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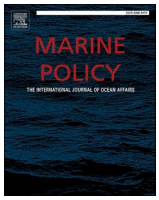

When the "best available science" is not good enough: The need for supporting scientific research in the United Nations treaty to protect biodiversity beyond national jurisdiction

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ABSTRACT

The distant ecosystems of the high seas are growing closer every year as humans create and deploy novel technologies to harvest resources from the open ocean. A new international agreement, the treaty for Biodiversity Beyond National Jurisdiction (BBNJ), is intended to ensure the conservation and sustainability of such ecosystems. Among other issue areas, the BBNJ agreement establishes requirements for conducting Environmental Impact Assessments (EIAs) for activities within (or impacting) Areas Beyond National Jurisdiction. This short communication argues that the EIA process created by the BBNJ treaty will not be effective at achieving the goals of conservation and sustainable use of marine biodiversity beyond national jurisdiction without strong scientific support. The basic problem is that EIAs require more information than what is available for even the *most* accessible marine ecosystems in Areas Beyond National Jurisdiction. We consider three cases of ocean uses – plastic cleanups, deep seabed mining, and mesopelagic fisheries – to demonstrate that available scientific knowledge is insufficient to conduct and evaluate informative EIAs. We suggest three ways that the Scientific and Technical Body established by the BBNJ agreement could be augmented by the Conference of Parties in order to help avoid dysfunction in the EIA process, support scientific discovery, and increase environmental protection.

The ocean is vast, dynamic, and populated. Achieving shared goals in the ocean, especially in the Areas Beyond National Jurisdiction (ABNJ), requires international cooperation. Legal instruments put in place to protect fragile and poorly understood marine ecosystems face critical challenges as human activities intensify and expand. Efforts to create new and formal mechanisms for international cooperation attempt to fill in the gaps. One such effort focuses on biodiversity. The negotiations for a new legal instrument governing 'Biodiversity Beyond National Jurisdiction' (BBNJ) concluded in June 2023 after six negotiation sessions. The BBNJ agreement covers four main issue areas, including requirements for conducting Environmental Impact Assessments (EIAs) for activities that occur (or have impacts) in Areas Beyond National Jurisdiction (ABNJ).[3] The overarching goals of the BBNJ agreement are conservation and sustainable use of marine biodiversity (Article 2). EIAs contribute to that goal by ensuring that activities will have minimal, negligible, or at least acceptable levels of impact on marine biodiversity before they are authorized. EIAs therefore reflect a precautionary approach to activity management.

This short communication argues that the EIA process created by the BBNJ agreement will not be effective at achieving the goals of conservation and sustainable use of marine biodiversity beyond national jurisdiction without support from the scientific community, including a strong Scientific and Technical Body (STB), and mechanisms to increase scientific research in ABNJ. The basic problem is that EIAs require more information than what is available for even the *most* accessible marine ecosystems in ABNJ (as we review in three examples below). A precautionary approach requires continuous study and monitoring by scientists under the best conditions, especially in the under-studied and

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[3] Areas Beyond National Jurisdiction include the high seas (water column) and Area (seabed) beyond the coastal zones where states have sovereign rights over resource exploitation, scientific research, and other activities.

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ever-changing ABNJ environment. But both the BBNJ agreement and its parent agreement UNCLOS[4] have a fundamentally passive stance towards scientific knowledge production. Although decisions must be based on the "best scientific evidence available" (UNCLOS)[5] or "best available science and scientific information" (BBNJ),[6] neither agreement requires nor facilitates direct investment in scientific research. This same "best available" standard is also applied to other bodies that govern ABNJ activities.[7]

This situation – requiring science-based decision-making in the absence of sufficient scientific data or support for scientific research – could result in undesirable outcomes. On one hand, EIAs might be conducted with low evidentiary standards, such that activities are authorized under conditions where their negative impacts cannot be reasonably ascertained. The fact that the BBNJ is not the "only game in town" (other bodies have EIA processes) could create a situation of forum shopping, where EIAs are conducted through the least onerous process with the lowest evidentiary standards.[8] On the other hand, EIAs might be conducted with high evidentiary standards, thereby substantially delaying authorization of activities until sufficient scientific evidence can be collected ad hoc to make a determination of likely harm. In other words, the low level of scientific information about ABNJ puts the international community between a rock and a hard place: either EIAs with low standards that do not reduce harms to marine biodiversity, or EIAs with high standards that take a very long time and a lot of expense to complete. There are options for the BBNJ Conference of Parties (COP) to respond to this situation, in particular through empowering the STB and other subsidiary bodies to formally support knowledge generation in ABNJ.

