HOUSE COMMITTEE ON
NATURAL RESOURCES
CHAIRMAN BRUCE WESTERMAN

To: House Committee on Natural Resources Republican Members
From: Subcommittee on Oversight and Investigations Staff,
Michelle Lane (Michelle.Lane@mail.house.gov) x6-4137 and Lucas Drill (Lucas.Drill@mail.house.gov) x5-0500
Date: April 28, 2025
Subject: Oversight Hearing titled *"Exploring the Potential of Deep-Sea Mining to Expand American Mineral Production*"

The Subcommittee on Oversight and Investigations will hold an oversight hearing titled "*Exploring the Potential of Deep-Sea Mining to Expand American Mineral Production*" on **Tuesday, April 29, 2025, at 10:15 a.m. in 1324 Longworth House Office Building**.

Member offices are requested to notify Jace McNaught (Jace.McNaught@mail.house.gov) by 4:30 p.m. on April 28, if their Member intends to participate in the hearing.

I. KEY MESSAGES

- Minerals, particularly critical minerals, are essential to contemporary life. The House Committee on Natural Resources Majority has repeatedly emphasized the importance of critical minerals and securing American mineral supply chains.

- Republican Members of Congress and the Trump Administration have championed an all-of-the-above approach to mineral exploration and extraction to counter longstanding foreign influence, particularly by China, and secure domestic mineral supply chains.

- The sea floor is lined with critical and other hardrock minerals, often found in the form of polymetallic nodules, which are similar in size to golf balls. While the technology and research to mine in the deep-sea has existed for decades, global supply chains, increased reliance on adversarial foreign nations for critical minerals, and an uptick in general demand for these minerals have increased interest in deep-sea mining.

- American seabed mining companies are leading the global race to explore deep-sea mineral deposits and develop technology enabling efficient mineral harvesting from the sea floor.

- Now is the time to reform permitting processes to unleash crucial terrestrial mining projects and embolden seabed mining operations, which together will secure American mineral supply chains.

II. WITNESSES

- **Mr. Gerard Barron**, CEO and Chairman, The Metals Company and The Metals Company USA, Raleigh, NC
- **Mr. Oliver Gunasekara**, CEO and Co-Founder, Impossible Metals, San Jose, CA
- **Dr. Thomas Peacock**, Professor of Mechanical Engineering and Director, Environmental Dynamics Laboratory, Massachusetts Institute of Technology, Cambridge, MA
- **Mr. Duncan Currie**, Legal Advisor, Deep Sea Conservation Coalition, Christchurch, New Zealand (*Minority witness*)

III. BACKGROUND

Minerals are Essential to Contemporary Life

An assortment of critical minerals.[1]

Minerals, particularly those identified by the U.S. Department of the Interior's (DOI) U.S. Geological Survey (USGS) as critical to America's national security, economy, or energy infrastructure, are essential to contemporary life. The House Committee on Natural Resources has repeatedly emphasized the importance of minerals and securing American mineral supply chains.[2] The Committee has highlighted the countless applications of hardrock minerals and the exponentially rising global mineral demand. In addition, the Committee continues to speak to the rapidly increasing difficulty of meeting mineral demand due to permitting delays, legislative restrictions, and America's near-total mineral dependence on foreign nations like China.[3]

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[1] *Critical Minerals*, Stanford University (2025), https://epsci.stanford.edu/critical-minerals.

[2] *See, e.g.*, *Now Ore Never: The Importance of Domestic Mining for U.S. National Security*, Oversight Hearing before the Subcomm. on Energy and Mineral Resources of the H. Comm. on Natural Resources, 119th Cong. (Feb. 6, 2025) (hearing memorandum), https://naturalresources.house.gov/uploadedfiles/hhrg-119-ii06-20250206-sd002.pdf; *Contrasting Momentum in the Space Mining Economy to the Terrestrial Mining Regulatory Morass*, Oversight Hearing before the Subcomm. on Oversight and Investigations of the H. Comm. on Natural Resources, 119th Cong. (Feb. 25, 2025) (hearing memorandum), https://naturalresources.house.gov/uploadedfiles/hearing_memo_--_sub_on_oi_ov_hrg_on_space_mining_02.25.25.pdf; *Unleashing the Golden Age of American Energy Dominance*, Oversight Hearing before the Subcomm. on Oversight and Investigations of the H. Comm. on Natural Resources, 119th Cong. (Apr. 2, 2025) (hearing memorandum), https://naturalresources.house.gov/uploadedfiles/hearing_memo_--_sub_on_oi_ov_hrg_on_energy_dominance_04.02.25.pdf.

[3] *See Id*. (referring to all three previously cited Committee hearing memoranda). *See also*, Climate Smart Mining Facility, *Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition*, THE WORLD BANK (2020), https://pubdocs.worldbank.org/en/961711588875536384/Minerals-for-Climate-Action-The-Mineral-Intensity-of-the-Clean-Energy-Transition.pdf; James Marshall, *Insufficient minerals threaten energy transition —report*, E&E NEWS (May 5, 2021),

Spurred by this battered current state of domestic mineral supply chains,[4] Republican Members of Congress[5] and the Trump Administration[6] have championed an all-of-the-above approach to mineral exploration and extraction policy, which includes not only streamlining permitting for terrestrial mining projects and encouraging American companies to continue investing in space mining technologies,[7] but also diving deep to harvest minerals lining the sea floor.

