DEEP SEA MINING:
Industrializing Earth's Last Sacred Space

Deep Sea Mining: Industrializing Earth's Last Sacred Space

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RISE Earth Initiative

RISE Earth Initiative is a Native Hawaiian 501(c)(3) advocacy organization focused on protecting the Ocean, advancing Indigenous and environmental justice, and educating future generations.

www.riseearthinitiative.org

Water Protector Legal Collective (WPLC)

An Indigenous-led 501(c)(3) nonprofit law firm and advocacy organization dedicated to defend and advance the rights of Indigenous Peoples and Original Nations, the Earth, and climate justice movements.

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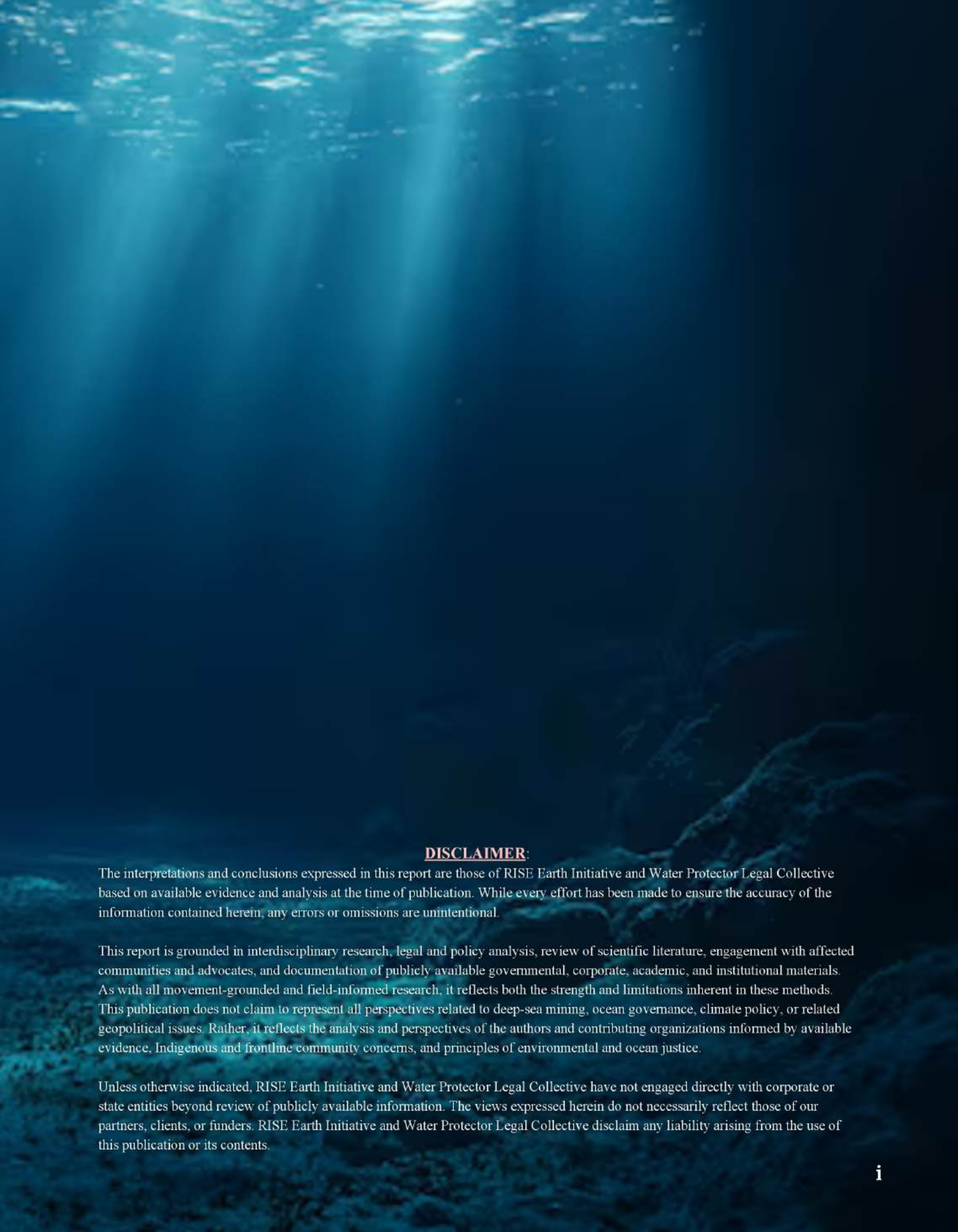

DISCLAIMER:

The interpretations and conclusions expressed in this report are those of RISE Earth Initiative and Water Protector Legal Collective based on available evidence and analysis at the time of publication. While every effort has been made to ensure the accuracy of the information contained herein, any errors or omissions are unintentional.

This report is grounded in interdisciplinary research, legal and policy analysis, review of scientific literature, engagement with affected communities and advocates, and documentation of publicly available governmental, corporate, academic, and institutional materials. As with all movement-grounded and field-informed research, it reflects both the strength and limitations inherent in these methods. This publication does not claim to represent all perspectives related to deep-sea mining, ocean governance, climate policy, or related geopolitical issues. Rather, it reflects the analysis and perspectives of the authors and contributing organizations informed by available evidence, Indigenous and frontline community concerns, and principles of environmental and ocean justice.

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DEDICATION

This report is dedicated to the protection of the Hawaiian Kingdom - a sovereign nation that still stands, despite over 130 years of illegal occupation by the United States. Neither the overthrow of 1893 nor the fraudulent annexation that followed extinguished the Hawaiian Kingdom under international law. It endures, and so do its people.

It is dedicated to the children who have not yet touched the sea - those whose first breath will be drawn from an atmosphere the ocean still sustains, whose names have not yet been spoken, whose feet have not yet met the reef. They are owed a living ocean, not a mined-out abyss.

It is dedicated to the ocean itself - the source of more than half the oxygen we breathe, the regulator of our climate, and the sustainer of all life on Earth. What is done to the deep sea is done to every person who draws breath on this planet.

It is dedicated to the frontline defenders - those who stand against militarism and its relentless impacts on lands, waters, and peoples across the Pacific and beyond. Their resistance is not symbolic; it is survival.

And it is dedicated to the whistleblowers - those willing to expose the conflicts of interest and hidden corruptions embedded within international systems, governments, and corporations that cloak extraction in the language of progress and governance in the architecture of self-dealing. Truth telling in the face of institutional power is among the most dangerous and necessary acts of our time.

For those who came before, for those who stand now, and those not yet born.

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EXECUTIVE SUMMARY

The ocean, for many, represents a vast mystery of the unknown; an ancestral system that sustains life itself. Yet today, the deep ocean is being positioned as the next extractive frontier and the corporate push to industrialize the Earth's last sacred space.

Under the banner of the global energy transition, governments and corporations are advancing plans to mine the deep seabed for minerals used in electric vehicles, renewable energy infrastructure, artificial intelligence systems, and military technologies. Industry proponents argue that deep-sea mining (DSM) is necessary to secure the materials required for the global energy transition. Critics warn that DSM risks opening the ocean to irreversible ecological damage before adequate ecological baselines, governance safeguards, or liability frameworks exist, while reproducing long-standing patterns of extractive exploitation.

This report examines deep-sea mining not only as an environmental issue, but as a political, economic, and historical project that will inevitably impact frontline Indigenous communities, shaped by competing visions of energy transition, development, and global power.

The debate surrounding DSM is unfolding within the context of accelerating climate disruption, intensifying geopolitical competition over critical mineral supply chains, and growing pressure to secure strategic resources. Minerals such as cobalt, nickel, copper, manganese, and rare earth elements have become increasingly central to battery manufacturing, advanced communications systems, aerospace technologies, weapons systems, renewable energy infrastructure, and national-security planning. DSM is being advanced through a convergence of climate-transition language and national-security urgency, even as scientific evidence continues to demonstrate profound uncertainty regarding ecological impacts, species loss, sediment-plume behavior, and recovery timelines.

The ocean occupies a foundational role within the Earth's ecological systems, generating an estimated 50–70% of the world's oxygen. It absorbs approximately 90% of excess heat associated with greenhouse gas emissions and functions as one of the planet's largest carbon sinks. More than 3 billion people rely upon marine and coastal biodiversity for livelihoods and subsistence, while fish provide approximately 17% of the global population's animal protein intake. Ocean systems regulate climate, nutrient cycling, fisheries productivity, and biogeochemical stability on a planetary scale.

Despite the ecological significance of the ocean, commercial pressure to authorize industrial seabed extraction is accelerating. The Clarion-Clipperton Zone (CCZ), a vast abyssal region stretching between Hawai'i and Mexico, has emerged as the principal focus of polymetallic nodule exploration. Scientific research indicates that approximately 88–92% of recorded species within the CCZ remain undescribed by science. Polymetallic nodules themselves form over millions of years and provide the critical hard substrate for life across abyssal plains otherwise dominated by soft sediment.

Within this context, the deep ocean is increasingly framed as both a climate solution and a strategic resource frontier essential to securing

materials required for renewable energy systems and a "just transition." This framing, however, obscures a longer and more complex history.