We explore these issues from the perspectives of ocean governance and high seas ecology. The first section describes the EIA process created by the BBNJ agreement, to establish that this process (a) is generally consistent with existing EIA models for terrestrial or near-shore ecosystems, and (b) is built on the assumption that adequate scientific evidence is, or will be, available. The second section, and main body of the paper, reviews three examples to demonstrate that the EIA processes for ABNJ are unlikely to function as envisaged by their proponents. We conclude by suggesting ways in which governments, scientists, and environmental groups might productively respond to this situation. Now that the negotiations have concluded, the first major window of opportunity for strengthening the treaty has closed. But when the BBNJ agreement enters into force after 60 ratifications, another window of opportunity will open, as the COP makes decisions about the modalities of institutions established by the treaty. We argue that a key avenue for improving the EIA process involves strengthening support for scientific research through a strong and empowered STB.

1. Environmental impact assessment in the BBNJ agreement

During the BBNJ negotiations, the section on EIAs presented a particular challenge for achieving consensus among states. The agreement creates a process for EIAs that largely draws on existing traditional EIA models from coastal and terrestrial activities, with some modifications. The BBNJ EIA process involves two major steps, each with a different threshold. Step one is screening, which must be done when an activity "may have more than a minor or transitory effect on the marine environment, or the effects of the activity are unknown or poorly understood" (Article 30(1)). This first step *could* be understood as adopting a precautionary approach, in that it suggests restraint in the absence of sufficient information. However, the purpose of screening is to determine whether an EIA is required, not whether an activity should be authorized. If the screening finds "reasonable grounds for believing that the activity may cause substantial pollution of or significant harmful changes to the marine environment," an EIA must be conducted, which is step two (Article 30(1)(b)). After the EIA, the state decides whether to authorize the activity.

The EIA process is essentially state-led. BBNJ member states are obligated to undertake, or ensure the undertaking, of screening and assessments for "activities under their jurisdiction or control" that take place in ABNJ (Article 28(1)). But there are some elements of the BBNJ EIA process that involve a limited degree of internationalization. The BBNJ agreement establishes, among other institutions, a Scientific and Technical Body (STB) (Article 49). If another state registers concern about the decision to *not* conduct an EIA, the STB can consider and evaluate potential impacts of an activity, and make recommendations to the state with jurisdiction over that activity (Article 31 (a)(ii-iv)). The STB is also empowered to create a "roster of experts" that states "with capacity constraints may request advice and assistance from" at either the screening or EIA steps of the process (Article 31(3)). These provisions represent a lighter version of the international stream of EIA review and decision making proposed by the Caribbean Community (CARICOM) and Pacific Small Island Developing States (PSIDS) (Hassanali 2021).

Another example of light internationalization involves the creation of standards and guidelines related to EIAs. Article 38 empowers the STB to "develop standards or guidelines" about various features of the EIA process, to be considered and potentially adopted by the COP. Many developing states, including the CARICOM coalition, preferred the phrasing "global minimum standards," such that the STB could produce a standard of comparison between the BBNJ and other, external, EIA processes. In stronger versions of this proposal, other international organizations (more specifically, their members who are BBNJ parties) would have to reform weaker EIA requirements to meet the BBNJ standard, or at least would be required to use EIA processes that meet the BBNJ standard. The compromise reached, reflected in the final BBNJ treaty text, is much weaker. If and when an EIA has already been conducted for an activity in ABNJ under *another* instrument, framework, or body, a separate EIA under BBNJ standards is not required, as long as the original EIA process "is equivalent" to the BBNJ EIA process.