Recognizing this need, on April 24, 2025, President Trump issued an Executive Order, Unleashing America's Offshore Critical Minerals and Resources, that made clear that the United States must immediately "accelerate the responsible development of seabed mineral resources," invest in deep sea mapping and technology to "quantify the Nation's endowment of seabed minerals," and "ensure secure supply chains for our defense, infrastructure, and energy sectors" through seabed mining.[8]

Seabed Mining

Seabed mining is the process of "extracting sediment and mineral resources from the seafloor."[9] These mineral resources prominently include three types of deposits:

The first, polymetallic nodules, typically exist on abyssal plains, look like potato-shaped rocks, and contain cobalt, copper, manganese, nickel, and other metallic rare earth elements (REEs) that are essential to the production of batteries, electronics, and steel.[10] The nodules develop over millions of years as minerals create thin concentric layers around small hard fragments like shells

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https://www.eenews.net/greenwire/stories/1063731805; Wilson Center, Duncan Wood, *et al.*, *The Mosaic Approach: a Multidimensional Strategy for Strengthening America's Critical Minerals Supply Chain,* https://www.wilsoncenter.org/sites/default/files/media/uploads/documents/critical_minerals_supply_report.pdf; Bonakdarpour et al., *Mine development times: The US in perspective,* S&P Global (June 2024), https://cdn.ihsmarkit.com/www/pdf/0724/SPGlobal_NMA_DevelopmentTimesUSinPerspective_June_2024.pdf; *Mineral Commodity Summaries 2024*, USGS, https://pubs.usgs.gov/periodicals/mcs2024/mcs2024.pdf; Ernest Scheyder, *China set to control rare earth supply for years due to processing dominance*, REUTERS (May 29, 2019), https://www.reuters.com/article/us-china-usa-rareearth-refining/china-set-to-control-rare-earth-supply-for-years-due-to-processing-dominance-idUSKCN1T004J.

[4] For example, China has repeatedly restricted or banned exports of critical and other hardrock minerals to the United States. Earlier this month, China imposed new export restrictions on minerals crucial to U.S. defense, energy, and automotive industries. *See, e.g.*, Gracelin Baskaran and Meredith Schwartz, *The Consequences of China's New Rare Earths Export Restrictions*, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES (Apr. 14, 2025), https://www.csis.org/analysis/consequences-chinas-new-rare-earths-export-restrictions.

[5] *See, e.g.*, Caitlin Keating-Bitonti and Jared G. Tupuola, *Seabed Mining Interests Across the Pacific Islands*, CONG. RESEARCH SERVICE (Apr. 17, 2025), https://www.crs.gov/Reports/IF12974.

[6] *See, e.g.*, *Unleashing America's Offshore Critical Minerals and Resources*, THE WHITE HOUSE (Apr. 24, 2025), https://www.whitehouse.gov/presidential-actions/2025/04/unleashing-americas-offshore-critical-minerals-and-resources/; *Immediate Measures to Increase American Mineral Production*, THE WHITE HOUSE (Mar. 20, 2025), https://www.whitehouse.gov/presidential-actions/2025/03/immediate-measures-to-increase-american-mineral-production/; *Ensuring National Security and Economic Resilience Through Section 232 Actions on Processed Critical Minerals and Derivative Products*, THE WHITE HOUSE (Apr. 15, 2025), https://www.whitehouse.gov/presidential-actions/2025/04/ensuring-national-security-and-economic-resilience-through-section-232-actions-on-processed-critical-minerals-and-derivative-products/; *Trump Administration Advances First Wave of Critical Mineral Production Projects*, THE WHITE HOUSE (Apr. 18, 2025), https://www.whitehouse.gov/articles/2025/04/trump-administration-advances-first-wave-of-critical-mineral-production-projects/.

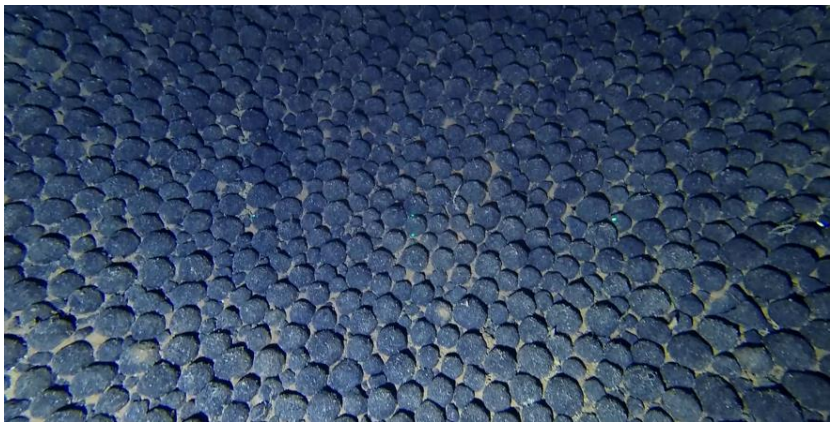
[7] *See Contrasting Momentum in the Space Mining Economy to the Terrestrial Mining Regulatory Morass*, Oversight Hearing before the Subcomm. on Oversight and Investigations of the H. Comm. on Natural Resources, 119th Cong. (Feb. 25, 2025) (hearing memorandum), https://naturalresources.house.gov/uploadedfiles/hearing_memo_--_sub_on_oi_ov_hrg_on_space_mining_02.25.25.pdf.

[8] *Unleashing America's Offshore Critical Minerals and Resources*, THE WHITE HOUSE (Apr. 24, 2025), https://www.whitehouse.gov/presidential-actions/2025/04/unleashing-americas-offshore-critical-minerals-and-resources/.

