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before the United States House of Representatives Committee on Natural Resources, Subcommittee on Oversight and Investigations

Hearing: "Exploring the Potential of Deep-Sea Mining to Expand American Mineral Production"

April 29, 2025

Opening Remarks

Witness Duncan Currie[1] has practiced international oceans law for over 35 years.. He has acted as counsel in several cases involving seabed mining in his home country, New Zealand. He advises the Deep Sea Conservation Coalition in matters of international law, and has attended International Seabed Authority meetings since 2012. A summary of his submission follows.

- **Environmental and scientific concerns**: Science demonstrates that deep-sea mining will cause harmful environmental damage to deep-sea ecosystems, with some impacts likely to be irreversible.[2] Below, we will discuss concerns related to: midwater and benthic plumes, as well as biodiversity and habitat loss, including the removal of nodules; noise and light pollution; the loss of new knowledge and discoveries such as Dark Oxygen; and the loss of current and future ecosystem services.
- **Threatens U.S. interests under UNCLOS**: The 1982 Convention on the Law of the Sea (UNCLOS) establishes a package of rights and freedoms that States, including the United States enjoy. This has implications for fisheries, the navy, shipping, marine scientific research, marine protection, maritime boundaries, and much else. Stepping outside UNCLOS could be detrimental to U.S. interests as well as those of other countries regarding freedoms of the high seas and including rights to the continental shelves and exclusive economic zones.

[1] The following remarks are only those of the witness and are not the expressed position of any organization.

[2] Niner, H. et al. (2018). Deep-Sea Mining with No Net Loss of Biodiversity - An Impossible Aim. Front. Mar. Sci., 5. https://doi.org/10.3389/fmars.2018.00053.

By going it alone, the U.S. would not only invite legal challenges but also weaken its ability to demand compliance from other States in areas like illegal fishing, military navigation, and enforcement of extended continental shelf claims. By undermining UNCLOS, the U.S. would risk the legitimacy of their recent extended continental shelf claims, especially those in the Arctic that border Russia and Canada. It could also open the way to mining by other countries, compounding the environmental damage.

- **International condemnation**: A unilateral process to mine the international seabed under DSHMRA would face significant political and legal challenges. The deep-sea Area and its mineral resources are universally supported as being the common heritage of humankind (UNCLOS Art. 136). When The Metals Company (TMC) announced its desire to use this controversial route in March, it was met with strong international protests from over 30 nations, including U.S. allies. In response to this Executive Order, China positioned themselves as champions of multilateralism and the rule of law, with a statement that deep-sea mining activities in the international seabed must be in accordance with UNCLOS. France's ocean minister described TMC's plan to mine the international seabed through U.S. legislation as 'environmental piracy', and France's ocean ambassador responded to the Executive Order by stating that "No one can claim the right to destroy the oceans, especially those over which they have no territorial rights. This is the strict application of international law". The decision by The Metals Company, a Canadian company, to abandon the ISA, multilateralism and Nauru and towards a United States unilateral approach give the appearance of forum shopping by the company.
- **Unnecessary:** The principal metals in polymetallic nodules are copper, cobalt, manganese, and nickel. Rare earth minerals present in nodules are not economically recoverable. China's dominance in the cobalt and nickel markets is due not to accessing minerals from China, but from the Congo and Indonesia respectively, and due to China processing the raw materials. It is a fallacy that deep-sea mining will change this equation significantly. Should deep-sea mining start, it would simply open another source of metals in addition to terrestrial mining, and various countries would continue to dominate metal markets.
- It would be far more strategically beneficial to stockpile minerals like cobalt and nickel than to mine the deep seabed.
- It is also a fallacy that deep-sea metals are needed for the energy sector and automotive batteries, another false narrative propounded by the would-be deep-sea mining industry. Already growing amounts of lithium-ion batteries in electric vehicles have no cobalt and nickel, relying instead on lithium iron phosphate (LFP) technology. Worldwide some 40% of EV batteries were LFP. Since Feb 2021, even though electric vehicle production is up 5 times. Deep sea mining (DSM)-related metals prices are down or flat.[3]