In short, the BBNJ agreement does not create a specific standard of comparison for external EIA processes. These external EIA processes may take place through other instruments, frameworks, and bodies that govern ABNJ. Or, in the case of activities within national jurisdiction that impact ABNJ, EIAs may take place through national processes.[9] The fact that EIAs are already conducted domestically and through other international organizations is both a benefit and a limitation for the BBNJ agreement. A benefit is that environmental assessments are widely viewed as a necessary management tool, and there are many models to draw on. A limitation is that states prefer to stick with what they know. It is unlikely, therefore, that the BBNJ EIA process will displace or substantially alter existing EIA processes applicable to activities in ABNJ.

The BBNJ EIA process does share something essential in common with existing EIA processes in ABNJ, however. EIAs must be conducted

[4] The United Nations Convention on the Law of the Sea

[5] UNCLOS Article 61(2), Article 119(1)(a), Article 234

[6] BBNJ Article 7(i), Article 19(3), Article 24(3), Article 26(5), Article 31(1)(a)(ii, iv), Article 31(1)(b, c), Article 35, Article 37(4)(a, c), Article 39(2)

[7] For fisheries, see Article 5(b) of the Fish Stocks Agreement. For seabed mining, see Regulation 2(g), Regulation 44(c), and Regulation 47(3)(d) of the Draft Regulations on Exploitation of Mineral Resources in the Area (ISBA/25/C/WP.1).

[8] An EIA under the BBNJ process does not need to be conducted if an "equivalent" assessment has taken place through another body, forum, or process (Article 29(4)(b)(i)). "Equivalent" is undefined.

[9] If an activity within national jurisdiction "may cause substantial pollution of or significant harmful changes to the marine environment" in ABNJ, the state must ensure that an EIA is conducted either via a national process or via the BBNJ process (Article 28(2)). There is no particular requirement that national EIA processes be equivalent to the BBNJ process.

using the *best available science* and scientific information (see footnotes 2–4[10]). In the context of the BBNJ agreement, "traditional knowledge" is also recognized as a valid and useful input to EIA decision making (Article 31(1), Article 32(3), Article 35). Much has been written about the inclusion of traditional knowledge in the BBNJ instrument (Pooja and Chugh 2015, [16,17]), and we do not add to that discussion here. But a basic assumption of this part of the BBNJ agreement is that existing or accessible scientific and traditional knowledge will be sufficient to actually conduct and evaluate EIAs that help protect marine biodiversity while enabling ocean use activities. Regarding scientific knowledge, three examples suggest that may not be the case.

2. Assessing environmental impacts beyond national jurisdiction

This section considers three examples of activities that are, or will be, taking place in ABNJ and therefore subject to EIA requirements under the BBNJ and/or other bodies. The first activity, plastic cleanup, is not regulated under existing instruments, frameworks, and bodies and will therefore be directly subject to the EIA process outlined in the BBNJ instrument. The other two, seabed mining and mesopelagic fisheries, are regulated under existing instruments, frameworks, and bodies and will be subject to their EIA processes, unless states choose to also undertake the BBNJ EIA process, which is unlikely. In all three cases, we argue that the best available scientific evidence is not nearly good enough to achieve the goals of conservation and sustainable use of marine biodiversity in ABNJ.

2.1. Plastic remediation

Standard EIAs assume a certain level of ecosystem knowledge, but this is not the case for even the most accessible high seas ecosystems. The ocean's surface habitat is comparatively easy to study and also on the front line of many human impacts (such as plastic pollution, oil spills, and climate change; [11]). For these reasons, high-seas surface habitats are likely to be an important case for EIAs. Surface ecosystems, termed *neustonic* ecosystems, float on or reside just above or below (within centimeters) of the ocean's surface alongside human pollutants. One organization, The Ocean Cleanup, proposes to clean plastic from the surface of the high seas using seine nets strung between ships [15].

