International Union for Conservation of Nature
ISSUES BRIEF
www.iucn.org

DEEP-SEA MINING

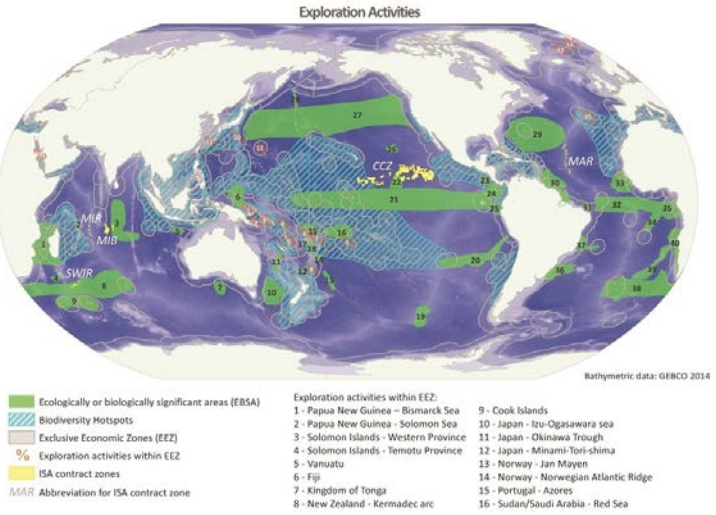
JULY 2018

- **Deep-sea mining is the process of retrieving mineral deposits from the deep sea** – the area of the ocean below 200 m.
- **Depleting terrestrial deposits** and **rising demand for metals** are stimulating interest in the deep sea, with commercial mining **imminent**.
- The scraping of the sea floor and pollution from mining processes can **wipe out entire species** – many yet to be discovered.
- **Environmental impact assessments, effective regulation and mitigation strategies** are needed to limit the impacts of deep-sea mining.
- **Comprehensive baseline studies** are needed to improve our understanding of the deep sea**.**

What is the issue?

Deep-sea mining is the process of retrieving mineral deposits from the deep sea – the area of the ocean below 200 m which covers about 65% of the Earth's surface.

There is growing interest in the mineral deposits of the deep sea. This is largely due to depleting terrestrial deposits for metals such as copper, nickel, aluminium, manganese, zinc, lithium and cobalt, coupled with rising demand for these metals to produce high-tech applications such as smartphones and green technologies such as wind turbines, solar panels and electric storage batteries.



Deep-sea mining activities within the Exclusive Economic Zones of countries and in areas beyond national jurisdiction © IUCN

So far, the focus has been on exploring the deep sea – assessing the size and extent of mineral deposits. By May 2018, the International Seabed Authority (ISA) – which regulates activities in areas beyond national jurisdiction – had issued 29 contracts for the exploration of deep-sea mineral deposits. More than 1.5 million km^2 of international seabed – roughly the size of Mongolia – have been set aside for mineral exploration in the Pacific and Indian oceans, and along the Mid-Atlantic Ridge.

But exploration may soon give way to exploitation. Commercial mining in national waters of Papua New Guinea is predicted to begin by 2020. Mining in international waters is expected to commence in 2025.

Why is this important?

The seafloor contains an extensive array of geological features. These include abyssal plains 3,500–6,500 m below the sea surface, volcanic underwater mountains known as seamounts, hydrothermal vents with bursting water heated by volcanic activity, and deep trenches such as the Mariana Trench, which at almost 11,000 m is the greatest depth registered in the ocean. These remote areas support species that are uniquely adapted to harsh conditions such as lack of sunlight and high pressure. Many of these species are unknown to science.

As the deep sea remains understudied and poorly understood, there are many gaps in our understanding of its biodiversity and ecosystems. This makes it difficult to thoroughly assess the potential impacts of deep-sea mining and to put in place adequate safeguards to protect the marine environment.

Based on current knowledge of the deep sea, the following impacts of mining activities could affect its biodiversity and ecosystems:

Disturbance of the seafloor

The scraping of the ocean floor by machines can alter or destroy deep-sea habitats, leading to the loss of species and fragmentation or loss of ecosystem structure and function. Many species living in the deep sea are endemic – meaning they do not occur anywhere else on the planet – and physical disturbances in just one mining site can possibly wipe out an entire species. This is one of the biggest potential impacts from deep-sea mining.