[3] From 12/31/20 to end-2024, EV production increased from 3.3 million vehicles to 13.3 million (+403%). And yet, cobalt prices have declined dramatically. Source: S&P Global Mobility Forecasts. From 12/31/20 to end-2024, EV production increased from 3.3 million vehicles to 13.3 million (+403%). And yet, nickel prices have declined significantly. Source: S&P Global Mobility Forecasts. From 12/31/20 to end-2024, EV production increased from

- **The comparison with terrestrial mining is false:** There are no academic studies that prove DSM will reduce terrestrial mining of metals in rainforests. Terrestrial mining would continue even if deep-sea mining begins. Damage to biodiversity on land cannot be compared to damage to biodiversity from deep-sea mining, which is currently unknown. TMC's own report[4] states that a comparison of the impacts on species and biodiversity from deep-sea mining versus terrestrial mining can't be done.[5] It would be far more strategically beneficial to stockpile minerals like cobalt and nickel than to mine the deep seabed.
- **Legal uncertainties abound:** No recognised legal title would be granted to a company which mined under a unilateral regime outside UNCLOS. Further, the ability of TMC to actually be able to mine is in considerable doubt, as its mining would need to be carried out by its partner Allseas, which is a Swiss-based company subject to compliance with UNCLOS. The Law of the Sea Convention could hardly be clearer: "All rights in the resources of the Area are vested in mankind as a whole on whose behalf the Authority shall act. These resources are not subject to alienation. The minerals recovered from the Area, however, may only be alienated in accordance with this Part and the rules, regulations and procedures of the Authority.*"*[6]
- **Deep-sea mining technology risks are underestimated:** DSM equipment would operate at freezing temperatures, 4,000+ pounds per square inch, at 5000 metres depth, surrounded by silt, and operating for extended periods of time. No full scale mining has occurred, and even The Metals Company has only done pilot test mining at one fifth the scale of a full commercial operation.

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[4] The Metals Company: Life Cycle Analysis: Where Should Metals for the Green Transition Come From? Comparing Environmental, Social, and Economic Impacts of Supplying Base Metals from Land Ores and Seafloor Polymetallic Nodules.

[5] The report states that: "Biodiversity is acknowledged in the paper as the most significant impact of nodule collection and is treated qualitatively in the paper. Because biodiversity impacts are treated qualitatively, it is difficult to say with certainty that biodiversity and species impacts from deep-sea nodule collection would be less significant than those observed and measured on land." TMC's own financial filings repeat this: '"it may also not be possible to definitively say whether the impact of nodule collection on global biodiversity will be less significant than those estimated for land-based mining." Annual Report for 2021 Form 10-K, p 41-2.

[6] Article 137 UNCLOS: Legal status of the Area and its resources

1. No State shall claim or exercise sovereignty or sovereign rights over any part of the Area or its resources, nor shall any State or natural or juridical person appropriate any part thereof. No such claim or exercise of sovereignty or sovereign rights nor such appropriation shall be recognized.

2. All rights in the resources of the Area are vested in mankind as a whole on whose behalf the Authority shall act. These resources are not subject to alienation. The minerals recovered from the Area, however, may only be alienated in accordance with this Part and the rules, regulations and procedures of the Authority.

3. No State or natural or juridical person shall claim, acquire or exercise rights with respect to the minerals recovered from the Area except in accordance with this Part. Otherwise, no such claim, acquisition or exercise of such rights shall be recognized.

- **What needs to happen now:** The geopolitical risks for U.S. security and maritime interests, combined with the lack of financial viability and absence of a workable business case for the deep sea mining industry, means deep sea mining is not in the interests of the U.S. Supporting deep sea mining will open a can of worms for the U.S. and is highly unlikely to lead to commercial operations at scale. There are far better home-grown industries with a proven track record of success to support and prioritize to deal with critical minerals than an industry already beset with problems and a poor future outlook.