Before the BBNJ agreement was finalized, The Ocean Cleanup commissioned two EIAs to evaluate the ecosystem impacts of this work. In the first, the neustonic ecosystem was not directly referenced in the main text, with only one table mentioning several neustonic species (page 24[11]). The large part of the EIA focused on marine mammals, sea turtles, and coastal and oceanic birds. Many sea turtles and seabirds feed on neustonic animals, and so inclusion of these species without inclusion of neustonic animals does not capture the full environmental picture [11]. The second EIA comissioned by The Ocean Cleanup contains 15 pages, of 159, on the neustonic ecosystem. These pages—written by consulting firm CSA Ocean Sciences, Inc. with input from Dr. Jenni Brandon (an expert in microplastics) and Dr. Delphine Thibault (an expert in plankton and neuston)—include many uncertainties and speculations, which is an accurate reflection of the limited scientific knowledge available for this habitat. Yet this habitat stands to be more impacted by this high seas activity than any other ecosystem. The EIA was clear that ecosystem impacts of trawling for plastic could significantly harm the neustonic ecosystem (page ES-7), but due to the fragility of this ecosystem the EIA also acknowledges that these impacts may be difficult to evaluate or predict from bycatch (page 101).[12]

To follow up this work, [21] used ecosystem modeling and stakeholder identification to determine the breadth of possible impacts. Even with all the available science, their mathematical models predict that, as a result of these activities, the potential loss of regional neustonic organisms ranges from relatively minor to absolute. This study also identified diverse potential stakeholders, not previously included in EIAs, which could be negatively impacted by a reduction in neustonic organism populations. For example, the neustonic zone is habitat for commercially important species that may be harmed by net encounters. The conclusion that can be drawn from this study is simple: for even the most accessible high seas ecosystem there is not enough scientific evidence to evaluate impacts using traditional EIA approaches and the best available science. The science simply does not exist.

2.2. Deep seabed mining

In other cases, there are existing EIA processes that are not superseded by (but may be informed by) the new BBNJ process. The International Seabed Authority (ISA) has a mandate to control, organize, and manage activities (mostly mining) in the 'Area' (international seabed) as the 'common heritage of mankind' (CHM) (UNCLOS Article 1, Article 136, and Part XI more generally). Its secondary obligations include the protection of the marine environment, protection of cultural heritage, and promotion of marine scientific research (UNCLOS Articles 143, 145, 149). The ISA fulfills this mandate by creating the so-called 'Mining Code,' which is the set of rules and procedures intended to regulate and manage mineral prospecting and extraction. The Mining Code already includes EIA requirements for prospecting and exploratory mining. Contract holders are required to submit an assessment of the marine ecosystems that their mining project may impact, a proposal for a monitoring programme to further determine the consequences of mining on the environment, and any data that can be used to establish an environmental baseline.

The BBNJ agreement does not undermine this approach, in that it allows its members to choose "equivalent" EIA protocols instead of the BBNJ process. The Mining Code – which at the time of writing it not yet complete for commercial exploitation – will certainly include additional EIA requirements, but their specificities remain to be determined. The ISA has a detailed guide on collecting and reporting relevant data, including baseline data. However, scientists and policy experts warn that the ISA is not equipped to evaluate the environmental impacts of deep seabed mining. Such assessments are "particularly difficult for the deep sea" [14]. The impacts of seabed mining will likely fall well outside the area being mined, and due to the lack of scientific data, the potential impacts of this operation are difficult to predict. A recent study identified the "scientific shortcomings" of this process, including "inadequate baseline data, insufficient detail of the mining operation, insufficient synthesis of data and the ecosystem approach, poor assessment and consideration of uncertainty, inadequate assessment of indirect impacts, inadequate treatment of cumulative impacts, insufficient risk assessment" [2].

Impacts of major concern include the generation of disturbance tracks on the seafloor, as well as sediment plumes generated by both the initial activity and through the dewatering discharge of mining debris into the mid-level water column (an area known as the midwater). Thanks to pioneering experiments in the 1980 s, we know that tracks generated by the initial activity can last for decades [7], and ecosystems within these tracks continue to exhibit signs of damage [23]. Results from track studies demonstrate the long-lived consequences of transient

[10] Or more specifically, the BBNJ members that are also members of other international organizations would be obligated to work within those organizations to reform weaker EIA requirements to meet the BBNJ standard.