[9] Caitlin Keating-Bitonti, *Seabed Mining in Areas Beyond National Jurisdiction: Issues for Congress*, CONG. RESEARCH SERVICE (Nov. 22, 2024), https://www.crs.gov/Reports/R47324.

[10] *Id.*

or shark teeth.[11] The nodules can vary greatly in size, from about 2 to 20 centimeters, and are estimated to exist worldwide in numbers as abundant as 210 trillion dry tons.[12]



Polymetallic nodules, each containing multiple valuable, including critical, minerals are seen here covering the sea floor in the Pacific Ocean.[13]

Polymetallic nodules are the most prominent form of seabed minerals targeted for extraction, with several methods for harvesting having been proposed. These include:

1. A "remotely operated collector vehicle fitted with caterpillar-like tracks that uses a water stream aimed at nodules laying on the seafloor to create a pressure drop and suction effect to lift sediment with nodules into a collector system."[14] This method functions as a vacuum-like system for harvesting polymetallic nodules.

2. An "autonomous underwater vehicle that hovers over the seafloor and uses robotic arms with a vision system to pick individual nodules from the seafloor."[15] This method is empowered by artificial intelligence to avoid picking up objects other than nodules.[16]

Nodules were discovered as early as the 1870s during the HMS Challenger expedition,[17] but extraction and processing methods were not adequately explored until the 1970s.[18]

The second type of deposit, polymetallic sulfides, is usually found on sea ridges and "precipitate from hydrothermal fluids at hydrothermal vent sites."[19] These sulfides often contain copper,

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[11] *Id.*
[12] *Id.*; see also Phillip Gales, *How Polymetallic Nodules Form*, DEEP SEA MINING, https://deepseamining.ac/how_polymetallic_nodules_form#gsc.tab=0.
[13] *Seven Hundred Trillion Reasons: The Unseen Scale of Cook Islands' Seabed Resources*, COOK ISLANDS SEABED MINERALS AUTHORITY (Aug. 24, 2024), https://www.sbma.gov.ck/news-3/article-148.
[14] Caitlin Keating-Bitonti, *Seabed Mining in Areas Beyond National Jurisdiction: Issues for Congress*, CONG. RESEARCH SERVICE (Nov. 22, 2024), https://www.crs.gov/Reports/R47324.
[15] *Id.*
[16] *Id.*
[17] Shane Scarminach, *Diving into the History of Seabed Mining*, EDGE EFFECTS (Oct. 12, 2019), https://edgeeffects.net/seabed-mining/.
[18] Rifat Jabbar et al., *Polymetallic Nodules and the Critical Minerals Supply Chain: A North American Approach*, WILSON CENTER (Mar. 6, 2024), http://wilsoncenter.org/sites/default/files/media/uploads/documents/Polymetallic%20Nodules%20and%20The%20Critical%20Minerals%20Supply%20Chain.pdf.
[19] Caitlin Keating-Bitonti, *Seabed Mining in Areas Beyond National Jurisdiction: Issues for Congress*, CONG. RESEARCH SERVICE (Nov. 22, 2024), https://www.crs.gov/Reports/R47324.

gold, iron, lead, silver, and zinc.[20] To mine sulfides, a "[r]emotely operated mining machine that cuts and/or drills into the hard substrate of the hydrothermal vent chimney to extract internal minerals" is required.[21]

The third, ferromanganese or cobalt-rich crusts, are typically found across ocean basins and shallower exclusive economic zones (EEZs) in volcanically active regions.[22] These crusts form on hard surfaces like rocks "from seawater rich in dissolved metals," and contain cobalt, manganese, nickel, platinum, and other metallic REEs.[23] To mine crusts, a "[r]emotely operated mining machine that scrapes across the surfaces of geologic features to remove surficial mineral crusts" is most effective.[24]

Two other types of mineral deposits, placers (heavy mineral sands) and phosphorites (sedimentary rocks), both occur in shallow waters close to shore. They contain relatively low concentrations of minerals and are, therefore, of little interest to commercial seabed mining operations.[25] Additionally, seabed mining techniques have been historically used to extract diamonds from the waters of South Africa and Namibia.[26]

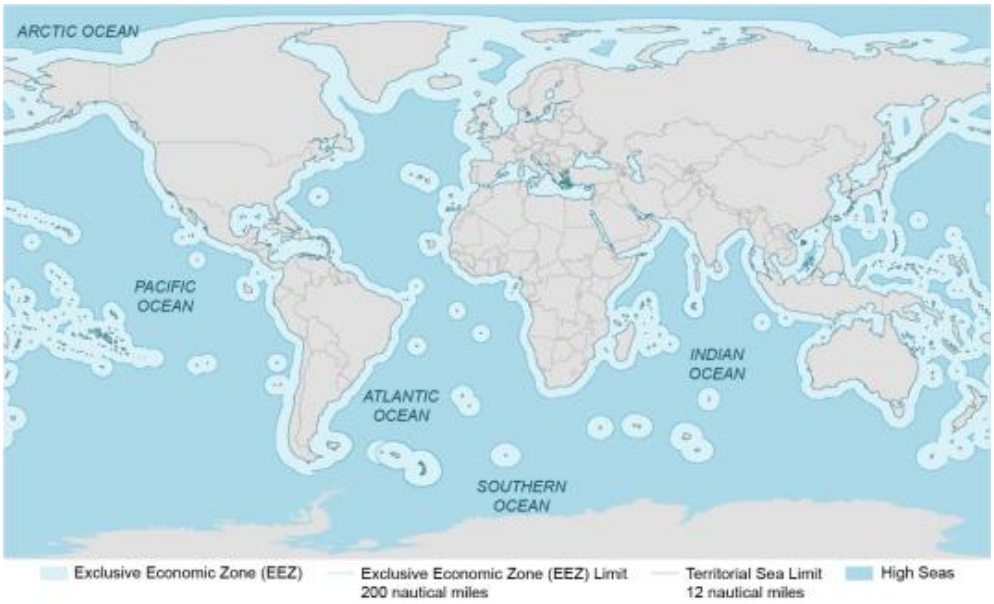

Illustration of ABNJ and EEZs of the world.[27]