In 1876, the HMS Challenger first explored the deep sea under the cover of science, aboard a Navy military battle ship. This is a powerful metaphor for how DSM is developing today: under the guise of a "green" transition, lies a more insidious backdrop of military dominance. From its earliest origins, the exploration of the deep ocean has been entangled with geopolitical ambition, military strategy, imperial expansion, and scientific competition among powerful states. Today's race to mine the seabed is not new; it is a continuation of a centuries-long struggle.

This report argues that deep-sea mining reflects the continuation of extractive frontier logics rather than a transformative break from them. It warns that the language of sustainability and climate necessity risks legitimizing the industrialization of the deep ocean before the scientific community fully understands the ecosystems at stake.

It draws particular attention to the continuity between contemporary seabed extraction proposals and longer histories of militarization, imperial ocean governance, extraction in Pacific territories, and sacrifice-zone politics. The report concludes that the current trajectory toward commercial deep-sea mining presents serious ecological, legal, and governance risks that remain insufficiently understood or addressed. Existing governance systems are not currently prepared to manage irreversible industrial extraction within deep-ocean ecosystems that exist on geological timescales.

While many argue for a precautionary pause or moratorium unless science can demonstrate that irreversible harm will not occur and enforceable legal standards for governance on the high-seas exist along with meaningful participation of affected frontline communities in decision-making processes, this is not enough. The ocean sustains life itself beyond its waters and the unknown and its unresolved mysteries together embody an ecological, cultural, and spiritual imperative that tells us that some places of the Earth are not meant for extraction.

Core Findings

- Deep-sea mining threatens ecosystems that remain among the least studied and least understood on Earth. The mineral deposits sought by industry are embedded within the ecological structure of the deep ocean itself: polymetallic nodules provide habitat, hydrothermal vents support endemic biological communities, and cobalt-rich crusts form part of long-lived seamount ecosystems. The resource being extracted is the habitat.
- Experimental disturbance studies in the CCZ in 1979, the Peru Basin in 1989 and other deep-ocean research areas indicate that physical and biological impacts persist for decades without ecological recovery, undermining claims that industrial extraction can be effectively mitigated or restored within human timescales.
- Existing governance systems, including the International Seabed Authority (ISA), are not only unprepared to regulate irreversible industrial extraction in the deep ocean, but reveal serious conflicts of interest.

- Pacific Indigenous Peoples and coastal communities are raising profound cultural, spiritual, and justice concerns that remain marginalized within dominant DSM policy frameworks and discourse, with no meaningful ability to stop DSM and deny consent.
- The current push for deep-sea mining is being driven not only by climate transition narratives, but by broader geopolitical , military competition over strategic mineral supply chains and ocean control.

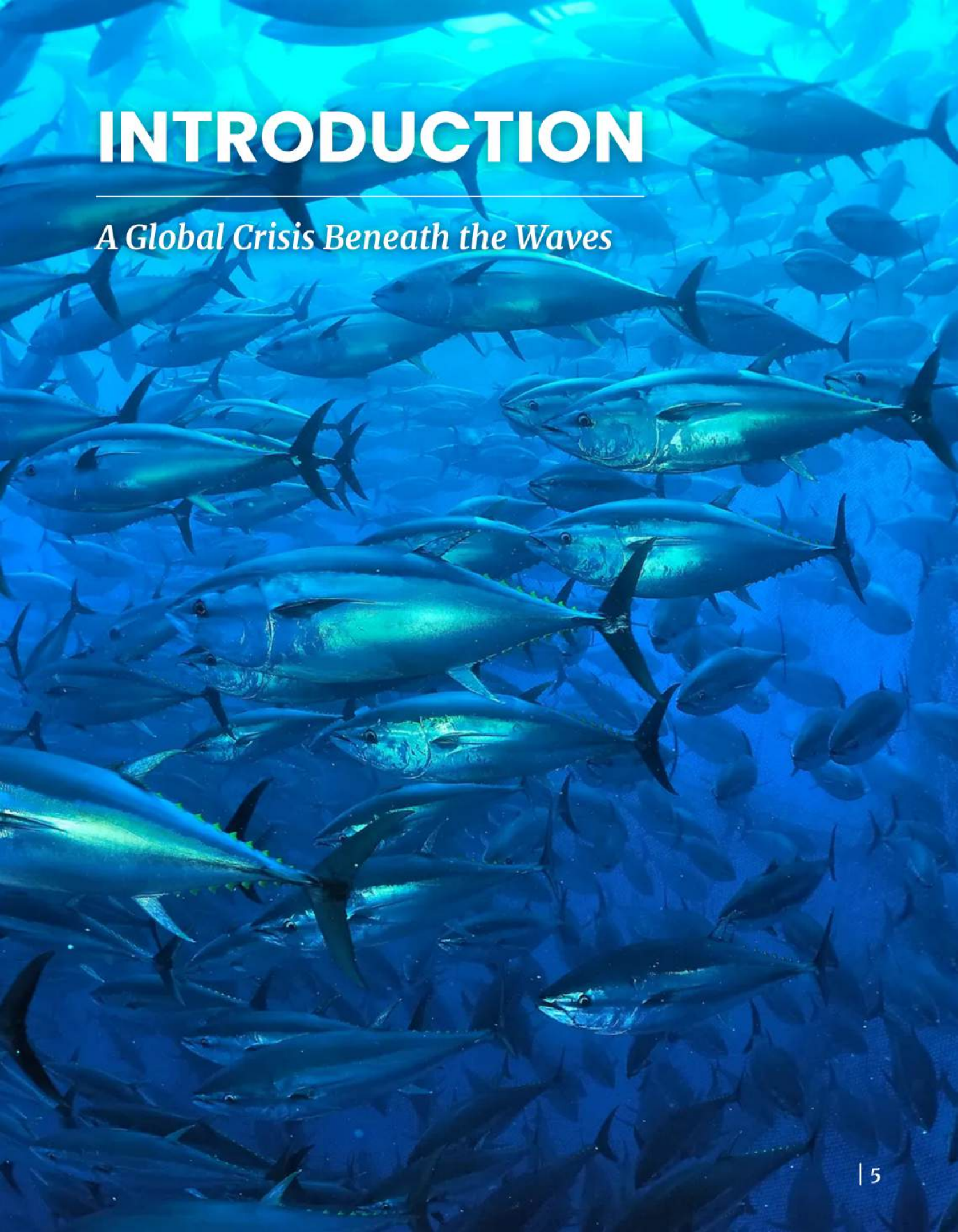
Key Recommendations

- Adopt a permanent global prohibition on commercial deep-sea mining.
- Prohibit DSM exploration, test mining, extraction, and commercialization within national jurisdictions and Exclusive Economic Zones. Reject unilateral licensing systems and ISA bypass strategies that undermine international ocean governance.
- Rescind existing ISA exploration contracts and halt the development of exploitation regulations and mining codes.
- Reform ISA governance structures to eliminate conflicts of interest and strengthen transparency, accountability, and independent scientific oversight.
- Fully uphold Indigenous rights, including Free, Prior and Informed Consent (FPIC) and the right of Indigenous Peoples and Pacific communities to refuse DSM.
- Expand marine protections, regional fisheries safeguards, and cumulative-impact assessment frameworks across vulnerable ocean ecosystems.
- End public and private financing, insurance, and investment support for commercial DSM projects and related infrastructure.
- Redirect climate-transition policy toward recycling, circular economies, reduced mineral demand, and less extractive development pathways.
- Remove seabed minerals from military, critical-minerals, and national-security strategies driving geopolitical competition and extraction pressure.
- Prohibit AI data center infrastructure project from externalizing its environmental costs onto terrestrial sacrifice zones or deep-ocean ecosystems in order to sustain unlimited computational growth.
- Ensure that independent science, ocean justice, biodiversity protection, and intergenerational responsibility—not commercial timelines—guide ocean governance.
- Recognize deep-sea mining as an issue of Indigenous rights, militarization, fisheries security, biodiversity protection, and ocean justice rather than solely a minerals-supply debate.

The future of climate action will be judged by whether humanity repeats or refuses extractive sacrifice zones.

INTRODUCTION

A Global Crisis Beneath the Waves



INTRODUCTION

The deep ocean is approaching a point of no return. Yet many people still know very little about what is being proposed in its depths, or how quickly governments and corporations are moving to industrialize the seabed in the name of progress, energy transition, and strategic power.

This report was written because deep-sea mining is no longer a distant or theoretical possibility. The machinery to begin commercial extraction in what is projected to be a $16+ trillion dollar industry, is already being assembled. In April 2025, the United States issued an Executive Order directing the federal government to accelerate seabed mineral development and secure domestic access to critical minerals tied to industrial and military supply chains. Shortly thereafter, The Metals Company submitted applications under U.S. law seeking permits for commercial recovery in the Pacific Ocean, with the NOAA moving forward in the preliminary review process despite significant legal and international controversy. At the same time, proposals such as Project Vault, a multibillion-dollar U.S. initiative aimed at securing strategic mineral independence and processing capacity, signal growing state-backed investment in a future domestic deep-sea mining industry. Internationally, pressure continues to intensify within the International Seabed Authority (ISA) to finalize exploitation regulations even as scientific uncertainty deepens and opposition continues to grow.