[11] "The Ocean Cleanup Environmental Impact Assessment." CSA Ocean Sciences, Inc, July 2018. https://assets.theoceancleanup.com/app/uploads/2019/04/TOC_EIA_2018.pdf.

[12] "The Ocean Cleanup Final Environmental Impact Assessment." CSA Ocean Sciences, Inc, July 2021. https://assets.theoceancleanup.com/app/uploads/2021/07/TOC_FL_21_3648_EIA_FINREV01_12July2021.pdf

activities. The longevity of these impacts is difficult to capture in traditional EIA approaches due to our ignorance of these ecosystems. Similarly, both the seafloor and midwater are vulnerable to sediment discharge, and the intensity and duration of these impacts is difficult to predict. Midwater life provides valuable ecosystem services, with filter-feeding organisms like salps and larvaceans contributing significantly to the deep-sea carbon pump [13]. Many midwater animals use extremely mesh mucus filters [3], which can become easily clogged [20]. Seafloor sediment is extremely fine-grained [19], could clog midwater animal filters, and may remain in the water column for several years. Over the course of a mining operation, as much as 500,000,000 m-cubed of sediment may be discharged into the midwater [5]. After floating in the midwater and impacting pelagic ecosystems, this sediment will settle on diverse seafloor habitats. While current scientific knowledge provides a warning for the potential large-scale hazards of deep-sea mining, a lack of basic data for many regions and species means the actual impacts of particular mining projects are difficult to assess. This lack of evidence is part of why many scientists,[13] concerned citizens,[14] and even states,[15] are now calling for a moratorium on deep-sea mining. To fill this data gap, scientific research must be a priority in legal frameworks designed to protect biodiversity.

2.3. Mesopelagic fishing

High seas fisheries are a small proportion of total global fishing, by volume and value, but that proportion has been increasing as distant water fleets seek out under-exploited and/or high value fisheries. The high seas fishing regime is fundamentally permissive – UNCLOS Article 87, 116, and 119 give all states the right to fish on the high seas, without discrimination by national origin. Fishing effort beyond national jurisdiction is managed by Regional Fisheries Management Organizations (RFMOs), small multilateral organizations made up of states with an interest in a particular high seas commercial fishery. RFMOs have historically been reactive, only managing fishing activity after it begins in earnest. This has often resulted in stocks, especially slow-growing deep ocean fishes, collapsing before conservation and management measures can prevent this outcome (see, for example, the orange roughy and patagonian toothfish). But RFMOs are required by the 1995 Fish Stocks Agreement to incorporate ecosystem-based management and the precautionary approach into their decision-making. The BBNJ agreement is unlikely to apply directly to commercial fishing activity, as seen in the discussion around fish as a commodity, and the 'should not undermine' proviso, so any EIA process for fishing would be led by RFMOs (Haas et al., 2021). However, the growth of mesopelagic fisheries (200–1000 m) on the high seas serves as a valuable real-world example of how a lack of scientific evidence can undermine meaningful environmental protection.

RFMOs are not required by UNCLOS or the 1995 Fish Stocks Agreement to conduct or evaluate EIAs before the opening of a new fishery ([18], 467). They are only required to assess the impact of fisheries on the fish stock itself [8]. While the FAO has elaborated more detailed requirements regarding the assessment of impacts from bottom fisheries, "there are no global rules in respect of EIA for other newly developing fisheries" ([18], 469). This is largely due to the fact that fisheries management operates under a different paradigm than environmental law more generally: "Fisheries management focuses on the assessment of the impact of activities on an ongoing basis and does not require the prior assessment of impacts." ([18], 469). While some RFMOs such as CCAMLR[16] and NEAFC[17] have specific measures for new and exploratory fisheries, these requirements are uneven across RFMOs and generally focus on the potential impacts of bottom fishing ([18], 469–471). Overall, RFMOs are poorly equipped to evaluate impacts on marine biodiversity and ecosystem services, especially in the context of climate change ([8] 43).

