RACHEL CARSON COUNCIL

Fact Sheet

Deep Sea Mining's Role in the Green Future

OVERVIEW

Deep sea mining is the process of extracting critical minerals from the ocean floor. The seafloor is an untapped resource with large reserves of various minerals, such as cobalt, zinc, copper and other rare earth elements. These minerals can typically be found in potato-shaped lumps on the seabed; these are known as **polymetallic nodules.** There are also large reserves of these minerals surrounding hydrothermal vents (deep sea volcanos) and within the crusts of seamounts.

The mining operations are carried out by a large undersea vacuum that can suck up the nodules and transfer them to boats on the surface for processing (**Figure 1**). However, these operations are not free from risk. Scientists worry about the resulting ecosystem damage from these operations; from the sediment kicked up by the vacuum, the deep sea organisms harmed, and the chemical leakage from the process; deep-sea mining is a controversial topic for many.

Are deep-sea minerals another finite resource that will soon be overexploited? Or can they be harvested sustainably to preserve both the ecosystem around as well as the minerals themselves in the long term? These deep-sea critical minerals are distributed across the seafloor throughout the world, but one area of international focus for deep sea mining is the Clarion–Clipperton Zone (CCZ), a 600 million km^2 region in the Pacific Ocean, east of Hawaii, in international waters. Currently the CCZ and other areas with mining potential are governed by the **United Nations International Seabed Authority (ISA).**

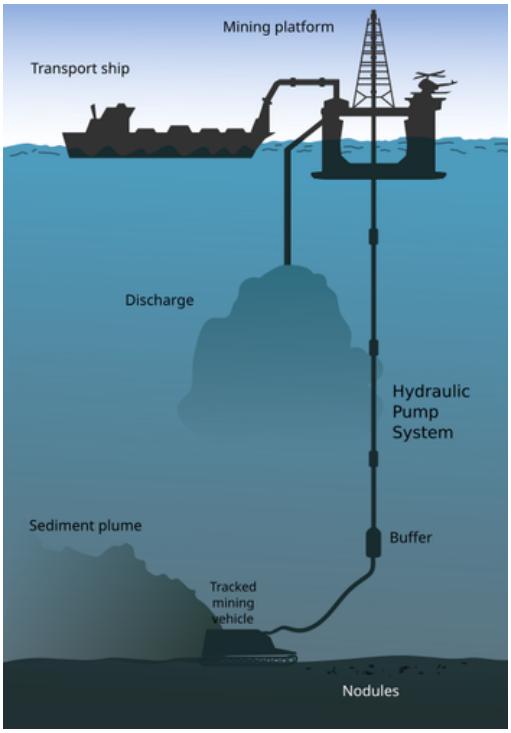

Figure 1: *Undersea mining operations. Source: Wikimedia*

THE ISA

Currently, the ISA has 172 members: 171 states and the European Union. The United States is not included in the ISA (having not ratified UNCLOS, the U.N. treaty that defines states rights and responsibilities in the ocean), but other major world powers such as Russia, China, Japan and Korea, are active members. The role of the ISA is to allow **all countries** to share the benefits of undersea resources, while also protecting the deep ocean flora and fauna. They support the future of deep-sea mining, but often require more thorough research on the true environmental implications and costs of undergoing such a task, and ensuring the sustainable use of these resources for years to come as well.

Independent of the ISA, the United States is **currently planning to begin deep-sea mining exploration** both within our own Exclusive Economic Zone, and in the CCZ, outside our national jurisdiction. NOAA recently took a seafloor sample containing some of the critical mineral nodules, from the waters near American Samoa. **Should the United States continue to pursue deep sea mining in the CCZ, independently of ISA oversight, there could be potential for international disagreement**. The ISA proclaims the seafloor as the "common heritage of humankind."[2] If the United States goes against the rules and regulations put forth by the ISA to evenly distribute ocean resources to all party countries, then they may be accused of stealing the resources and scorning the natural order put into place by the ISA.

KEY FACTS

- In the Clarion Clipperton Zone, which is often perceived as an undersea desert, scientists estimate there are over 5,500 different species of animals.[3]
- These minerals are used for more than just renewables; cobalt is a key component for lithium-ion batteries found in nearly all smartphones.
- Approximately 15% of workers in the DRC terrestrial mines, where cobalt is sourced, are children.[4]
- There are currently 17 active contracts for exploring the polymetallic nodules in the CCZ.
- 41 countries have currently issued a moratorium or precautionary pause on deep-sea mining.[5]

RELEVANCE

Estimates predict that demand for critical minerals could double by 2040, as they are integral to many emerging decarbonization and green energy technologies.[6] Polymetallic nodules take millions of years to form as the minerals gradually precipitate from the water. Currently, these minerals are sourced via terrestrial mining in different regions of the world. The Democratic Republic of Congo mines the largest share (over 50%) of the world's cobalt, while Indonesia is a large source for nickel. Once mined, the majority of these minerals are then shipped to China for processing. Terrestrial mining can be controversial, due to the high potential for child labor, exploitation and unsafe working conditions. It can also contaminate water supplies, and destroy large swaths of forest.

Similarly, some scientists are concerned about the potential environmental impacts of deep-sea mining. Illegal, unreported and unregulated fishing contributes to a number of human rights abuses in the high sea, with reports of forced labor and unhealthy working conditions. It is likely that these conditions would continue with the introduction of deep-sea mining as companies aim to extract the most profit while incurring fewer costs of labor or frequent returns to port. Additionally, the process of mining would damage the seafloor, as the powerful vacuum sucks up nodules and other materials indiscriminately. This also kicks up sediment from the bottom, creating plumes that permeate the water column. While deep-sea mining has not yet begun on a large scale, there is potential for these untapped undersea resources to make a difference in the future.

ENDNOTES

1. Wikimedia "Deep Sea Mining Schematic" https://commons.wikimedia.org/wiki/File:Deep_sea_mining_schematic_2.svg
2. International Seabed Authority "About ISA" https://isa.org.jm/about-isa/
3. Current Biology "How many metazoan species live in the world's largest mineral exploration region?" https://www.cell.com/current-biology/fulltext/S0960-9822(23)00534-1
4. Byline Times "From Stone to Phone: Modern Day Cobalt Slavery in Congo" https://bylinetimes.com/2020/06/19/from-stone-to-phone-modern-day-cobalt-slavery-in-congo/
5. Deep Sea Conservation Coalition "Momentum for a Moratorium" https://deep-sea-conservation.org/solutions/no-deep-sea-mining/momentum-for-a-moratorium/governments-and-parliamentarians/
6. International Energy Agency "Global Critical Minerals Outlook 2024" https://www.iea.org/reports/global-critical-minerals-outlook-2024

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The Rachel Carson Council (RCC), founded in 1965, is the national environmental organization envisioned by Rachel Carson to carry on her work after her death. We promote Carson's ecological ethic that combines scientific concern for the environment and human health with a sense of wonder and reverence for all forms of life in order to build a more sustainable, just, and peaceful future. The Rachel Carson Council is a nonpartisan 501(c)(3) nonprofit organization.