The urgency of this moment is difficult to overstate. Once industrial extraction begins in the deep sea, the political and economic pressure to expand it may become nearly impossible to reverse. The ecosystems targeted for mining formed over millions of years. Polymetallic nodules in the Clarion-Clipperton Zone grow at rates measured in millimeters per million years, yet entire regions of the seabed are already being divided into industrial contract zones. Scientists already know that mining operations would remove habitat, generate massive sediment plumes, produce continuous light and noise pollution in ecosystems evolved for darkness and silence, disrupt carbon storage processes, and threaten species found nowhere else on Earth.

Experimental disturbance studies conducted decades ago in the Pacific still show visible ecological damage with limited recovery. At the same time, some of the greatest risks remain unknown. Scientists still do not fully understand the ecological relationships that structure deep-ocean ecosystems, the cumulative impacts of industrial mining across ocean systems, or how large-scale disturbance of the seabed may affect climate regulation, fisheries, nutrient cycles, biodiversity, and planetary processes that remain only partially understood. Much of the life in these regions has not even been identified by science before extraction is being considered.

This report was also written because the ocean is not merely a repository of minerals. It is one of the living systems that makes life on Earth possible. Marine ecosystems regulate climate, absorb vast amounts of excess atmospheric heat, circulate nutrients, sustain fisheries, and generate much of the oxygen upon which all species depend. Deep-ocean systems play a critical role in planetary stability even as science continues to uncover how little is fully understood about their functioning. Yet the deep sea is increasingly

being framed primarily through the language of extraction, competition, and strategic dominance. We do not protect what we do not love, and we do not love what we do not know. Part of the purpose of this report is therefore to make visible what is at stake before industrial mining begins in one of the Earth's last relatively undisturbed ecosystems.

The race toward the seabed is not only about minerals. It is about power. The same minerals promoted as necessary for batteries and renewable energy systems are also essential to weapons manufacturing, military technologies, advanced communications infrastructure, aerospace engineering, and geopolitical competition between states. The deep ocean is being drawn into struggles over industrial dominance, strategic supply chains, maritime control, and national security. If one state or corporation moves to unilaterally exploit the deep seabed outside broad international consensus, the consequences will extend far beyond environmental harm. The seabed has long been recognized under international law as the common heritage of humankind. The erosion of that principle risks destabilizing international governance itself and transforming the ocean into the site of a new global extractive conflict.

The report begins with the fundamentals of deep-sea mining itself: what it is, how extraction would occur, where mining exploration is already underway, and the environmental considerations surrounding proposed operations. It then moves into the broader geopolitical struggle shaping the deep ocean, situating DSM the within longer Pacific histories of colonialism, extraction, and militarization, that continue to shape which communities are expected to bear the brunt of ecological risk in the name of global development. The report also documents the escalating governance crisis surrounding the International Seabed Authority, including concerns over conflicts of interest and the possibility of unilateral state action outside international consensus. Finally, it examines the growing global resistance movement calling for a ban that goes beyond precautionary pauses and advocates for alternative pathways grounded not in extraction, but in protection, restraint, and relational responsibility, recognizing the ocean not as a commodity or frontier, but as a living relative and source of life.

Deep-sea mining proposals raise questions concerning governance legitimacy, ecological uncertainty, militarization, extraction, intergenerational responsibility, and humanity's relationship to the ocean itself. This report proceeds from the position that precaution must guide decision-making where proposed activities carry risks of serious or irreversible harm, particularly within ecosystems that remain profoundly understudied and ecologically indispensable. The record reviewed here demonstrates that the push toward DSM is advancing more rapidly than scientific understanding of the deep ocean and the systems it sustains. At stake is not only the future of abyssal ecosystems, but the question of whether the living ocean will continue to be treated as a frontier for conquest and extraction, or remembered as the ancestral system upon which all life still depends.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I. WHAT IS DEEP-SEA MINING?

DSM 101: The Basics

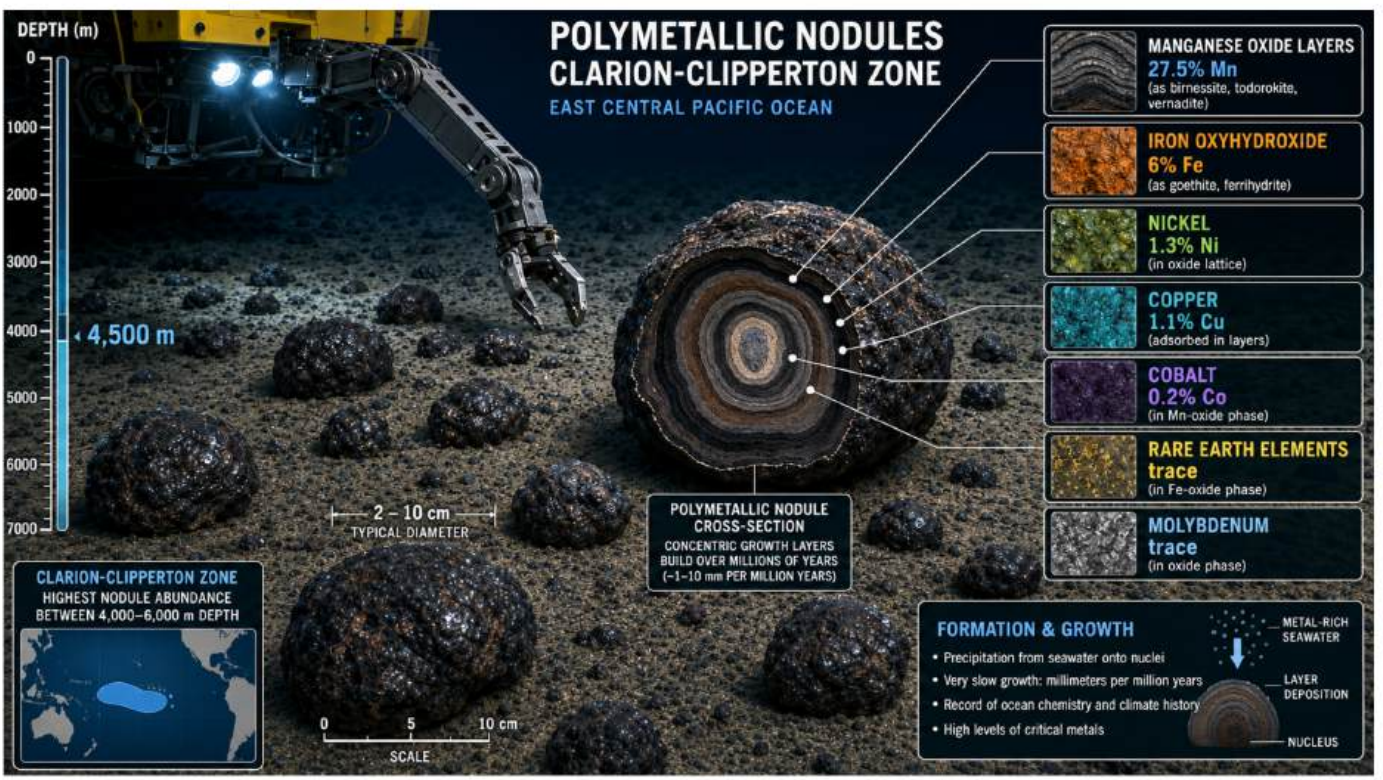
DEEP SEA MINING EXPLAINED

Deep-sea mining refers to the extraction of mineral resources from the ocean floor, generally at depths exceeding 200 meters and extending to approximately 6,000 meters or deeper. Commercial interest in DSM has accelerated in response to projected demand for minerals used in batteries, electronics, renewable energy systems, advanced manufacturing, aerospace technologies, artificial intelligence infrastructure, and military applications. Unlike terrestrial mining operations, DSM targets ecosystems located within some of the least explored and least understood environments on Earth. Proposed commercial extraction efforts focus primarily upon **three primary categories of mineral deposits: polymetallic nodules, seafloor massive sulfides (SMS), and cobalt-rich ferromanganese crusts (CRFCs).**[1]

Polymetallic Nodules

Polymetallic nodules—sometimes referred to as manganese nodules—are mineral concretions scattered across abyssal plains at depths generally ranging between 4,000 and 6,000 meters. These nodules contain manganese, nickel, copper, cobalt, molybdenum, and rare earth elements (REEs) used in industrial technologies.

