission to provide recommendations to the Council on how the procedures of the Commission could be further improved to provide for more transparency while maintaining its effective operation and recognizing the need to ensure the confidentiality of data and information;</p>

³¹ <https://www.isa.org.jm/news/isa-legal-and-technical-commission-concludes-its-review-environmental-impact-statement/>