Deep Sea Mining: Technological & Logistically Challenged

- No entity has ever mined the seafloor in commercially-viable quantities on a sustained basis. A priori, it is therefore unproven. TMC has executed a single pilot lifting project, which yielded 3,000 tons of nodules in 2021. Their own reporting cited collecting just 14 tons in one hour in 2021.[7] Thus, their pilot run was executed at just 12% of the rate they projected for their collectors at full production rates. So deep-sea mining is unproven at scale and will undoubtedly face technical challenges running continuously in extremely hostile conditions, including high pressure, near freezing temperatures, high salinity and turbidity caused by vehicle operations.
- Norway, which has a highly developed offshore industry for oil & gas extraction, has attempted to start deep-sea mining within its seabed but has been beset by problems and has been unable to support the start of deep sea mining to date. Initial announcements of government support for deep sea mining were met with vocal opposition from the fishing industry and multi-sector stakeholders. The Norwegian government's decision to open up an expansive area equivalent to the size of Italy for deep-sea mining was met with strong political rebuke from key Norwegian political allies in Europe. The government then faced a legal challenge, reputational damage in international media and had to ultimately stop the first licensing round for at least the whole of 2025 in political negotiations to pass its budget through parliament. The frontrunner Norwegian company, which had claimed it could become the biggest deep sea miner in the world, has since entered into bankruptcy proceedings. This cautionary tale from one of the US's allies highlights the unforeseen risks, political pitfalls and financial weaknesses associated with deep-sea mining.

The Metals In Question

Deep sea mining would primarily target three types of mineral deposits - polymetallic nodules, ferromanganese crusts, and polymetallic sulfides. Of these, polymetallic nodules, found on deep abyssal plains, are the deposits of greatest economic interest because of their cobalt, nickel, and copper content. They also contain manganese but the value of manganese is much lower than the other three metals. These nodules are also the primary hard substrate in their ecosystem, on which up to half of the metazoan species - the more complex animals - rely on. They also take millions of years to form and are not a 'sustainable' source of metals - they will not regrow. There is no need and no credible argument to engage in destructive deep-sea mining. Instead, the

[7] https://investors.metals.co/news-releases/news-release-details/tmc-and-allseas-achieve-historic-milestone-nodules-collected

sustainable response to minerals needs lies in innovation in battery technology; circular economy strategies including increased recovery, recycling, repurposing, remanufacturing, refurbishing, repairing, reusing, and reducing capacities; and the continued extraction of metals from terrestrial sources under greatly improved environmental and social governance frameworks.[8]

- Of the four metals in polymetallic nodules, manganese is relatively low value per kilogram, and terrestrial mines are far more cost-effective to mine these elements than doing so through deep sea mining. Polymetallic nodules are really all about nickel, copper, and cobalt; the latter is experiencing an oversupply that some are saying may persist for a number of years. This is because cobalt is largely a byproduct of mining copper in the DRC. DRC has increased copper production in recent years leading to an increase in the production of cobalt.
- Although manganese, cobalt, and nickel are in the 2022 US Critical Minerals list, and cobalt, copper, and nickel make the 2023 US Critical Materials for Energy list, much of the focus on criticality is focused on rare earth elements (REEs), which is where China has the greatest market dominance, both in terms of mining and processing.[9] Polymetallic nodules contain small traces of some REEs but REEs are not considered economically recoverable from nodules.
- The ISA expects approximately 3 million tons (MT) dry weight of nodules to be mined each year under each contract or mining license issued by the ISA. This is the figure upon which the estimates of the economic value of mining the nodules and the royalty payments that would accrue to the ISA are based. At this rate[10], each nodule mine would stripmine an estimated 10,000-12,000 square kilometers (km^2) equivalent to approximately 4,000-4,500 square miles of seabed over 30-year license period to mine 3MT/year of nodules. Scientists estimate that sediment plumes detrimental to life on the seabed generated by the mining could 'easily' cover another 20,000 - 30,000 $km.^2$ The mining operation itself would only produce approximately 0.14% (30-35K tons) of the copper, approximately 1.1% (30-35K tons) of the nickel and approximately 3.2% (5-6K tons) of cobalt per year over and above terrestrially mined supplies in 2022. Given the large increases in terrestrial mined production of nickel and cobalt over the past two years, the contribution to world metals supplies would be substantially lower today.[11]