[20] *Id.*
[21] *Id.*
[22] *Id.*
[23] *Id.*
[24] *Id.*
[25] Caitlin Keating-Bitonti and Laura B. Comay, *Critical Minerals on the U.S. Outer Continental Shelf: The Bureau of Ocean Energy Management's Role and Issues for Congress*, CONG. RESEARCH SERVICE (Apr. 9, 2025), https://www.crs.gov/Reports/R48302.
[26] *Diamond Mining*, CAPE TOWN DIAMOND MUSEUM, https://www.capetowndiamondmuseum.org/about-diamonds/diamond-mining/.
[27] Caitlin Keating-Bitonti, *Seabed Mining in Areas Beyond National Jurisdiction: Issues for Congress*, CONG. RESEARCH SERVICE (Nov. 22, 2024), https://www.crs.gov/Reports/R47324.

Seabed mining can occur within two distinct geographic areas:

1. *Exclusive Economic Zones (EEZs)*: Areas to which coastal nations "may claim sovereign rights for the purpose of exploring and exploiting the natural resources of its continental shelf."[28] A nation's domestic laws regulate seabed mining activities within EEZs.[29] EEZs typically extend up to 200 nautical miles from shore and usually feature waters less than 200 meters (approximately 656 feet) deep.[30] In the United States, the EEZ encompasses the U.S. Outer Continental Shelf (OCS), which extends from about 3 nautical miles from shore,[31] where state-controlled waters end,[32] to about 200 nautical miles.[33] Seabed mining in the U.S. EEZ is regulated by DOI's Bureau of Ocean Energy Management (BOEM).[34]

2. *Areas Beyond National Jurisdiction (ABNJ)*: Areas beyond EEZs, also known as the high seas or international waters, include all areas beyond approximately 200 nautical miles from the shores of coastal nations.[35] ABNJ commonly feature depths beyond 200 meters, at which seabed mining is also called deep-sea mining.[36] ABNJ seabed mining is generally regulated by the United Nations Convention on the Law of the Sea (UNCLOS) and its established International Seabed Authority (ISA).[37] In the United States, which is not a party to UNCLOS, ABNJ seabed mining is regulated by the U.S. Department of Commerce's (DOC) National Oceanic and Atmospheric Administration (NOAA).[38] The most prominent hotspot of ABNJ seabed mining interest is known as the Clarion-Clipperton zone (CCZ) in the Pacific Ocean.[39]

