Deep Seabed Mining: Why we must protect our Biodiversity Beyond National Jurisdiction (BBNJ)

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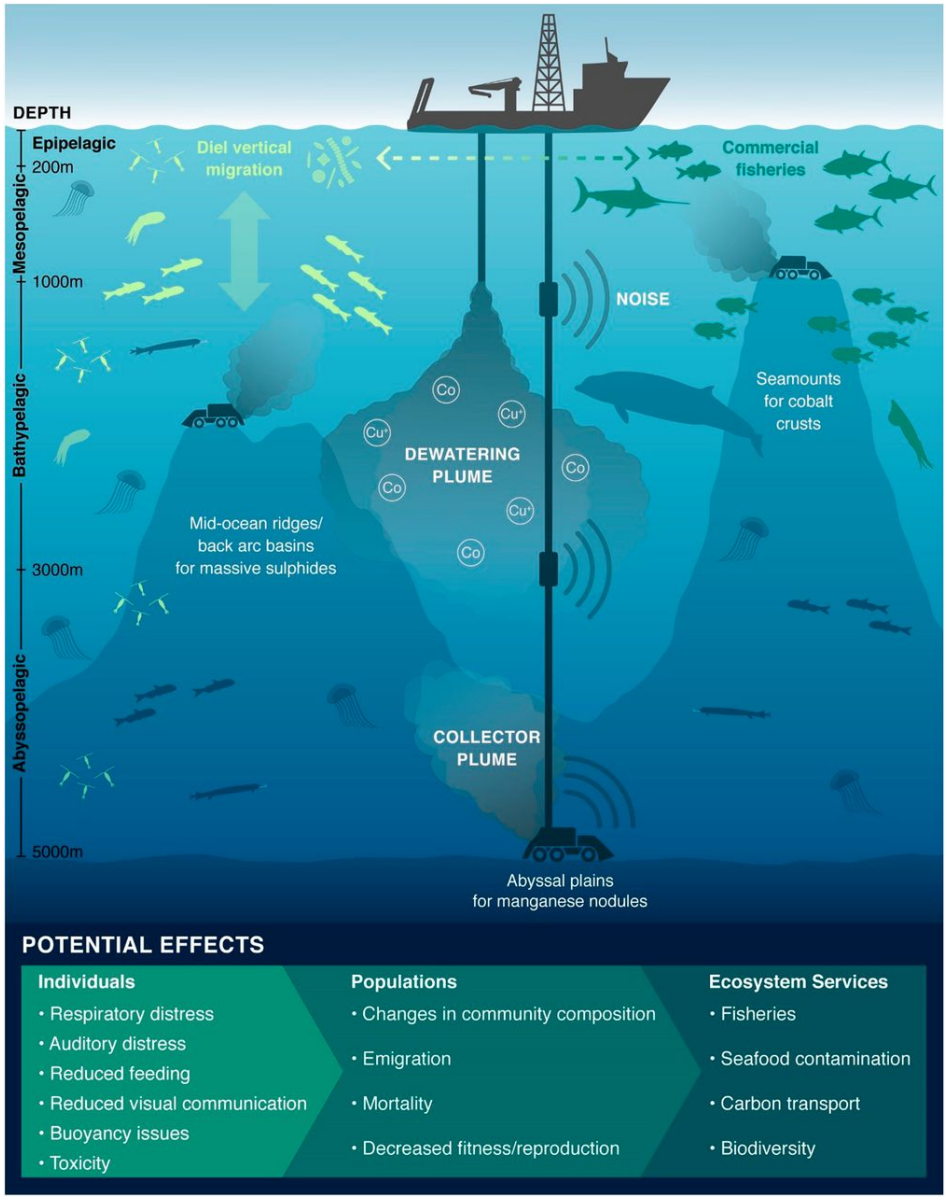

Figure 1: Potential harmful effects of deep-sea mining (IUCN, 2022)1

EXECUTIVE SUMMARY

Deep seabed mining could be one of primary threats to biodiversity beyond national jurisdiction (BBNJ) if mining activities are given the go-ahead in the future. BBNJ is found in areas beyond national jurisdiction (ABNJ). ABNJ is commonly known as the high seas (the water column and the seabed) and are areas of ocean where no one nation has sole responsibility for managing[1]. BBNJ is therefore the diversity between and within species and the ecological systems of which they are part, that is found in the high seas [2]. To date, no commercial-scale deep seabed mining trials have been undertaken but studies from offshore mining activities like marine diamond mining have shown that these activities have detrimental ecological impacts to marine organisms. It is essential therefore to protect marine biodiversity as it is vital for human well-being as it underpins a wide range of ecosystem services on which life above water and on land depends.