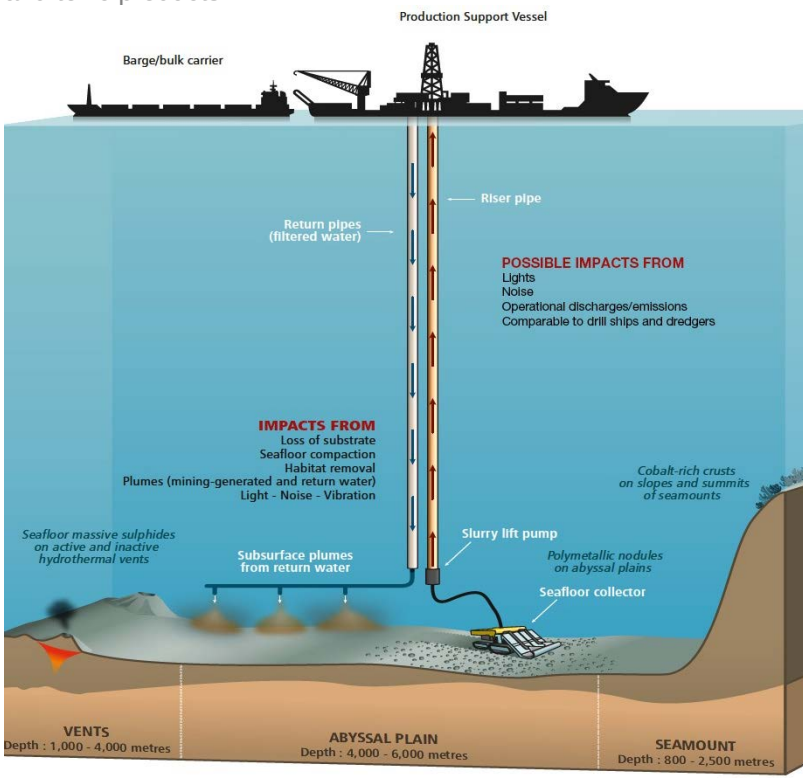
Sediment plumes

Some forms of deep-sea mining will stir up fine sediments on the seafloor consisting of

silt, clay and the remains of microorganisms, creating plumes of suspended particles. It is unclear how far these particles may disperse beyond the mining area, how long it would take for them to resettle on the seafloor, and to what extent they may affect ecosystems and species, for instance by smothering animals or harming filter-feeding species that depend on clear, clean water to feed, such as krill and whale sharks.

Pollution

Species such as whales, tuna and sharks could be affected by noise, vibrations and light pollution caused by mining equipment and surface vessels, as well as potential leaks and spills of fuel and toxic products.



Potential impacts from deep-sea mining © IUCN, adapted from Secretariat of the Pacific Community (2013).

What can be done?

A better understanding of the deep sea is necessary to guide mitigation strategies and proper enforcement of regulations in order to limit the environmental impacts of mining activities.

Baseline studies

Comprehensive baseline studies are needed to understand what species live in the deep sea, how they live, and how they could be affected by mining activities. More funds are needed for training and educational programmes focused on improving our understanding of the deep sea.

Environmental impact assessments

High-quality environmental assessments are needed to assess the full range, extent and duration of environmental damage from deep-sea mining operations. These assessments are also needed to ensure that the loss of biodiversity as a result of mining operations is properly accounted for in mining regulations set by authorities, well before any decision to mine is approved. The costs to the marine environment should be included in the financial and economic assessments conducted by mining companies.

Mitigation

Current technologies may not be sufficient to avoid serious and lasting harm to the environment, including the loss of biodiversity. Mining operations strategies will need to prioritise the avoidance of environmental impacts. This needs to include establishing protected area networks to keep large parts of the seabed undisturbed as well as stringent and precautionary controls on the permissible extent and duration of mining operations. Minimising impacts should involve, among other things, improving mining equipment to reduce seafloor disturbance. Remedying environmental impacts has not yet been shown to be effective in practice.

Enhanced regulation

The ISA is operating with the dual mandate of promoting the development of deep-sea minerals whilst ensuring that this development is not harmful to the environment. This challenging and conflicting mandate will require improved oversight by the international community – including government representatives and the general public – to ensure that marine life is adequately protected.

To avoid possible conflicts of interest due to the dual mandate of ISA, the organisation should consider divesting itself of some of its responsibilities, and placing them on independent entities.

Circular economy

The repair, recycling and reuse of products should be encouraged to help reduce the demand for raw materials from the deep sea. Enhancing product design to make use of less or alternative materials can also reduce the demand.

Where can I get more information?

Cuyvers, L. et al. (2018). *Deep seabed mining: a rising environmental challenge*. Gland, Switzerland: IUCN and Gallifrey Foundation.

MIDAS – Managing Impacts of Deep-seA reSource exploitation