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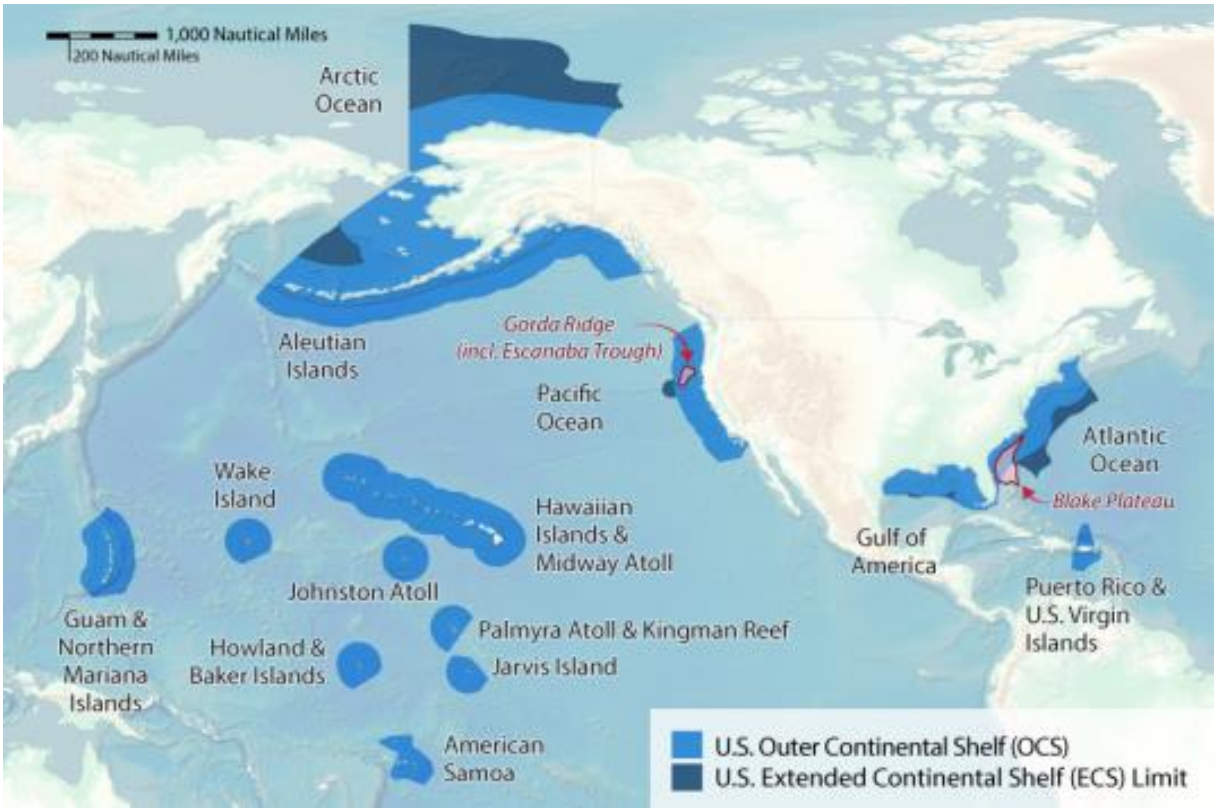
[28] *Id.*
[29] *Id.*
[30] *Id.*
[31] Florida, Texas, and Puerto Rico each control boundaries extending up to approximately 9 nautical miles from shore. *See* Caitlin Keating-Bitonti and Laura B. Comay, *Critical Minerals on the U.S. Outer Continental Shelf: The Bureau of Ocean Energy Management's Role and Issues for Congress*, CONG. RESEARCH SERVICE (Apr. 9, 2025), https://www.crs.gov/Reports/R48302.
[32] In the United States, some states and territories prohibit seabed mining within their water. These jurisdictions include American Samoa, California, Hawaii, Oregon, and Washington. *See* Caitlin Keating-Bitonti, *Seabed Mining in Areas Beyond National Jurisdiction: Issues for Congress*, CONG. RESEARCH SERVICE (Nov. 22, 2024), https://www.crs.gov/Reports/R47324.
[33] Caitlin Keating-Bitonti, *Seabed Mining in Areas Beyond National Jurisdiction: Issues for Congress*, CONG. RESEARCH SERVICE (Nov. 22, 2024), https://www.crs.gov/Reports/R47324; *see also* Caitlin Keating-Bitonti and Laura B. Comay, *Critical Minerals on the U.S. Outer Continental Shelf: The Bureau of Ocean Energy Management's Role and Issues for Congress*, CONG. RESEARCH SERVICE (Apr. 9, 2025), https://www.crs.gov/Reports/R48302.
[34] Caitlin Keating-Bitonti and Laura B. Comay, *Critical Minerals on the U.S. Outer Continental Shelf: The Bureau of Ocean Energy Management's Role and Issues for Congress*, CONG. RESEARCH SERVICE (Apr. 9, 2025), https://www.crs.gov/Reports/R48302.
[35] *See* Caitlin Keating-Bitonti, *Seabed Mining in Areas Beyond National Jurisdiction: Issues for Congress*, CONG. RESEARCH SERVICE (Nov. 22, 2024), https://www.crs.gov/Reports/R47324.
[36] *Id.*
[37] *Id.*
[38] *Id.*; *see also* Caitlin Keating-Bitonti and Laura B. Comay, *Critical Minerals on the U.S. Outer Continental Shelf: The Bureau of Ocean Energy Management's Role and Issues for Congress*, CONG. RESEARCH SERVICE (Apr. 9, 2025), https://www.crs.gov/Reports/R48302.

Domestic (EEZ) Governance Framework for Seabed Mining



A map of BOEM-regulated U.S. EEZ/OCS areas. Source: CRS[40]

Seabed mining within the United States EEZ is regulated by BOEM, which has two primary functions related to seabed mining and critical minerals: 1) evaluating the U.S. OCS for mineral resources; and 2) leasing submerged lands for critical mineral exploration and development.[41] BOEM's administration of OCS leases, pursuant to the Outer Continental Shelf Lands Act of 1953,[42] most directly impact the seabed mining industry. While BOEM's Marine Minerals Program has "supported work to evaluate critical mineral resources on the OCS" to meet its first mission,[43] BOEM has not "held any lease sales for critical minerals on the OCS or issued any critical mineral leases" to meet its second, more essential, mission to secure domestic mineral supply chains.[44]

[40] Caitlin Keating-Bitonti and Laura B. Comay, *Critical Minerals on the U.S. Outer Continental Shelf: The Bureau of Ocean Energy Management's Role and Issues for Congress*, CONG. RESEARCH SERVICE (Apr. 9, 2025), https://www.crs.gov/Reports/R48302.
[41] *Id.*
[42] 43 U.S.C. §§ 1331 *et seq*.
[43] BOEM's analysis suggests that 37 of 50 minerals identified by USGS as critical occur on the sea floor within the U.S. EEZ, some in greater quantities than found on land. BOEM has not formally evaluated the commercial viability of harvesting these critical minerals from the U.S. OCS. *See* Caitlin Keating-Bitonti and Laura B. Comay, *Critical Minerals on the U.S. Outer Continental Shelf: The Bureau of Ocean Energy Management's Role and Issues for Congress*, CONG. RESEARCH SERVICE (Apr. 9, 2025), https://www.crs.gov/Reports/R48302.
[44] Caitlin Keating-Bitonti and Laura B. Comay, *Critical Minerals on the U.S. Outer Continental Shelf: The Bureau of Ocean Energy Management's Role and Issues for Congress*, CONG. RESEARCH SERVICE (Apr. 9, 2025), https://www.crs.gov/Reports/R48302.

The failure to lease areas within the U.S. EEZ is due largely to a fatal flaw in BOEM's regulatory scheme that poses a heavy economic burden coupled with unnecessary risk on aspiring American seabed mining operations.[45] BOEM's scheme is a two-step process. First, an entity interested in exploring U.S. seabed mineral deposits for later commercial purposes must apply to BOEM for a prospecting permit.[46] Data collected by the permit holder must then be shared with BOEM. Crucially and problematically, "a prospecting permit is separate from a lease to develop minerals in an area, and the prospecting permit does not convey any preferential right to a lease."[47] Put simply, a company that expends considerable resources prospecting for seabed minerals under a BOEM prospecting permit must then begin the leasing process from scratch and compete with other seabed mining entities for the right to extract the minerals it located and studied.