Mining companies want access to the rich mineral deposits that are found on the seabed floor which can be used in high-tech industries for making electronics and batteries for renewable energy. However, there are currently no policies in place to regulate deep seabed mining activities in ABNJ.

This brief provides six broad recommendations to protect biodiversity beyond national jurisdiction in areas beyond national jurisdiction and could help to improve governance of the deep seabed in relation to mining:

- Establish a coherent network of marine protected areas (MPAs)
- Develop coherent seabed protection policy
- Facilitate improved monitoring, research and governance in ABNJ
- Effective environmental management framework
- Enforced Mandatory social-cost benefit analysis
- Fully inform and involve the global community

[1] Pecoraro (2019)
[2] https://www.un.org/depts/los/biodiversityworkinggroup/marine_biodiversity.htm

Deep Seabed Mining and biodiversity beyond national jurisdiction (BBNJ): an overview

The last decade has seen a renewed interest in the commercial exploitation of deep seabed minerals located beyond national jurisdiction. The recent discovery of diverse mineral deposits, such as polymetallic nodules, phosphorite nodules, and cobalt-rich ferromanganese crusts, as well as the growing demand for their use in high-tech industries like electronics and battery storage, has given rise to a new frontier for the extraction of the Earth's natural resources in the form of deep-seabed mining in areas where biodiversity beyond national jurisdiction are. Biodiversity Beyond National Jurisdiction (BBNJ) is defined as areas for which no nation has sole responsibility for management. They comprise of the high seas; the seabed beyond the limits of the continental shelf; polar areas; and outer space[3].

Contemporary research and trends in the market indicate an increasing demand for industries securing exploration rights and concessions with the aim of commencing with mining and the extraction of minerals from the deep sea. At present, there are 30 exploration contracts awaiting authorization for exploitation in the regions of the Indian Ocean, the Mid-Atlantic, the Western Pacific, and the Clarion Clipperton Fracture Zone. Contractors are therefore at different stages of developing the technology required to extract these resources.

There is also currently no robust, precautionary approach in place to safeguard against impacts to biodiversity beyond national jurisdiction (BBNJ). Furthermore, the regulations for deep-seabed mining in the High Seas are only in the early stages of development which further renders deep-seabed mining as a source of debate and ambiguity. Deep-seabed mining is viewed as an exciting new economic frontier for the blue economy, valued at US$2-20 billion and hailed as being necessary for a decarbonized future. However, from case studies of offshore diamond mining, there is clear evidence of detrimental ecological impacts to cold-water coral, sponge reefs, hydrothermal vents, and seamounts, supporting the need for undertaking conservation action even if our scientific understanding of these ecosystems is still imperfect. While the economic impact of deep seabed mining on the ocean economy has been valued at US$1.5-2.4 trillion annually, the accuracy of this prediction can be critiqued as impacts on marine ecosystems have no obvious physical boundaries.

Deep seabed mining cannot occur in isolation and its impacts would not be limited to the ocean floor. Ecological disturbances can easily cross ecological and jurisdictional boundaries, leading to unexpected and unquantifiable consequences, even on land. Loss of primary production, for example, could affect global fisheries, threatening the main protein source of around 1 billion people and the livelihoods of around 200 million people, many living in poor coastal communities.

[3] FAO. 2022

This policy brief draws on scientific data, empirical research and various case studies to present a case against deep sea-mining in areas beyond national jurisdiction in order to safeguard BBNJ.

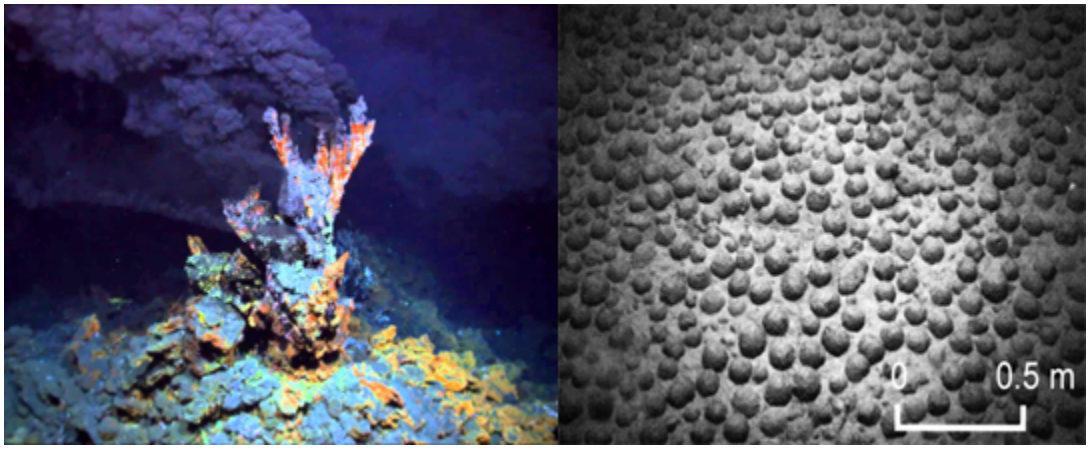

Figure 2: Ocean vents and mineral deposits on the deep seabed in areas beyond national jurisdiction.

