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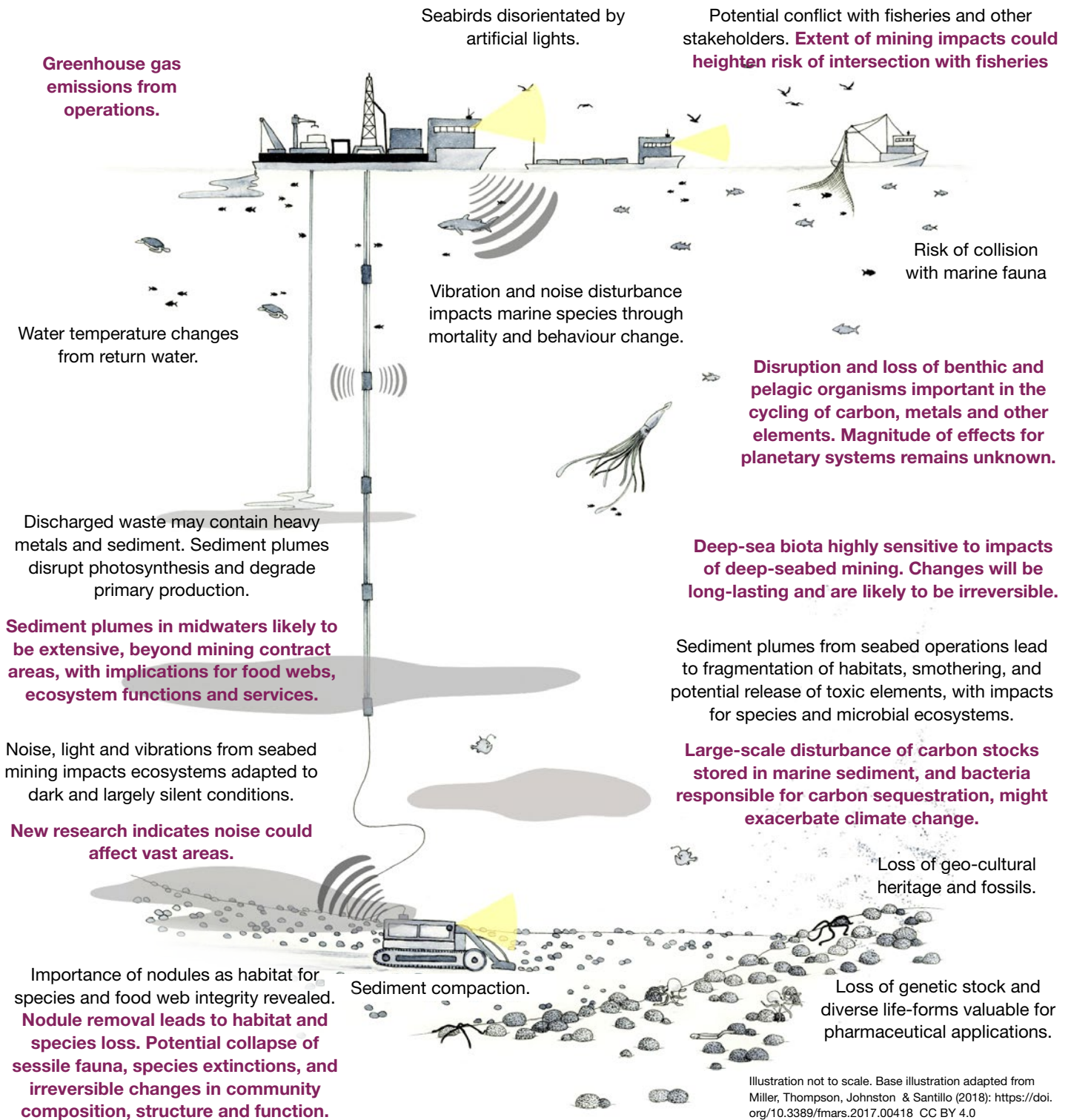
Update to ‘An assessment of the risks and impacts of seabed mining on marine ecosystems’

We now know more, but still not enough to rush into deep-sea mining

In early 2020, Fauna & Flora published ‘An assessment of the risks and impacts of seabed mining on marine ecosystems’ – it highlighted crucial evidence about the importance of the deep sea for marine biodiversity and proper functioning of ocean habitats, and raised concerns about the threat posed by deep-seabed mining to ecosystem function and dependent planetary systems including the global climate. Fauna & Flora has now reviewed new evidence emerging between 2020 and 2022 to provide an update to its original assessment report.