The BOEM leasing process itself is also burdensome. The leasing process can start with an unsolicited request for a lease sale to BOEM or can be initiated by BOEM.[48] Regardless, BOEM must publish a request for interest detailing the mineral lease sale in the Federal Register.[49] BOEM lease sales must be awarded through competitive cash auctions.[50] Then, once a lease is awarded, BOEM must approve three plans before any seabed mining activities may start: 1) a delineation plan describing how the lessee will locate and characterize the minerals to be extracted; 2) a testing plan describing pilot mining and equipment testing activities; and 3) a mining plan that includes "comprehensive detailed descriptions, illustrations, and explanations of the proposed OCS mineral development, production, and processing activities, as well as plans to address environmental impacts and plans to clear the lease area when mining activities end."[51] Each of these approved plans must then be strictly adhered to during all seabed mining operations.[52] Pursuant to the Inflation Reduction Act of 2022, BOEM's regulations and processes also apply to "submerged lands offshore of U.S. territories as part of the OCS."[53]

Despite the burdens of BOEM's regulatory scheme, at least one American company, Impossible Metals, "has submitted a request to commence a leasing process for exploration and potential mining of critical minerals in the deep sea off the coast of American Samoa."[54] This first-of-its-kind request from Impossible Metals to BOEM may facilitate increased interest in seabed mining in the U.S. EEZ.

Additionally, President Trump's April 2025 Executive Order aimed at revitalizing American seabed mining dominance directs DOI, through BOEM, to "establish an expedited process for

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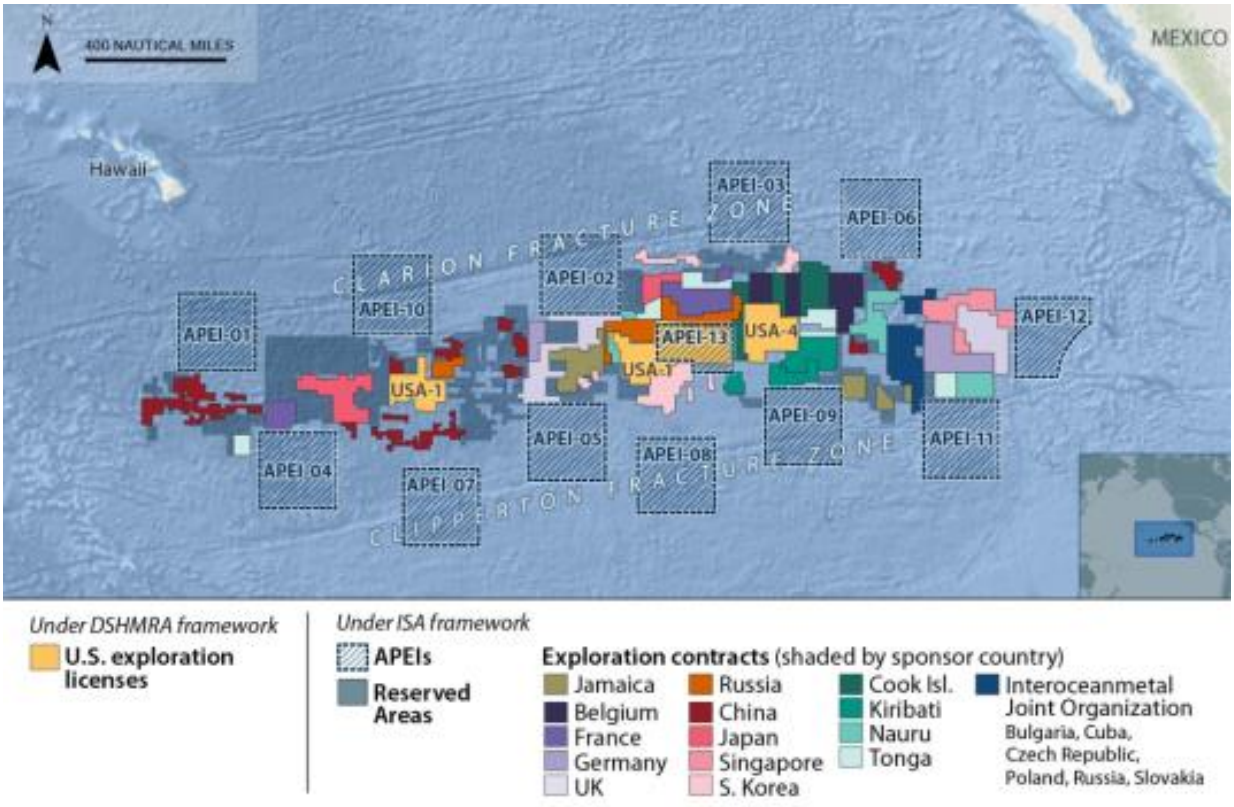
[45] *See Id.*
[46] *Id.*; *see also* 30 C.F.R. §§ 580.24, 580.40 – 580.52, 580.70 – 580.73.
[47] Caitlin Keating-Bitonti and Laura B. Comay, *Critical Minerals on the U.S. Outer Continental Shelf: The Bureau of Ocean Energy Management's Role and Issues for Congress*, CONG. RESEARCH SERVICE (Apr. 9, 2025), https://www.crs.gov/Reports/R48302.
[48] *Id.*; *see also* 30 C.F.R. §§ 581.11 – 581.12.
[49] Caitlin Keating-Bitonti and Laura B. Comay, *Critical Minerals on the U.S. Outer Continental Shelf: The Bureau of Ocean Energy Management's Role and Issues for Congress*, CONG. RESEARCH SERVICE (Apr. 9, 2025), https://www.crs.gov/Reports/R48302; *see also* 30 C.F.R. §§ 581.12.
[50] 30 C.F.R. §§ 581.18 – 581.21.
[51] Caitlin Keating-Bitonti and Laura B. Comay, *Critical Minerals on the U.S. Outer Continental Shelf: The Bureau of Ocean Energy Management's Role and Issues for Congress*, CONG. RESEARCH SERVICE (Apr. 9, 2025) (internal quotations omitted), https://www.crs.gov/Reports/R48302.
[52] *Id.*
[53] *Id.*; *see also* 43 U.S.C. § 1331(a).
[54] Impossible Metals Applies for Deep Sea Mining Lease in U.S. Federal Waters, Impossible Metals (Apr. 15, 2025), https://impossiblemetals.com/blog/impossible-metals-applies-for-deep-sea-mining-lease-in-u-s-federal-waters/.