Current Policy Approach and Policy Alternatives

At present, no policies exist that regulate deep seabed mining. International bodies and treaties do exist that govern ocean resources and human activity in areas beyond national jurisdiction. However, jurisdictions often overlap and few mechanisms exist that coordinate across geographic areas. While regulations are being negotiated by states seeking exploratory rights and the International Seabed Authority (ISA), there are no existing governance organisations with a comprehensive mandate to assist with coordinating and ensuring the effective management and conservation of BBNJ.

Deep-sea bed mining is therefore out of step with the direction the world is taking in seeking more sustainable solutions to climate change and rapid biodiversity loss. Set within a circular economic model, this approach is in line with the United Nations (UN) Sustainable Development Goal (SDG) 12 – to ensure responsible consumption and production – and the UN's designated decades of ocean science and habitat restoration.

Deep-sea mining prospectors claim we have no choice but to open the ocean to mining in order to power the green shift-a shift to renewable energy and the technology and materials required for this. The minerals required for these technologies (manganese, cobalt and nickel) are found both on land, and now on the seafloor. However, alternatives to deep-seabed mining are within reach providing the following:

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- The continued extraction of mineral resources from terrestrial sources under greatly improved environmental and social governance (ESG) frameworks
- Improved recycling infrastructure and technology In order to maximize global resources
- Preservation of the seabed is only possible if the global community is provided with the knowledge of the intra- and intergenerational impacts of deep seabed mining. This will also improve transparency and scientific reporting.
- Establish marine protected areas in ABNJ, in a bid to preserve species and ecosystems.
- Develop coherent seabed protection policies. That s will allow for proper governance of seabed mining, promote global seafloor monitoring and improve stakeholder dialogue[4].

POLICY RECOMMENDATIONS

Policy Options

This policy brief provides following guidance, arranged in six broad themes, that would protect marine ecosystems from harm and could help to improve governance of the deep seabed in relation to mining:

1. **Establish a coherent network of marine protected areas (MPAs):** Growing demand for minerals has motivated a desire among some to exploit ocean resources. It is well known that seabed mining will cause irreversible damage to biodiversity on local scales and possibly wider areas depending on the type of mining[5]. The impact of continuous and cumulative commercial-scale mining operations may generate interacting stressors that are very different from those associated with one single mining event[6] and well beyond the natural variations that the seabed has experienced to date. One approach to limit biodiversity loss in deep-sea ecosystems is to establish a coherent network of marine protected areas (MPAs).

2. **Develop coherent seabed protection policy:** There is no robust, precautionary approach in place to safeguard against impacts to biodiversity, and regulations for deep-seabed mining in the High Seas are only in the early stages of development. Currently, environmental impact assessments (EIAs) do not always take into account the dynamic nature or interconnectivity of marine ecosystems, or that an ecosystem may be subject to multiple stressors. Conducting an EIA for deep seabed mining in the Area is challenging because of the environmental conditions and uncertainties involved, which include a lack of environmental data at all spatial and temporal scales and the fact that

[4] Thompson, Miller, Currie, Johnston and Santillo (2018)
[5] Jones et al. (2017); Van Dover et al. (2017); Miller et al. (2018)
[6] Van Dover (2011)

mining technologies remain under development[7].Under current legislation it is necessary for a mining project to conduct an Environmental Impact Assessment (EIA), but there is little legislation in place to ensure minimum standards for EIAs, and no means yet of monitoring how they are conducted in ABNJ. A coherent seabed protection policy will assist in defining the procedures for assessing deep seabed mining impacts.

3. **Facilitate improved monitoring, research and governance in ABNJ:** Developing and implementing a research agenda for addressing key scientific questions that must be answered before commercial-scale mining commences could provide an entry-point into understanding the dangers associated with mining the ocean space.

4. **Effective environmental management framework:** TheInternational Seabed Authority (ISA) should improve the robustness in the permitting process. Must comply with the United Nations Convention on the Law of the Sea and cover continental shelf applications.