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[8] https://deep-sea-conservation.org/wp-content/uploads/2024/02/DSCC_FactSheet8_DSM_minerals_4pp_OCT_23.pdf.pdf

[9] https://www.energy.gov/sites/default/files/2023-05/2023-critical-materials-assessment.pdf; https://www.federalregister.gov/documents/2022/02/24/2022-04027/2022-final-list-of-critical-minerals; https://www.bbc.co.uk/news/articles/c1drqeev36qo

[10] Gianni, Matthew "Deep-sea mining and the International Seabed Authority: science and the current state of play from a conservation perspective" IES-iAtlantic webinar "Examining the Environmental Impacts of Deep-sea Mining" (2024)

https://www.the-ies.org/sites/default/files/documents/giannim_presentation_iatlanic_ies_uk_webinar_31_jan2023_1.pdf

[11] Gianni, Matthew "Deep-sea mining and the International Seabed Authority: science and the current state of play from a conservation perspective" IES-iAtlantic webinar "Examining the Environmental Impacts of Deep-sea Mining" (2024)

- Although EV manufacturers will still use cobalt and nickel for batteries and other products in the near future, the issue is whether or not developing and executing this very expensive, untested, and minor additional production capability is worth the billions of dollars of investment per nodule mining operation to make it happen. And that is before assessing the potential severe environmental damage that would be done.
- There have been significant changes in battery chemistry during 2020-2024 and almost all of them do not involve use of high priced metals such as cobalt or nickel. Those technologies include lithium iron phosphate, solid-state lithium sodium, and iodium-ion batteries.[12]
- If the processing facilities are in the U.S., the facility could source ore worldwide, just as China does. China has a primary position in the world supply of many critical metals through processing rather than mining. The U.S. is already seeking a deal with the Democratic Republic of Congo, where China sources significant supplies of its cobalt and copper, and has been seeking a critical minerals deal with Indonesia and the Philippines to access nickel.[13] The President has also enacted an Executive Order focussed on increasing domestic mining and processing of minerals, negating the need for expanding deep sea mining.[14]
- The sustainable response to pressures on the use of minerals lies in a transformational and circular economy. By adopting circular economy principles, resources are used more efficiently, waste is minimized, and materials are kept in use for as long as possible, reducing reliance on new mineral extraction and mitigating environmental impact.[15] Even the defence sector is recognising the security value of circular economy principles.[16]

Other Financial Considerations

Aside from the demand-side arguments on metals above, there are a number of other financial concerns which include:

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https://www.the-ies.org/sites/default/files/documents/giannim_presentation_iatlanic_ies_uk_webinar_31_jan2023_1.pdf

[12] Goldman Sachs has projected that LFP batteries will capture 45% market share in 2026. NCM batteries will go from 73% in 2019 to just 37% in 2026 – its market share will have declined by half in just 7 years.

[13] https://www.bbc.co.uk/news/articles/cp34140qkw0o; https://www.reuters.com/markets/commodities/us-approaches-indonesia-multinational-critical-mineral-partnership-2024-07-15/

[14] EO for Immediate Measures to Increase American Mineral Production https://www.whitehouse.gov/presidential-actions/2025/03/immediate-measures-to-increase-american-mineral-production/ with implementation - https://www.whitehouse.gov/articles/2025/04/trump-administration-advances-first-wave-of-critical-mineral-production-projects/

[15] Sunil Luthra, Sachin Kumar Mangla, Joseph Sarkis, Ming-Lang Tseng,

Resources melioration and the circular economy: Sustainability potentials for mineral, mining and extraction sector in emerging economies, Resources Policy, Volume 77, 2022. At https://www.sciencedirect.com/science/article/abs/pii/S0301420722001015.