reviewing and approving permits for prospecting and granting leases for exploration, development, and production of seabed mineral resources" found in the OCS.[55] This new expediated process "should ensure efficiency, predictability, and competitiveness for American companies" as BOEM's regulatory scheme is reviewed and streamlined.[56]

International (ABNJ) Governance Frameworks for Seabed Mining



The CCZ, a polymetallic nodule-rich area in the Pacific Ocean.[57]

There are two major international entities that regulate ABNJ seabed mining. In addition, the United States has also established its own international regulatory scheme:

1. *UNCLOS*. In 1982, the United Nations (UN) "established a framework governing activities on, over, and under the world's ocean."[58] UNCLOS "considers minerals collected from ABNJ as common heritage of mankind, meaning seabed resources are available for everyone's use and benefit, including Small Island Developing States, Landlocked Developing Countries, and Least Developed Countries."[59] UNCLOS entered into force in 1994. The United States did not ratify UNCLOS and is not a party to the

[55] *Unleashing America's Offshore Critical Minerals and Resources*, THE WHITE HOUSE (Apr. 24, 2025), https://www.whitehouse.gov/presidential-actions/2025/04/unleashing-americas-offshore-critical-minerals-and-resources/.
[56] *Id.*
[57] Caitlin Keating-Bitonti, *Seabed Mining in Areas Beyond National Jurisdiction: Issues for Congress*, CONG. RESEARCH SERVICE (Nov. 22, 2024), https://www.crs.gov/Reports/R47324.
[58] *Id.*
[59] *Id.*

convention.[60] The U.S. does, however, recognize that some portions of UNCLOS reflect customary international law.[61]

2. *ISA.* UNCLOS established the International Seabed Authority (ISA) as "an autonomous organization that regulates and controls mineral-related activities in ABNJ for parties to UNCLOS."[62] Because the U.S. is a member of the UN, it holds observer delegate status at the ISA despite not being party to UNCLOS.[63] The ISA has issued 31 exploration contracts to public and private seabed mining companies, including 17 for polymetallic nodules in the CCZ, which contains "more copper, cobalt, nickel, and manganese than all known land deposits combined."[64] The ISA "has yet to develop a regulatory regime for the extraction of seabed minerals and therefore has not issued exploitation contracts" for the extraction of deep-sea minerals.[65] The ISA's deadline to establish this regulatory regime is 2025. Notably, China and Russia are both parties to UNCLOS and hold exploration contracts issued by the ISA in the CCZ. China, in particular, has actively sought "seabed mining partnerships far beyond its shores," which presents security concerns to the United States as China's seabed exploration activities generate data that can be used for future deep-sea mineral harvesting and military purposes.[66]

3. *U.S. Law and NOAA.* NOAA regulates U.S. seabed mining activity beyond the boundary of the U.S. EEZ. In 1980, Congress passed the Deep Seabed Hard Mineral Resources Act (DSHMRA) that established a framework for "authorizing U.S. citizens to explore for and recover minerals from the seabed in ABNJ" by enabling NOAA "to issue exploration licenses and commercial recovery permits to U.S. citizens for deep-seabed mining activities."[67] NOAA must "prepare and publish an environmental impact statement for its issuance" of an exploration license or commercial recovery following National Environmental Policy Act (NEPA) processes.[68] To be clear, "the lack of accession by the United States to UNCLOS does not preclude NOAA from issuing exploration licenses or commercial recovery permits pursuant to DSHMRA."[69] In fact, in 1984, "NOAA issued exploration licenses for four sites located in the CCZ."[70] Two of these exploration licenses, USA-1 and USA-4, were renewed in 2022 and are still held by Lockheed Martin.[71] However, these licenses were originally issued prior to UNCLOS entering into force and before the establishment of the ISA.[72] Today, it is unclear whether new NOAA recovery permits would be recognized as legitimate by UNCLOS parties, and it is possible that the ISA could attempt to issue permits to other companies