Nodules are frequently described in simplified terms as "potato-sized rocks," yet that description understates both their geological complexity and ecological significance. Nodules form around a small core, such as a shark tooth, shell fragment, or microfossil, through slow hydrogenetic and diagenetic processes that accumulate dissolved



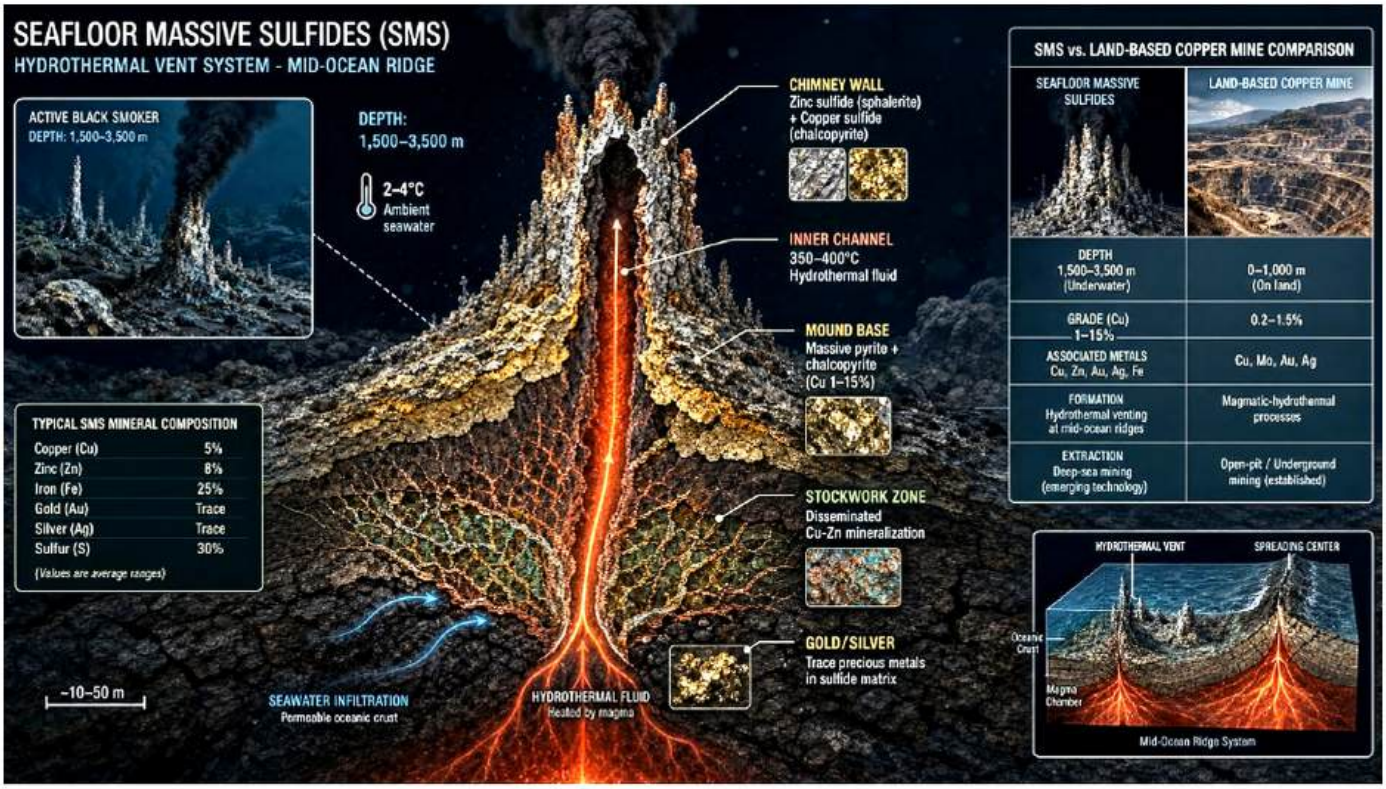
Polymetallic nodules, found in highest concentration in the Clarion-Clipperton Zone, are high in Manganese, Iron, Nickel, Copper, Cobalt, REEs and Moybdenium. *Source: RISE Earth Initiative 2026.*

Polymetallic nodules scattered across the Abyssal Plains of the Clarion-Clipperton Zone. *Source: RISE Earth Initiative 2026.*

metals layer by layer over millions of years. Scientists estimate growth rates of approximately one to fifteen millimeters per million years. On any meaningful human timescale, they are effectively nonrenewable.[2]

The Clarion-Clipperton Zone in the Pacific Ocean, stretching roughly between Hawai'i and Mexico, contains the world's most commercially significant known polymetallic nodule fields and has become the center of the contemporary DSM race. The CCZ is estimated to hold billions of tons of nodules containing commercially valuable concentrations of nickel, manganese, copper, and cobalt.[3]

The same region is also among the most biologically significant and understudied deep-ocean environments on Earth. Scientific assessments continue to indicate that the overwhelming majority of species recorded within the CCZ remain undescribed.[4] The nodules themselves function as ecological substrate across abyssal plains otherwise dominated by soft sediment. Sessile organisms including sponges, corals, xenophyophores, microbial communities, anemones, and other deep-sea organisms attach directly to the nodules, meaning that extraction would remove not only mineral deposits, but habitat structure essential to abyssal ecosystems.[5]



Seafloor massive sulfide (SMS) deposits form around hydrothermal vent systems, biodiversity hotspots foundational to life cycles and food web. *Source: RISE Earth Initiative 2026.*

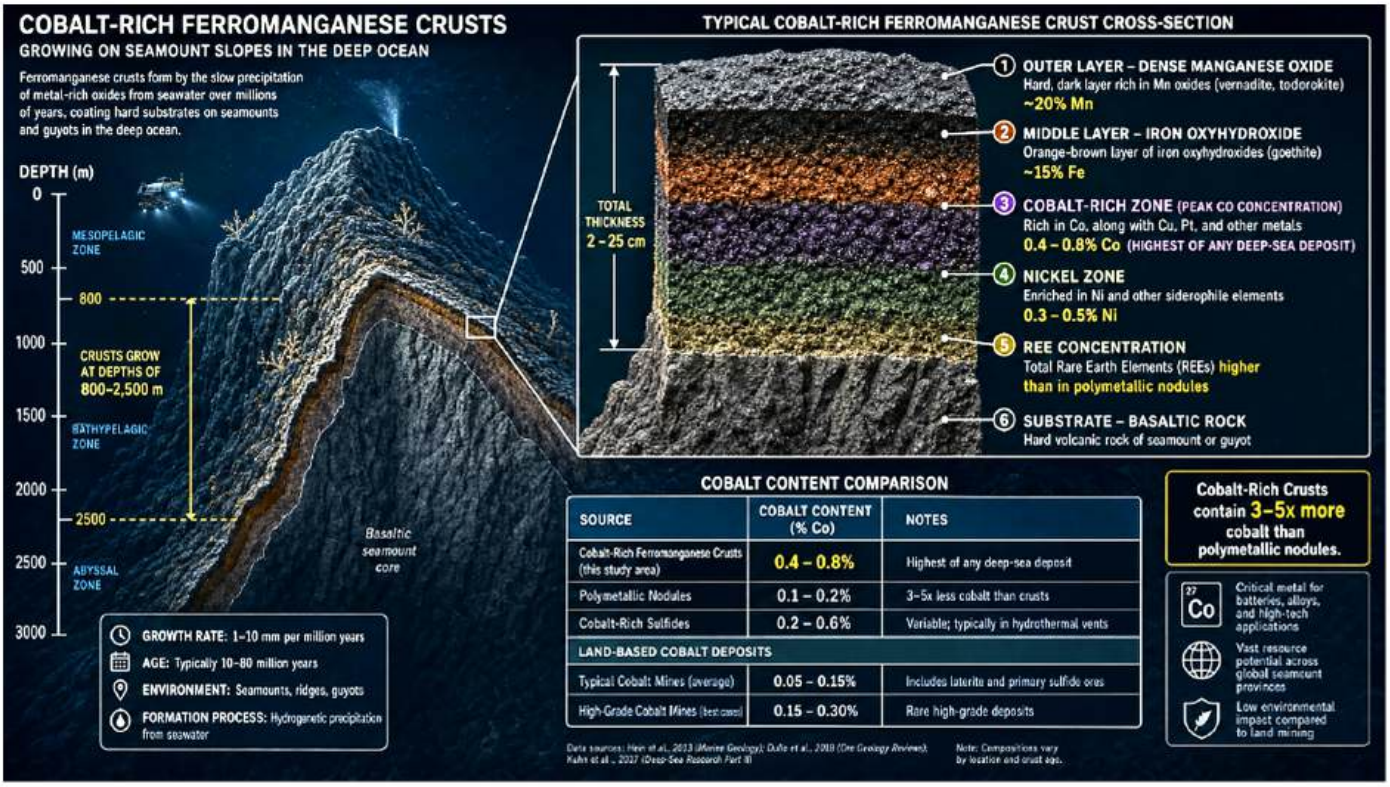
Seafloor Massive Sulfides (SMS)

Seafloor massive sulfide deposits form around hydrothermal vent systems where mineral-rich superheated fluids emerge through the seafloor and precipitate metals upon contact with cold seawater.[6] These deposits may contain copper, zinc, gold, silver, and additional minerals sought for industrial and strategic purposes.