In light of the imminent threat posed by deep-seabed mining, scientific attention has increased rapidly, with many new studies published on deep-sea environments, the functions and services they provide for humanity, and the potential implications of deep-seabed mining for life in the deep ocean. These recent studies strongly accentuate the potential risks of deep-seabed mining and therefore that it remains premature for deep-seabed mining to proceed at the current time and, in the absence of any suitable, proven impact-avoidance or mitigation techniques, deep-seabed mining should be avoided entirely.

Figure 1: Risks and impacts of mining of polymetallic (ferromanganese) nodules, updated to show new evidence accentuating these risks and impacts (shown in purple text).



FULL IMPACTS OF MINING POLYMETALLIC NODULES ARE UNKNOWN.

Deep-seabed mining will not occur in isolation. The effects of climate change and mining will interact and may exacerbate mining impacts. Risks and uncertainties around the cumulative effects of human activities and other stressors are very high.

Growing concern around implications for human rights, including the right to health, and to a clean, healthy and sustainable environment.

With growing insight comes increasing awareness of how little we know

Since *Fauna & Flora's 2020 report*, new studies continue to reveal the extraordinary diversity and complexity that exists in the deep sea. Species new to science continue to be revealed in large numbers and scientists expect many more are yet to be discovered.

What has been further confirmed:

- We know less about the deep sea than any other place on the planet. Over 75% of the seafloor still remains unmapped and unobserved and less than 1% of the deep ocean has been explored.
- There remain profound gaps in even the most basic knowledge about the deep sea.
- The roles of deep-sea fauna in ecosystem functions, including carbon fixation, cycling and storage, productivity and metal cycling are the focus of scientific attention but are still not well understood.
- Deep-sea species are inherently vulnerable to environmental change, many are highly sensitive, very slow growing and ultra-long living.
- If deep-seabed mining goes ahead, we can expect significant, likely irreversible and currently immitigable impacts on biodiversity.

What is now even clearer:

- The importance for biodiversity and overall marine ecosystem function of the resources targeted for extraction, such as the polymetallic nodules on the seabed.
- The vast spatial scale of potential impacts from deep-seabed mining on biodiversity, ecosystem function and services. For example, the effects of noise and sediment plumes will be far-reaching and their effects can be expected to persist over long timescales.
- Deep-sea ecosystems will struggle to ever recover to pre-impact state.
- Marine sediment carbon stocks are one of the most expansive and critical carbon reservoirs on the planet. Deep-seabed mining will disturb marine sediment over large areas.
- The critical role of benthic and pelagic deep-sea species and ecosystems in the cycling and storage of carbon. Deep-seabed mining may disrupt and lead to the potential collapse of these processes and could exacerbate our current crises of climate change and biodiversity loss. Such impacts are likely to be irreversible.

This raises even greater concern about:

- Whether existing measures to support impact avoidance in regions targeted for deep-seabed mining are effective and appropriate.
- The potential magnitude of effects from the impacts of deep-seabed mining.
- The potential for cumulative effects of the impacts of deep-seabed mining and other stressors on the deep-sea environment, such as climate change and fisheries, including deep-sea trawling.

Our update report reinforces the conclusions of our 2020 report:

- In the face of uncertainty and absence of knowledge, a precautionary approach and strict adherence to the mitigation hierarchy are essential.
- Given the ongoing considerable gaps in the knowledge of ocean complexity and how this relates to earth-system processes, gaps in basic baselines of the biodiversity and ecosystem function of the ocean, and clear indications that impacts would be considerable and likely irreversible, there is an inadequate basis on which to make informed, science-based decisions as to whether deep-seabed mining could be permitted without serious harm to the marine environment and, if so, under what conditions.
- A moratorium on deep-seabed mining is strongly recommended. At the very least a precautionary pause is needed to ensure deep-sea ecosystems and potential mining impacts can be comprehensively studied, until such time as exploitation technologies and operational practices are able to demonstrate no serious harm to the environment and no net loss of biodiversity.
- Bold decisions are required that put ocean health and the benefits of the deep sea for all humankind front and centre because, once initiated, deep-seabed mining and its effects may be impossible to stop.

Fauna & Flora's 2023 Update Report can be accessed [here](#)

The 2020 report 'An assessment of the risks and impacts of seabed mining on marine ecosystems' can be accessed [here](#) with an Executive Summary [here](#)

**Sophie Benbow, Director, Marine
Catherine Weller, Director, Policy**

info@fauna-flora.org