[60] *Id.*
[61] *Id.*
[62] *Id.*
[63] *Id.*
[64] *Id.*
[65] *Id.*
[66] Caitlin Keating-Bitonti and Jared G. Tupuola, *Seabed Mining Interests Across the Pacific Islands*, CONG. RESEARCH SERVICE (Apr. 17, 2025), https://www.crs.gov/Reports/IF12974.
[67] Caitlin Keating-Bitonti, *Seabed Mining in Areas Beyond National Jurisdiction: Issues for Congress*, CONG. RESEARCH SERVICE (Nov. 22, 2024), https://www.crs.gov/Reports/R47324; *see also* 30 U.S.C. § 1412; 15 C.F.R. § 970 – 71.
[68] Caitlin Keating-Bitonti, *Seabed Mining in Areas Beyond National Jurisdiction: Issues for Congress*, CONG. RESEARCH SERVICE (Nov. 22, 2024), https://www.crs.gov/Reports/R47324; *see also* 30 U.S.C. §1419(d).
[69] Caitlin Keating-Bitonti, *Seabed Mining in Areas Beyond National Jurisdiction: Issues for Congress*, CONG. RESEARCH SERVICE (Nov. 22, 2024), https://www.crs.gov/Reports/R47324
[70] *Id.*
[71] *Id.*
[72] *Id.*

from UNCLOS party nations in the same areas as U.S. companies permitted by NOAA.[73]

Nevertheless, leading American scholars claim that the NOAA regulatory scheme is sufficient to allow American companies to mine the deep sea without the U.S. ratifying UNCLOS.[74] Because of this confidence, at least one American company, The Metals Company USA, has "initiated a process" with NOAA "to apply for exploration licenses and commercial recovery permits under existing U.S. legislation."[75] Moreover, President Trump's April 2025 seabed mining Executive Order directs DOC, through NOAA, to "expedite the process for reviewing and issuing seabed mineral exploration licenses and commercial recovery permits in areas beyond national jurisdiction."[76] This expedited process seeks to explicitly reinvigorate NOAA's ABNJ regulatory authority, which gives U.S. companies like The Metals Company USA the conviction, predictability, and competitiveness necessary to lead the world in seabed mineral exploration, identification, and collection.[77]

Regulatory and Permitting Reform is Essential for Successful Seabed Mining Operations

Navigating domestic and international regulatory frameworks to harvest minerals from the sea floor presents unique challenges for seabed mining stakeholders. Additionally, efficiently processing and refining these minerals once recovered is a vital consideration for mining operators without a clear solution, barring permitting reform. Today, although some foreign mineral processing facilities can extract some minerals from polymetallic nodules, no such facilities exist in the United States. Further, no purpose-built facility exists to effectively extract all the valuable minerals found in each nodule brought up from the sea floor.[78] According to experts, one purpose-built facility could not only unleash polymetallic nodule processing capabilities but also create approximately 1,500 direct and 10,000 indirect jobs.[79] Yet, until more processing facilities are constructed, particularly in the United States, reaping all the benefits of an all-of-the-above approach to securing domestic critical mineral supply chains, which includes seabed mining, remains a moving target.

Seabed mining efforts by U.S. entities, in the U.S. EEZ and in ABNJ, collectively represent a willingness to dive deep and use natural resources found in our waters effectively. As technology progresses at a rapid pace, costs are further reduced and collaboration in the seabed mining industry continues, the U.S. could not only develop the ability to harness vast mineral resources,

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[73] *Id.*
[74] Steven Groves, The U.S. Can Mine the Deep Seabed Without Joining the U.N. Convention on the Law of the Sea, The Heritage Foundation (Dec. 4, 2012), https://www.heritage.org/report/the-us-can-mine-the-deep-seabed-without-joining-the-un-convention-the-law-the-sea.
[75] NAM Staff, *The Metals Company seeks permits for deep-sea exploration*, NORTH AMERICAN MINING (Apr. 9, 2025), https://northamericanmining.com/index.php/2025/04/09/the-metals-company-seeks-permits-for-deep-sea-exploration/; *see also The Metals Company to Apply for Permits under Existing U.S. Mining Code for Deep-Sea Minerals in the High Seas in Second Quarter of 2025*, THE METALS COMPANY (Mar. 27, 2025), https://investors.metals.co/news-releases/news-release-details/metals-company-apply-permits-under-existing-us-mining-code-deep.
[76] *Unleashing America's Offshore Critical Minerals and Resources*, THE WHITE HOUSE (Apr. 24, 2025), https://www.whitehouse.gov/presidential-actions/2025/04/unleashing-americas-offshore-critical-minerals-and-resources/.
[77] *Id.*
[78] *See* Wilson Center, Duncan Wood, *et al.*, *The Mosaic Approach: a Multidimensional Strategy for Strengthening America's Critical Minerals Supply Chain,* https://www.wilsoncenter.org/sites/default/files/media/uploads/documents/critical_minerals_supply_report.pdf.
[79] Notes from conversation with stakeholder group on file with the Committee.

but also apply these technologies to mining operations on land and in space to secure U.S. mineral supply chains.

Like most sectors, new and innovative technology has historically driven the mining industry. Today, promising new technologies in withstanding pressure, artificial intelligence, mapping, data, processing, and refining efficiencies promise to upend the industry just as updates in machinery, robotics, and basic safety equipment did in years past.[80] The time is now to embrace permitting reform for seabed and land-based mining as the United States seeks to secure its domestic supply chain. This is crucial not only for developing emerging technologies and strengthening our economy, but also for ensuring national security.

[80] Miranda Barker, *Innovation Can Disrupt the Mining Industry. These Sustainable Start-Ups are Leading the Way*, WORLD ECONOMIC FORUM (Nov. 29, 2024), https://www.weforum.org/stories/2024/11/13-innovations-making-the-mining-and-metals-industry-more-sustainable/.