Hydrothermal vent ecosystems are an important ecosystem that offer high temperature, extreme chemical conditions, sulfide deposits, and other mineral deposits making this a "hotspot" of biodiversity. The most important of which is microbial life forms responsible for chemically cycling at the deep sea such as particular bacteria or archaea that represent a diverse genetic reservoir of life, unexplored potential medical and commercial applications.

These inorganic metals also form the backbone for highly specialized chemosynthetic communities that do not depend upon sunlight for survival. Instead, these adapted organisms can derive energy from inorganic chemical compounds released through hydrothermal activity, including sulfides and other minerals that form the basis of complex biological cycles found nowhere else on Earth. Organisms associated with vent systems include microbial extremophiles, tube worms, shrimp, crabs, mollusks, and other species adapted to conditions of extreme pressure, heat, acidity, and chemical concentration.

Many of these organisms are so biologically specialized that even relatively small disruptions to vent chemistry or mineral availability could



Cobalt-rich ferromanganese crusts grow on seamount slopes in the deep ocean, along underwater volcanic formations. Mauna Kea is the world's largest seamount, at peak 13,796 feet above sea level, extending 19,700 feet below the ocean to the seafloor (total 33,500 feet)—taller than Mount Everest. *Source: RISE Earth Initiative 2026.*

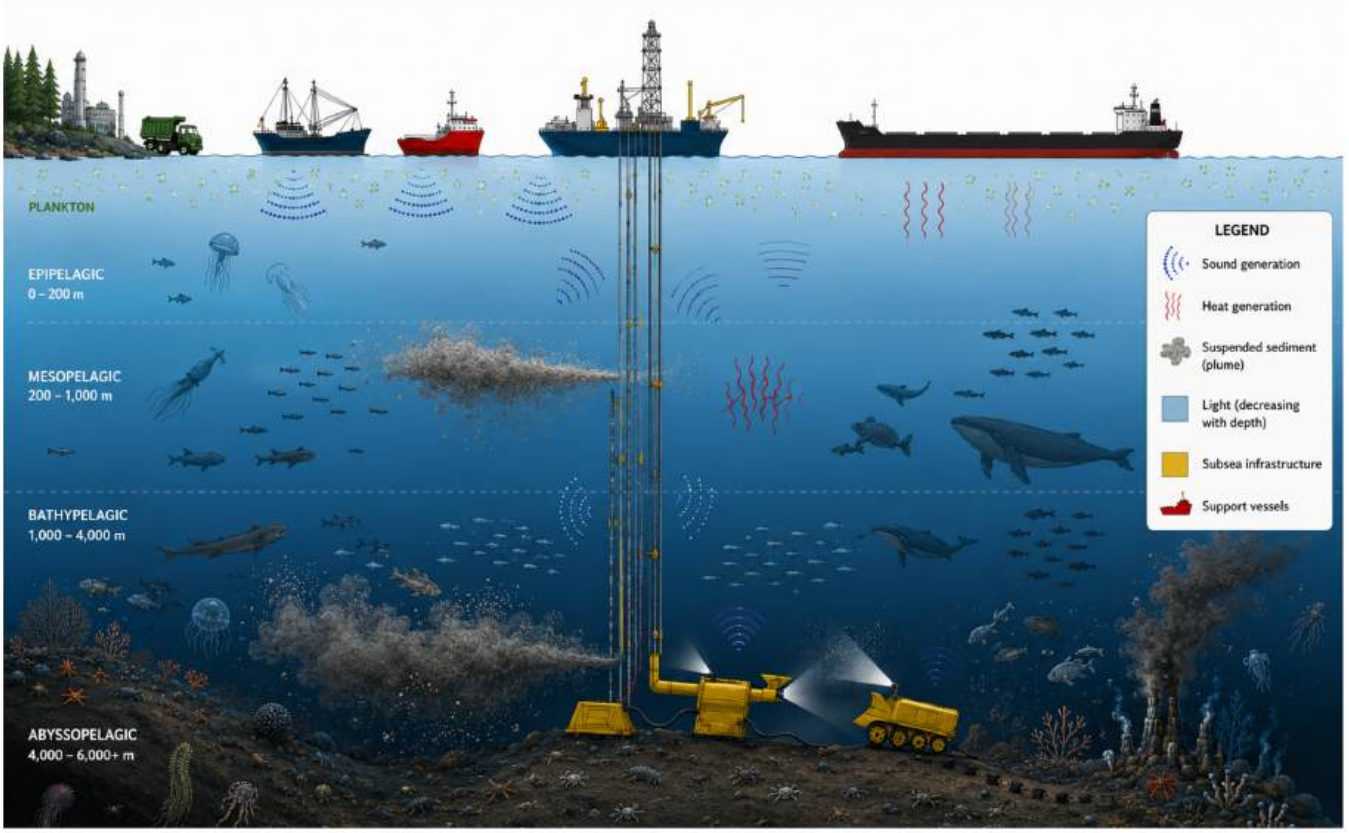
destabilize entire ecosystems. Certain vent-associated bacteria, for example, survive only through processing specific sulfur compounds released through hydrothermal activity, forming the foundation of the broader food web. Any damage in these processes can result in cascading impacts affecting trophic levels damaging the entire food web.[7]

Hydrothermal vents also hold major scientific significance because they provide insight into evolutionary adaptation, extremophile biology, and theories regarding the origins of life itself. Industrial extraction of sulfide deposits would involve cutting, grinding, or removing mineralized vent structures that support these unique ecosystems without having a baseline of the actual conditions of diversity, abundance, biomass, connectivity, resilience, ecosystem functions, or temporal variability of microbial communities.

Cobalt-Rich Ferromanganese Crusts (CRFCs)

Cobalt-rich ferromanganese crusts form along seamounts and underwater volcanic formations, often at depths between approximately 800 and 2,500 meters. These crusts contain cobalt, nickel, rare earth elements, tellurium, and additional minerals increasingly sought for strategic technologies, renewable energy infrastructure, and defense systems.[8]

Seamount ecosystems support corals, sponges, fish nurseries, benthic communities, and migratory species that may take centuries or millennia to recover from disturbance.[9] Mining crust deposits would require physically cutting or removing hardened mineral layers from seamount surfaces, generating substantial habitat destruction within ecosystems characterized by extremely slow growth and long ecological recovery periods.



The impact of heavy industrial machinery at different pressures and ocean depths would impact every layer of the ocean across the water column, past the point of extraction. *Source: RISE Earth Initiative 2026.*

Extraction Technologies

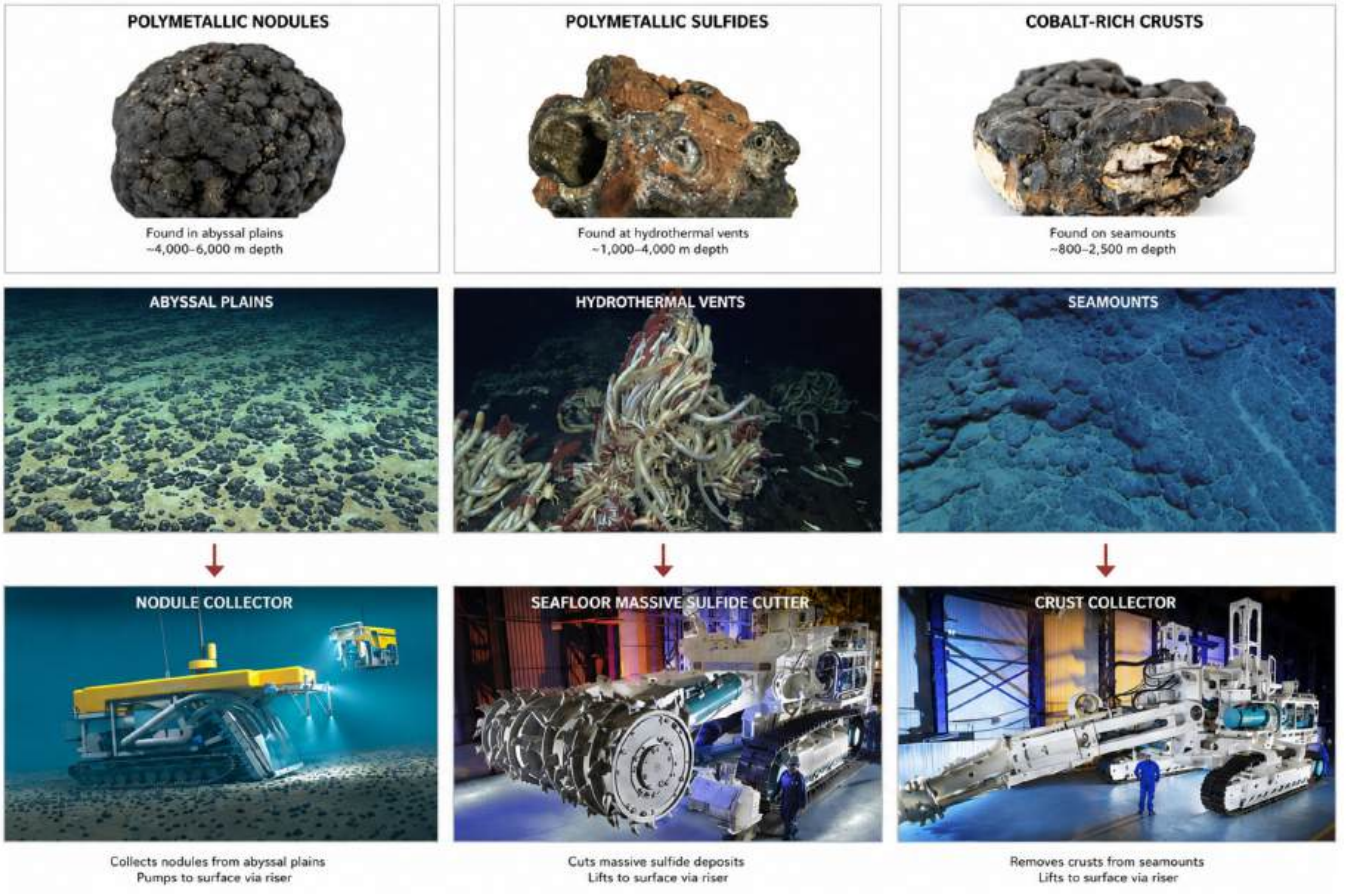
Current commercial DSM proposals rely upon extensive industrial infrastructure operating thousands of meters beneath the ocean surface and often far from ordinary public visibility.