The mesopelagic zone is believed to contain "a massive unexploited marine resource" which may soon be subject to growing commercial fishing [6]. Mesopelagic fishing is indiscriminate (similar to bottom trawling) and uses huge nets to collect biomass in the midwater. However, the mesopelagic zone includes far more than just target fish species and the mesopelagic ecosystem plays a major role in global ocean health. Many non-fish species will be impacted by this activity. Our lack of available scientific data will render activities in this zone risky. The mesopelagic ecosystem is critical to the oceanic carbon pump [1], as many mesopelagic species–including fish–vertically migrate to the surface at night to feed, transporting carbon into deeper water during the day as biomass and fecal pellets [4]. Yet we lack the science necessary to understand what impacts a large-scale mesopelagic fishing industry could have on regional ocean health or the global carbon pump.

Scientists and policy experts alike recognize that more scientific research is critically needed to evaluate the potential impacts of human activity on the mesopelagic ecosystem (St. [12,22,8]). Mesopelagic fish are understudied compared to coastal counterparts, and the age and life cycle of many mesopelagic fish is unknown, especially in the southern hemisphere [9]. However, this is a challenging ecosystem to study. Scientific access to the mesopelagic zone, as is true for many high seas areas, requires large ships and expensive specialized equipment. For these reasons, many mesopelagic fisheries, especially in areas where research has not been conducted, will have scant information on which to conduct and evaluate ecosystem impact assessments.

3. Improving the BBNJ EIA process

These are only three examples of the myriad ways that novel ABNJ activities could impact the environment in ways that cannot be adequately understood or evaluated. In each of these cases, we see that the *best available science* is not enough. The high seas and deep ocean are difficult to access, and high-seas science is resource intensive. Without support for scientific activity through the BBNJ agreement, many EIAs – including those conducted under other bodies – will not have enough information to perform as intended. Here we outline three potential ways the BBNJ agreement could be strengthened to avoid the twin perils described in the introduction: EIAs that cannot be conducted or evaluated for lack of information, or EIAs that are conducted and evaluated while gathering critical information. Much depends on the decision-making of the COP at its first meeting after entry into force.

Central to these proposals are the features and functions ascribed to the STB. The STB is assigned a large number of functions in the BBNJ agreement, most of them related to guidance, support, and recommendations. While the STB is established through the BBNJ agreement itself (Article 49(1)), its actual formulation, specific mode of operation, and potential future activities will be fleshed out after the treaty enters into force, by decisions of the COP and by the work of the STB itself (Article 49). At its very first meeting, the COP will determine the "terms of reference and modalities for the operation of the Scientific and Technical Body, including its selection process and the terms of its members' mandates" (Article 49(2)). The COP can also, during its first or subsequent meetings, assign other functions to the STB (Article 49(4)). We argue that the STB can fulfill important functions related to the knowledge gaps described above.

[13] Marine Expert Statement Calling for a Pause to Deep-Sea Mining. https://seabedminingsciencestatement.org. 31 October 2023.

[14] World Wildlife Fund. "No Seabed Mining." https://wwf.panda.org/discover/our_focus/oceans_practice/no_deep_seabed_mining. 31 October 2023.

[15] Resistance to deep-sea mining: governments and parliamentarians. Deep Sea Conservation Coalition. https://savethehighseas.org/voices-calling-for-a-moratorium-governments-and-parliamentarians. 31 October 2023.

[16] The Convention on the Conservation of Antarctic Marine Living Resources

[17] North East Atlantic Fisheries Commission

First – implementation of the BBNJ instrument can help to incentivize and guide marine scientific research to fill critical knowledge gaps. The current standard of knowledge as "best available" will not provide enough information for meaningful environmental assessments; the STB can serve a global leadership role in addressing this issue. One of the major functions assigned to the STB by the COP should be the identification of major knowledge gaps or deficits in our understanding of high seas biodiversity. These knowledge gaps will include (but may not be limited to) ecosystems and ecological processes where little or no scientific evidence is available to evaluate high seas impacts. Because the high seas and deep ocean are poorly known, these knowledge gaps may be further rated based on priority, because some ecosystems and ecological processes will experience greater human impact than others. By identifying knowledge gaps and priority areas, the STB can provide insights into where data collection is most needed.