5. **Enforced social cost–benefit analyses:** The evaluation of a seabed mining proposal needs full transparency, together with effective quantification and communication of the manifold impacts of mining, the benefits and the justification for mining virgin materials. This assessment should include current baseline conditions, environmental externalities and address uncertainties. Improved benefit sharing, including to local communities and indigenous peoples. Designated funds should be set aside for disasters and incidents.

6. **Fully inform and involve the global community:** Communication is key. Given that the consequences of biodiversity loss are significant, decision-making relating to exploitation of seabed minerals cannot be left to those with predominantly economic interests. Equall yimportant is to ensure that the global community understands that no financial provision to clean up or mitigate environmental damage (accidental or otherwise) will compensate for the loss of ecosystems that may take millennia to recover[8] The policies should clearly articulate the public engagement process to ensure that states have a complete understanding of the intra- and intergenerational impacts of marine mineral exploitation.

Implications

Accidents and incidents caused by seabed mining have been described as ‘low probability, high risk’[9]. However, as was evidenced by the 2010 BP Deepwater Horizon disaster, marine accidents and incidents can include unanticipated incidents with far reaching effects, especially if they occur offshore at extreme depth. Such events can involve not only financial losses but grave social and environmental losses.

[7] Durden et al. (2018)
[8] Niner et al. (2018).
[9] Wakefield and Myers (2016).

A range of findings have ascertained that the implications associated with deep sea-bed mining include:

1. **Seabed mining will damage the marine environment for many centuries**[10]: Life on the ocean floor moves at a glacial pace. Sediment accumulates at a rate of 1 millimeter every millennium. With such a slow rate of growth, areas disturbed by deep-sea mining would be unlikely to recover on a reasonable timescale. There is concern that if there is a biological community specific to the area, it might be irretrievably impacted by mining.
2. **Mining activities could negatively impact fish stocks**[11]: Communities that rely on fish stocks for subsistence could be particularly vulnerable to the impacts of seabed mining as it affects carbon sequestration in sediments.
3. No liability regime exists and, if established, would warrant the establishment of a fund to cover gaps in liability coverage, such as impecuniosity of operators:No commercial-scale seabed mining has yet taken place, a mechanistic description of the extent to which local communities will be affected by seabed mining is difficult to provide.
4. **A system to distribute mining benefits to current and future generations of the global community has not yet been defined:**[12]Advocating the continued exploitation of Earth's resources is likely to reinforce unsustainable patterns of consumption;

Actionable Recommendations

Evaluation should be carefully considered with the utmost and highest urgency to ensure that this is indeed necessary and viable not only for our marine ecosystem but also for our own future.

We reiterate that the following be taken into consideration:

1. Extensive and sufficient information to ensure informed decisions
2. Transparency:understanding of Impacts on the seabed as well as the ecosystem it surrounds
3. Legislation/ Seabed Policies:Proper and effective environmental impact assessment.
4. Monitoring: key environmental activities and changes in the environment/ ecosystem
5. Sustainability: Thoughtful operation procedure to be followed and monitored to the utmost extent for any crisis control
6. Enforcement: should crisis occur, specialist guidelines be put in place and the following steps to ensure minimal harm to the environment is caused
7. Rehabilitation of the area or the mined seabed after mining and full plan to be out in place before mining occurs

[10] Van Dover et al. (2017)
[11] Levin et al. (2016)
[12] Kim (2017)

Additional reading

Is deep-sea mining a cure for the climate crisis or a curse? | Mining | The Guardian

The Dangers of Deep Seabed Mining (harvard.edu)

The Detrimental Effects of Deep-Sea Mining on Marine Ecosystems | Earth.Org

The Potential Pros and Cons of Seabed Mining - JSTOR Daily

Deep Sea Mining About to Start in Pacific Not 'Sustainable at Any Level' (newsweek.com)

wwf_intoodeep_what_we_know_and_dont_know_about_deepseabedmining_report_february_2021.pdf (panda.org).

https://www.mining-technology.com/analysis/future-of-deep-sea-mining/

https://cer.org.za/safeguard-our-seabed/seabed-mining-around-the-world/the-high-seas#:~:text=Seabed%20mining%20in%20the%20high%20seas%20is%20regulated%20by%20a,of%20the%20International%20Seabed%20Authority.

https://cer.org.za/safeguard-our-seabed/seabed-mining-around-the-world/the-high-seas#:~:text=Seabed%20mining%20in%20the%20high%20seas%20is%20regulated%20by%20a,of%20the%20International%20Seabed%20Authority.

https://hakaimagazine.com/news/a-mining-code-for-the-deep-sea/