Polymetallic nodule mining systems involve:

- Seafloor collector vehicles designed to scrape, cut, or vacuum mineral deposits from the seabed;
- Riser systems transporting extracted slurry vertically through the water column to surface production vessels;
- Surface processing systems that separate minerals from sediment and discharge wastewater and waste material back into the ocean.

Nodule-mining systems would involve continuous collection of seabed material across abyssal plains, while sulfide (SMS) and crust (CFRCs) mining would require cutting, grinding, or mechanically fragmenting mineralized surfaces.

Mining activities for any and all types of deep-sea mineral deposits, would generate sediment plumes, physical disturbance, acoustic pollution, artificial light exposure, vibration, chemical discharge, and waste streams within ecosystems adapted to darkness, immense pressure, low temperatures, environmental stability, and extremely slow biological processes.[10] Because these ecosystems evolved under conditions fundamentally different from those found at the ocean surface, scientists continue to warn that industrial disturbance may generate consequences extending far beyond immediate extraction zones.



Extraction technologies vary for mineral deposits, but all include heavy industrial machinery at different pressures and ocean depths, producing plume, discharge, noise and light pollution. *Source: RISE Earth Initiative 2026.*

Deep-sea mining therefore represents more than a new mineral-supply option. It is a proposal to introduce continuous industrial extraction into ecosystems shaped over millions of years by extreme pressure, darkness, limited nutrient availability, slow biological growth, and complex ecological interdependence. **The risks associated with DSM cannot be evaluated solely through analogies to terrestrial mining because deep-ocean ecosystems operate under profoundly different physical, biological, and temporal conditions.**[11]

This distinction is central to understanding why many marine scientists continue to warn that ecological harms associated with commercial seabed extraction may be effectively irreversible on human timescales.[12]

More than 800 marine scientists and policy experts have joined a global coalition to sign a consesnsus statement that DSM must never occur due to irreveirsible loss of biodiversity and disruption of critical ocean carbon cycles.[13]

Element	Symbol	Selected Applications
Scandium	Sc	Super alloys, ultra-light aerospace components, X-ray tubes, baseball bats, lights, semiconductors
Yttrium	Y	Ceramics, metal alloys, rechargeable batteries, TV phosphors, high-temperature superconductors
Lanthanum	La	Batteries, optical glass, camera lenses, petroleum refining catalysts
Cerium	Ce	Catalysts, metal alloys, radiation shielding, water purifier
Praseodymium	Pr	Magnets, lasers, pigments, cryogenic refrigerant
Neodymium	Nd	High-strength permanent magnets, lasers, infrared filters, hard disc drives
Samarium	Sm	High temperature magnets, nuclear reactor control rods and shielding, lasers, microwave filters
Europium	Eu	Liquid crystal displays, fluorescent lighting, red and blue phosphors
Gadolinium	Gd	Magnetic resonance imaging contrast agent, memory chips, nuclear reactor shielding, compact discs
Terbium	Tb	Green phosphors, lasers, fluorescent lamps, optical computer memories
Dysprosium	Dy	Permanent magnets, lasers, catalysts, nuclear reactors
Holmium	Ho	Lasers, nuclear reactors, catalysts, magnets
Erbium	Er	Lasers, vanadium steel, infrared absorbing glasses, optical fibers
Thulium	Tm	Portable X-ray machines, microwaves,
Ytterbium	Yb	Infrared lasers, chemical reducing agent, rechargeable batteries, fiber optics
Lutetium	Lu	PET scan detectors, superconductors, high refractive index glass, x-ray phosphor

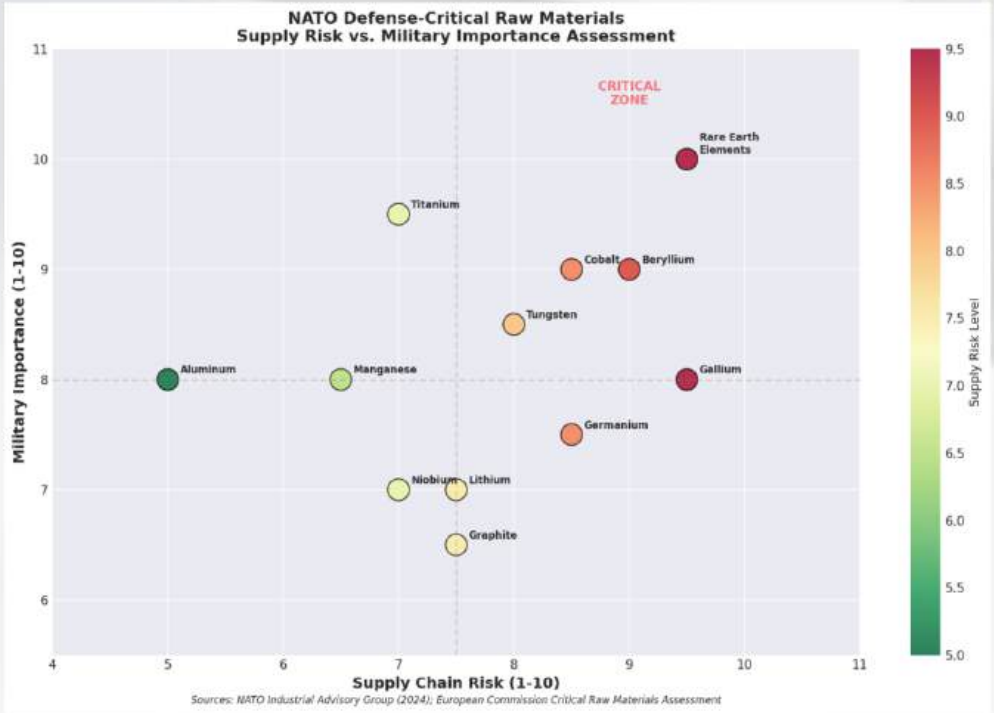
The Military Connection

The link between Deep-Sea Mining and military technology and weapons infrastructure has been understated. While past analyses of the potentaial impacts and cost-benefit of Deep-Sea Mining have stated military do not require use of minerals from DSM, the reality of increased militarism and geopolitical competition in a renewal of the high-stakes technological races to the bottom that dominated Cold War-era politics have shifted that analysis.

The chart to the left shows military applications of rare earth minerals found in Deep-Sea mineral deposits. The uses span technology from batteries, camera lenses, semiconductors, to infrared filters, high-strength permanent magnets, infrared lasers, and nuclear reactors.

The figure on the bottom left shows NATO Defense-Critical Raw Materials Supply Risk (2024). As evidenced, NATO defines REEs and other elements found in deep-sea mineral deposits as running high in the "critical risk" supply.

(Above) Rare Earth Elements (REEs) military applications. *Source: USGS Pacific Coastal & Marine Science Center;* (Below) NATO Defense-Critical Raw Minerals Supply Risk v. Military Importance Assessment. *Source: NATO Industrial Advisory Group (2024).*



10 MUST-KNOW FACTS ABOUT DEEP-SEA MINING

1. **The ocean produces at least half — and possibly up to 70–80% — of the oxygen humanity breathes.** Deep-sea mining would industrialize one of the planet's largest living systems during a climate and extinction crisis.

2. **Deep-sea mining minerals are not "green."** They are also being pursued for fighter jets, missiles, AI systems, weapons manufacturing, and military dominance in a new geopolitical arms race.

3. **Deep-sea mining could become the largest mining operation in human history.** The primary mining zone in the Pacific covers roughly 4.5–6 million square kilometres — about the size of the Amazon rainforest.

4. **Around 90% of species in proposed deep-sea mining zones are still unknown to science.** Humanity is preparing to destroy ecosystems before we even know what lives there.