United Nations Environment Programme (2024): Global Resources Outlook 2024: Bend the Trend – Pathways to a liveable planet as resource use spikes. International Resource Panel. Nairobi.

https://wedocs.unep.org/20.500.11822/44901

[16] https://www.circularinnovationlab.com/post/sustainability-and-security-a-new-battlefield-for-the-defence-sector

- As befits the experimental nature of the industry, the main companies who are pursuing deep-sea mining are small, speculative junior companies.[17] One of the key proponents of deep sea mining, The Metals Company, only had $3.5 million in the bank at the end of 2024 and access to a potential $41.5 million loans including one offered by its main investors. Commentators have pointed to their precarious financial position.[18] There are currently multiple SEC investigations and lawsuits directed at TMC, largely about allegedly misleading investors. The precursor to TMC, Nautilus Minerals, filed for bankruptcy in early 2019, leaving Papua New Guinea in over $100 million USD of debt due to the failed venture. The current owner of the United Kingdom's licence holder UK Seabed Resources filed for bankruptcy this April.[19]
- Several major companies including Apple, Google, Microsoft, Phillips, BMW, Volvo, and SalesForce support a moratorium on deep-sea mining and/or are committed to not sourcing or allowing minerals mined from the seabed in their supply chains.[20] This calls into question whether the products of deep sea mining can be easily sold. There are also potential problems with investment and insurers given a significant number of potential major banks and asset managers, including major insurers have rejected deep sea mining.[21] These include two of the three biggest re-insurers in the world, Hannover Re and Swiss Re, significantly increasing the potential costs of reinsurance for the deep sea mining industry.
- Irreversible damage is almost certainly imposed on the delicate habitats and life in the deep sea. Some of the world's most important fisheries will increasingly overlap with deep-sea mining operations as, for example, tuna's range shifts due to warming waters.[22] The cost of managing such damages is likely to be astronomical. For instance, it is estimated that US$5.3–5.7 million would have to be spent per km^2 to replace the polymetallic nodules with artificial clay nodules in an attempt to restore the biota lost, with no guarantee of success, and it is estimated that the cost of restoring 30% of deep sea mining concessions in international waters would likely far exceed the entire global defense budget.[23]
- The Executive Order Unleashing America's Offshore Critical Minerals and Resources calls for an exploration of "the feasibility of an international benefit-sharing mechanism for seabed mineral resource extraction and development that occurs in areas beyond the

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[17] https://dsm-campaign.org/wp-content/uploads/2023/12/2023-082-Mapping-of-DSM-companies-ordered-by-pure-play.xls

[18] https://seekingalpha.com/article/4776255-the-metals-company-these-are-not-the-metals-trump-is-looking-for; https://www.bairdmaritime.com/offshore/undersea-mining/column-the-metals-company-goes-full-maga-subsea-miner-tilts-to-trump-as-international-waters-threaten-to-become-the-new-wild-west-offshore-accounts

[19] https://www.mining.com/nautilus-minerals-officially-sinks-shares-still-trading/; https://www.greenpeace.org.uk/news/greenpeace-accuse-uk-government-of-losing-control-of-deep-sea-mining-exploration-licences-as-parent-company-goes-bust/

[20] https://www.stopdeepseabedmining.org/endorsers/

[21] https://dsm-campaign.org/wp-content/uploads/2025/02/250203_FI-DSM-policies_table.pdf

[22] Amon, D. J. et al. Climate change to drive increasing overlap between Pacific tuna fisheries and emerging deep-sea mining industry. Ocean Sustain. 2, 9 (2023), https://www.nature.com/articles/s44183-023-00016-8

[23] https://planet-tracker.org/report/the-sky-high-cost-of-deep-sea-mining/

national jurisdiction of any country."[24] This acknowledges (1) that the Area is beyond national jurisdiction (including that of the US) and (2) that there should be some form of international benefit sharing (compensation) involved with mining in international waters - which is a manifestation of the common heritage of humankind principle.

The Science of Deep Sea Mining

Deep-sea mining impacts[25] include the removal of biodiversity and habitat, as well as the creation of mid-water (aka discharge, dewatering) plumes, seafloor (aka benthic) plumes, noise and light.