Second – capacity building and transfer of marine technology (CBTMT) should be specifically directed towards supporting marine scientific research needs [10]. While the STB can identify the needs for scientific research to better understand ABNJ ecosystems and impacts on them, a separate CBTMT committee established by the BBNJ is intended to identify the needs for CBTMT among particular states and regions (Article 46). Like the STB, the CBTMT committee's activities are somewhat open-ended, as the "terms of reference and modalities for the operation of the committee" will be decided at the first meeting of the COP (Article 46(3)). The activities of the STB and CBTMT can and should be synergistic. The STB can identify important knowledge gaps that are of high priority for biodiversity protection (especially for EIAs), which can be assessed through the coordinated efforts of many stakeholders (for example, high seas plastic pollution cleanup impacts and population connectivity of mesopelagic fish). Assessments of existing knowledge are likely to conclude that particular regions, such as the Indian Ocean, are under-studied compared to other regions, such as the North Atlantic Ocean. This strongly implies a need for capacity building for particular types of marine scientific research. In addition to identifying needs and monitoring CBTMT implementation, the STB committee can make recommendations to the COP about the types of CBTMT needs, "to respond and adapt to the evolving needs of States, subregions and regions" (Article 44(3)).

Third – the STB should "lean in" to the internationalization of EIA processes, with support from the COP. The BBNJ agreement still provides room for the STB to produce "standards and guidelines" on the conduct of EIAs "for consideration and adoption" by the COP (Article 38 (2)(b)). These standards do not need to be uniform for all types of activities, in all parts of the ABNJ. A better approach would be to create standards specific to knowledge gaps, the nature of proposed activities, and potential impacts. For example, what we need to know to evaluate the impact of The Ocean Cleanup will be different from what we need to evaluate deep seabed mining. The STB could therefore produce standards that are both higher and more specific than "best available scientific evidence." These could be used to ensure that EIA processes taking place through existing instruments, frameworks, and bodies are also responsive to, and take account of, major data deficiencies.

A major barrier to using STB-produced, COP-adopted "standards and guidelines" for raising the bar on EIAs is the lack of a hierarchical relationship between the BBNJ agreement and other frameworks, instruments, and bodies. As discussed above, it is acceptable for BBNJ parties to conduct "equivalent" EIAs under other bodies such as the ISA or RFMOs, and the meaning of "equivalent" is unclear. But there is still value in BBNJ bodies setting a higher bar for EIAs. New, more specific standards and guidelines can shape the meaning and interpretation of "equivalent," thereby creating indirect pressures for external bodies to raise their standards. The BBNJ COP is also mandated to "develop mechanisms" for the STB to "collaborate" with other instruments, frameworks, and bodies that regulate ABNJ activities (Article 29(2)). These collaborations are specifically aimed at the development and updating of standards and guidelines for EIAs (Article 29(3)). So there is reason to believe the targeted efforts by the STB can shape the EIA processes taking place under other bodies.

Although these proposals are specific to the bodies (especially the STB) established through the BBNJ treaty, they apply to the ocean governance regime more generally. To improve the effectiveness and functionality of existing frameworks, instruments, and bodies, a more general change in the model of science for ABNJ decision-making is needed. While the BBNJ agreement offers an important new opportunity for 'raising the bar,' similar efforts can and should be undertaken in other instruments, frameworks, and bodies such as the ISA and RFMOs. Here we have proposed augmenting the "best available" standard with specific standards targeted towards what we *need* as opposed to what we *already have*. Implementing this approach will require more resources, directed towards specific knowledge gaps, coordinated by a central expert institution. With this approach, the EIA process created by the BBNJ agreement is much more likely to achieve its intended goals of conservation and sustainable use of marine biodiversity beyond national jurisdiction.

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The authors did not use any form of AI in generating this manuscript.

Data Availability

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

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