5. **The minerals targeted for mining are the habitat itself.** Deep-sea mining would destroy the actual living foundation entire species depend on.

6. **Polymetallic nodules take millions of years to form.** What is destroyed will not recover within any human civilization timescale.

7. **Mining scars created on the seafloor in the 1970s are still visible today.** More than 40 years later, parts of the deep ocean have still not recovered from experimental disturbance.

8. **The deep ocean stores enormous amounts of carbon that help stabilize Earth's climate.** Deep-sea mining risks disrupting ancient carbon storage systems humanity barely understands.

9. **The Clarion-Clipperton Zone is one of the last ecosystems on Earth not yet heavily industrialized by humans.** Extraction here would occur before the science even exists to understand the consequences.

10. **There is currently no proven way to restore deep-sea ecosystems after mining.** None. The damage would be irreversible.

II. WHERE IS DEEP-SEA MINING PROPOSED?

The Geospatial Dimensions of DSM

GEOSPATIAL DIMENSIONS

The geography of deep-sea mining is central to understanding its ecological, legal, and geopolitical implications. Proposed extraction is not confined to a single type of seabed, a single ocean region, or a single jurisdictional framework. DSM proposals span abyssal plains, hydrothermal vent systems, seamount chains, continental margins, and national Exclusive Economic Zones (EEZs), as well as the seabed beyond national jurisdiction known in international law as "the Area."[14] The geography of DSM is also both vertical and horizontal: mining activities would occur across multiple ocean-depth zones while simultaneously affecting interconnected systems of currents, fisheries, migratory pathways, island nations, and ocean basins extending far beyond individual contract blocks.

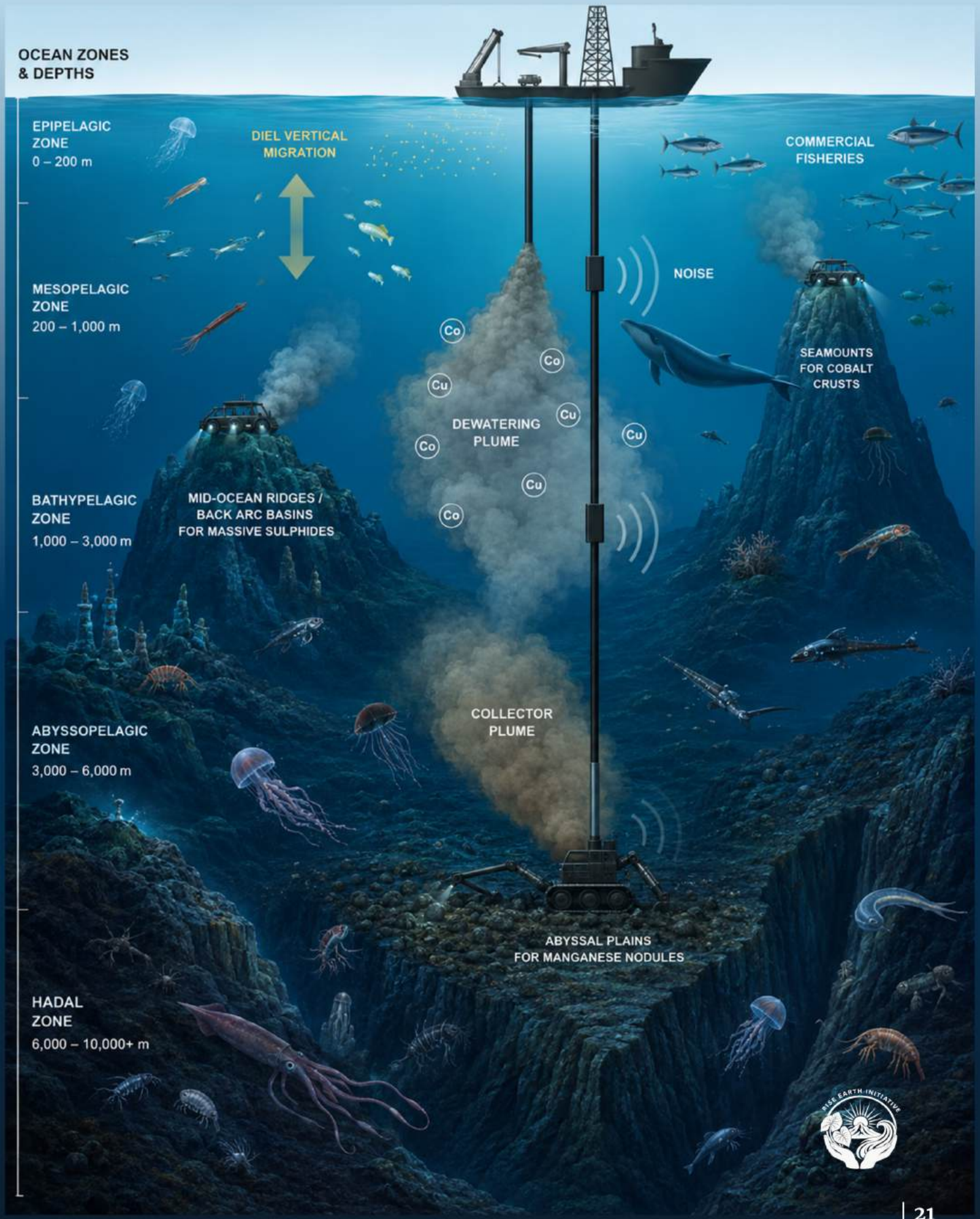
The ocean is not a flat or uniform environment. It is a vertically stratified and horizontally interconnected planetary system composed of distinct ecological layers, circulation systems, pelagic zones, benthic habitats, abyssal plains, seamount ecosystems, trench environments, and hydrothermal vent systems extending across immense ocean regions. None of these systems exists in isolation. Changes within one ocean layer or ecological region may directly affect others through interconnected currents, nutrient cycles, migratory pathways, carbon exchange processes, and biological relationships operating across vast spatial scales. Industrial extraction within one region therefore carries the potential to disrupt ecosystems and ocean processes far beyond the immediate mining site itself.

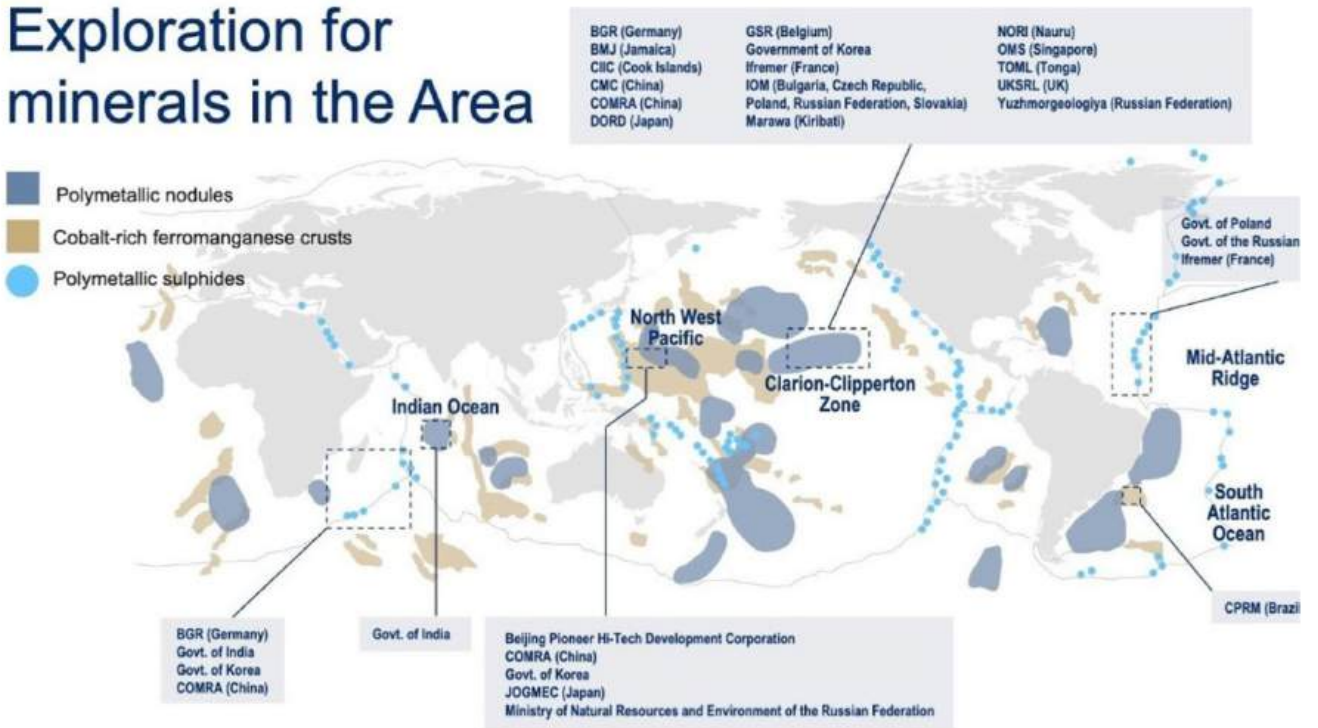
Vertical Ocean Layers and Ecosystems

The vertical dimension of DSM is particularly important because ocean ecosystems differ dramatically by depth, pressure, temperature, light availability, food supply, and ecological function.