Managing and mitigating these impacts is very challenging given that scientific knowledge and understanding of the deep sea is very limited, and in particular in those regions where deep-sea mining may take place. It is far from adequate to be able to understand the current state of the marine environment, with many fundamental ecological questions (e.g. related to levels of biodiversity, species ranges, connectivity among populations and habitats) remaining unanswered, let alone to assess and manage the full effects of deep-sea mining at up to 6 km deep.[26] This is exemplified by a recent scientific study, published in Current Biology in May 2023, which revealed that there are more than 5,000 species in the Clarion-Clipperton Zone, 88-92% of which are undescribed and with thousands more not yet discovered.[27]

Mid-water plumes: Plumes of wastewater, sediment, and residual metals discharged from ships during mining - expected to be discharged into 1,200-2,000 metre depths from most proposed mining methods - would flow hundreds of kilometers away from the mining sites. These plumes could impact ocean ecosystems at various depths. This would affect thousands of meters of the water column from the seabed to the surface. The plume could disrupt the feeding, breathing, communication and buoyancy of inhabiting species, including commercially-important species and their prey, as well as whales and other animals that use sound or light to communicate and find prey in the ocean's depths [28]. Additionally, the mid-water plume is expected to contain elevated concentrations of toxic metals, which could be incorporated into deep-sea food webs and enter our seafood supply through tuna and other economically important species [29]. Even if there were only low risks from toxic accumulation, this could still provoke a negative consumer

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[24] https://www.whitehouse.gov/presidential-actions/2025/04/unleashing-americas-offshore-critical-minerals-and-resources/

[25] https://deep-sea-conservation.org/wp-content/uploads/2023/02/DSCC_FactSheet1_DSM_intro_4pp_OCT_23.pdf-2.pdf, https://deep-sea-conservation.org/wp-content/uploads/2024/02/DSCC_FactSheet2_DSM_science_4pp_OCT_23.pdf.pdf

[26] Amon, D., et al. (2022). Assessment of scientific gaps related to the effective environmental management of deep-seabed mining. Marine Policy, 138. https://doi.org/10.1016/j.marpol.2022.105006.

[27] Rabone, M., et al. (2023). How many metazoan species live in the world's largest mineral exploration region. Current Biology, 33 (12). https://doi.org/10.1016/j.cub.2023.04.052.

[28] Martin, C., et al. 2021. Deep-Sea Mining: A noisy affair. OceanCare. https://www.oceancare.org/wp-content/uploads/2021/12/Deep-Sea-Mining_A-noisy-affair_Report-OceanCare_2021.pdf.

[29] Drazen, J., et al. (2019). Report of the workshop: Evaluating the nature of midwater mining plumes and their potential effects on midwater ecosystems. Research Ideas and Outcomes, 5, p.e33527. House of Commons Environmental Audit Committee (17 January 2019). Sustainable Seas, Fourteenth Report of Session 2017–19. Available at: https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/980/98 0.pdf

reaction. Many commercially-important species are highly migratory, such as tuna, and any contamination of fishes through the food chain could percolate through the wider stock distribution.

Benthic plumes and Sediment disruption: In the deep abyssal plains, such as the Clarion-Clipperton Zone, mining will stir up sediment that has lain on the seabed for thousands and millions of years. The sediment plumes could drift from the actual mining sites themselves, potentially smothering or killing filter feeders and other deep-sea species, which are slow moving or sedentary[3031].

Removal of Nodules: More than 50% of deep-sea megafaunal species, such as corals and sponges, in the Clarion-Clipperton Zone depend on nodules as an attachment surface, anchor, or shelter.[32] Without the presence of nodules, recolonisation of a significant portion of the inhabiting fauna will not be possible.[33] For example, "Due to the slow growth rates of nodules (ca. 10 mm/My) and overall very low sedimentation rates, short-term recovery is unlikely; the nodules and nodule dependent fauna may take millions of years to recover, and even the partial recovery of the motile sediment-dwelling fauna may take hundreds to thousands of years".[34] As such, severe and likely irreversible effects of mining activities on seafloor communities will occur.

Noise and light pollution: Mining noise could be extensive and affect thousands of meters of the water column from the seabed to the surface. This could cause impacts on marine life including on commercially important species and their prey, as well as deep-diving whales that use noise and echolocation to communicate and find prey in the ocean's depths.[35]

Dark oxygen: Recent peer-reviewed research suggests that polymetallic nodules on the seafloor of the Clarion-Clipperton Zone may have a role in generating oxygen, perhaps by splitting seawater through electrolysis. This discovery challenges the long-held belief that all oxygen production on Earth relies on photosynthesis.[36] The environmental effects of dark oxygen are as yet unknown, but this discovery is another reminder of how little scientific understanding there is of deep-sea ecosystems.

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[30] Drazen, J., et al. 2020. Midwater ecosystems must be considered when evaluating environmental risks of deep-sea mining. PNAS, 117(30), 17455-17460. https://doi.org/10.1073/pnas.2011914117.

[31] Simon-Lledó, et al. (2023). Carbonate compensation depth drives abyssal biogeography in the northeast Pacific. Nature Ecology & Evolution; doi:10.1038/s41559-023-02122-9. See paper for more methodological details

[32] Uhlenkott, K., Simon-Lledó, E., Vink, A. et al. Investigating the benthic megafauna in the eastern Clarion Clipperton Fracture Zone (north-east Pacific) based on distribution models predicted with random forest. Sci Rep 12, 8229 (2022). https://doi.org/10.1038/s41598-022-12323-0

[33] Simon-Lledó, E., Bett, B.J., Huvenne, V.A.I. et al. Biological effects 26 years after simulated deep-sea mining. Sci Rep 9, 8040 (2019). https://doi.org/10.1038/s41598-019-44492-w

[34] Kaiser, S., Smith, C.R. & Arbizu, P.M. Editorial: Biodiversity of the Clarion Clipperton Fracture Zone. Mar Biodiv 47, 259–264 (2017). https://doi.org/10.1007/s12526-017-0733-0

[35] Williams, R., et al. 2022. Noise from deep-sea mining may span vast ocean areas. Science, 377(6602), 157-158. https://doi.org/10.1126/science.abo2804.

[36] Sweetman, A.K., Smith, A.J., de Jonge, D.S.W. et al. Evidence of dark oxygen production at the abyssal seafloor. Nat. Geosci. 17, 737–739 (2024). https://doi.org/10.1038/s41561-024-01480-8

Loss of current and future ecosystem services: Deep-sea mining risks the loss of many ecosystem services, which we benefit from. These include fisheries, climate regulation via the sequestering of carbon, and potential marine genetic resources that could be derived from these species and used for biotechnological or medical advancements.

Opposition to Deep Sea Mining in the United States & Around the World

There are now 32 countries, many of which are U.S. allies, that support a pause, moratorium or ban on deep-sea mining. In addition to countries, over 900 scientists and policy experts, Indigenous communities from around the world, and many companies and financial institutions, also oppose deep-sea mining. This is not a position held by a small group of environmentalists, but by major players in international business, finance, and politics. This opposition is also not constrained to the international community, but is within the U.S. as well.

Nearly all Pacific U.S. States and Territories, including California[37], Washington[38], Oregon[39], Hawai'i[40], American Samoa[41], and Guam[42] have either prohibited, banned, or restricted deep sea mining in their state or territorial waters. These legislative decisions were made based on concerns surrounding environmental damage, negative impacts on the fishing industry and other maritime industries, and the need to protect the ocean for all people who rely on it. The International Seabed Authority currently is discussing the issue of cultural concerns of Indigenous Peoples under a working group on Intangible Cultural Underwater Heritage.

Such State and Territory opposition to deep-sea mining increases the likelihood of legal action if permits are granted for mining in or adjacent to waters protected by this or other legislation. Moreover, if the fishing industry operating in waters near Hawai'i or American Samoa, for example, is impacted by DSM, there is further risk for industry push back, protest from indigenous Hawaiian people, litigation, and financial damages.

[37] The Seabed Mining Prevention Act (AB 1832)

[38] SB 5145 - 2021-22 - Concerning the prevention of seabed mining of hard minerals.

[39] Ocean Resources Management Act of 1987/1991 (ORS 196.405 to 196.583)

[40] Hawaii Seabed Mining Prevention Act - SB2575

[41] See July 2024 executive order from Governor Lemanu Peleti Mauga

[42] Resolution 210-36 asserting a moratorium on deep sea mining

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