The Epipelagic Zone (or "Sunlight Zone"), extending from the ocean surface to approximately 200 meters in depth, contains the sunlight necessary for photosynthesis and supports phytoplankton, the foundation of ocean oxygen production and many marine food webs.[15] Above and within this layer occur critical ecological processes tied to fisheries productivity, nutrient cycling, and climate regulation.

Beneath the Epipelagic Zone lies the Mesopelagic or "Twilight Zone," extending roughly from 200 to 1,000 meters below the surface. The Mesopelagic Zone supports vast populations of fish, squid, crustaceans, zooplankton, and migratory organisms increasingly recognized as central to marine food systems and carbon cycling. Many mesopelagic species participate in diel vertical migration, one of the largest daily biomass migrations on Earth, ascending toward surface waters at night to feed before descending again into deeper waters during daylight hours.[16] Through these migrations, mesopelagic organisms help transport carbon and nutrients between ocean layers and contribute to regulation of the biological carbon pump.


OCEAN ZONES
& DEPTHS
EPIPELAGIC
ZONE
0 – 200 m
DIEL VERTICAL
MIGRATION
COMMERCIAL
FISHERIES
MESOPELAGIC
ZONE
200 – 1,000 m
NOISE
SEAMOUNTS
FOR COBALT
CRUSTS
Co
Cu
DEWATERING
PLUME
BATHYPELAGIC
ZONE
1,000 – 3,000 m
MID-OCEAN RIDGES /
BACK ARC BASINS
FOR MASSIVE SULPHIDES
COLLECTOR
PLUME
ABYSSOPELAGIC
ZONE
3,000 – 6,000 m
ABYSSAL PLAINS
FOR MANGANESE NODULES
HADAL
ZONE
6,000 – 10,000+ m
DEEP EARTH INITIATIVE



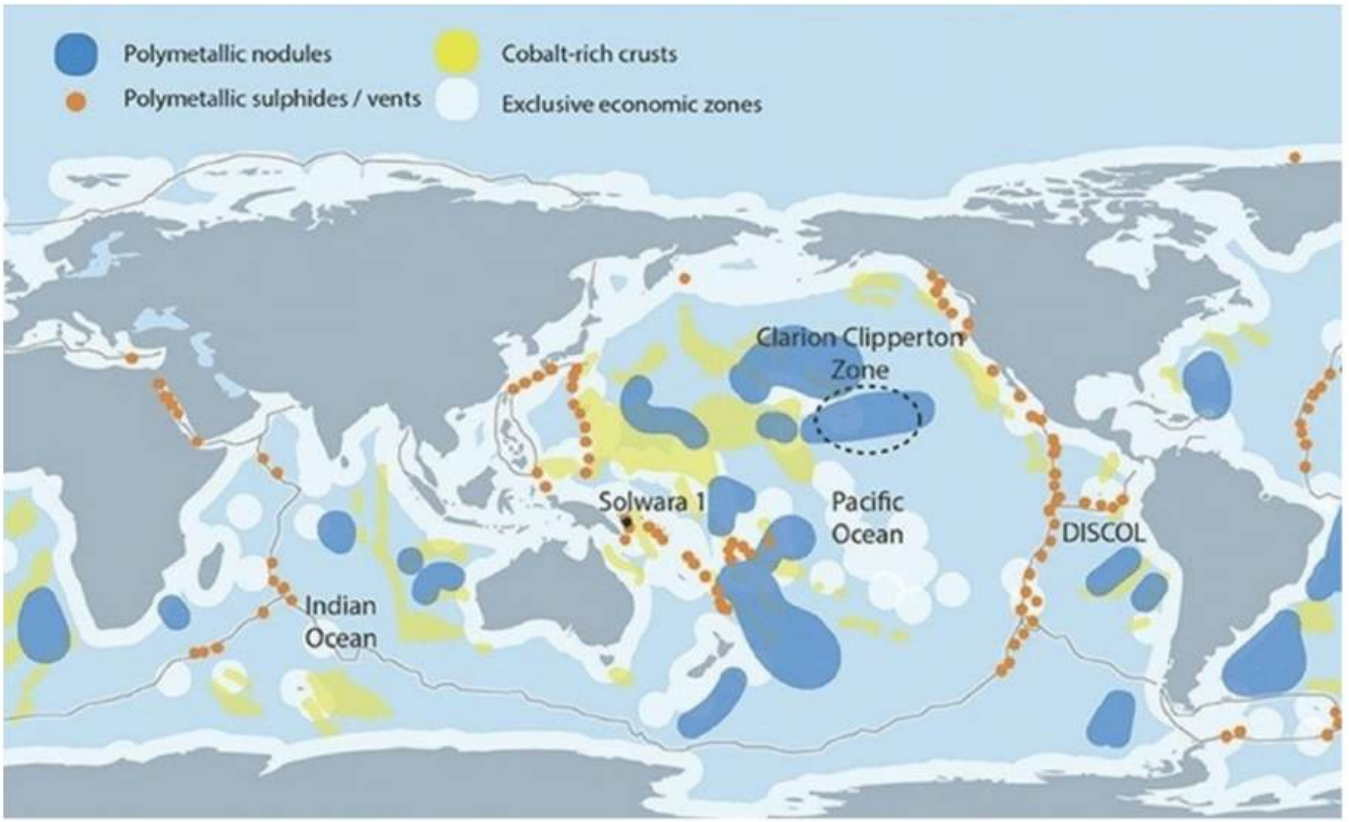
Exploration for minerals in the Area (beyond the limits of any national jurisdiction i.e., beyond coastal states' continental shelves) is spread across the world. *Source: ISA 2021; Inland Ocean Coalition.*

The Bathypelagic or "Midnight zone," extending from approximately 1,000 to 4,000 meters, is characterized by perpetual darkness, near-freezing temperatures, extreme pressure, and dependence upon marine snow, predation, and nutrient transport from upper ocean systems.[17] Beneath this region lies the Abyssopelagic Zone, extending roughly from 4,000 to 6,000 meters in depth and containing the abyssal plains targeted for polymetallic nodule mining.

Although abyssal ecosystems are often portrayed in public discourse as empty or lifeless environments, they support highly specialized organisms adapted to extreme conditions, including xenophyophores, sponges, corals, brittle stars, sea cucumbers, crustaceans, polychaetes, microbial communities, and numerous species still unknown to science. Ecological processes in these environments occur over exceptionally long timescales shaped by low temperatures, limited nutrient availability, slow biological growth, and stable environmental conditions.

Mining operations occurring at abyssal depths would not remain confined to the depth at which collector vehicles contact the seabed. Polymetallic nodule-mining systems would physically disturb abyssal plains while riser systems transport extracted slurry vertically through the water column to surface production vessels. Depending upon project design and regulatory approval, wastewater and sediment discharge could occur at varying depths within the water column, including ecologically sensitive mesopelagic regions.[18]

Finally, below the Abyss is the Hadal Zone, the deepest region of the ocean and a cold, dark, high-pressure environment in ocean trenches



A world map showing the concentration of the three main marine mineral deposit types: polymetallic nodules (blue); polymetallic or seafloor massive sulfides (orange); and cobalt-rich ferromanganese crusts (yellow). *Source: Frontiers in Marine Science, Miller et al., 2018.*

below about 6,000 meters to 11,000 meters deep. These trenches are created by tectonic plate subduction such as the Mariana Trench (deepest known trench on Earth). The extreme pressures in this region increase to over 1,000 times atmospheric pressure - enough to crush most submarines and surface organisms. Despite the harsh conditions, specialized organisms also survive there adapted to deep pressure, and also support microbial ecosystems based on chemosynthesis.

While DSM operations target depths between 800 and 6,000 meters to extract minerals like polymetallic nodules, massive sulfides, and cobalt-rich crusts, primarily along the Abyssal Plains avoiding the deepest ocean trenches, the Hadal zone remains vulnerable to secondary impacts from deep-sea mining.[19]

Sediment plumes generated at the seafloor may travel along deep currents across large distances, while midwater discharge may affect organisms involved in migration, feeding, reproduction, and nutrient transport. Because ocean systems remain interconnected across vertical and horizontal scales, disturbances generated at abyssal depths may propagate into broader ecological systems in ways that remain difficult to predict.

Noise and vibration generated through pumps, vessels, riser systems, and industrial machinery may interfere with organisms dependent upon pressure gradients, sound, vibration, or chemical cues for survival. Artificial light introduced into permanently dark ecosystems carries the potential to disrupt species dependent upon darkness, bioluminescence stable sensory

conditions for navigation, communication, predator avoidance, reproduction, and prey attraction.[20]

The geospatial scale of DSM thus extends vertically through multiple ocean layers and ecological systems rather than remaining confined to extraction points on the seafloor.

Horizontal Global Mining Regions

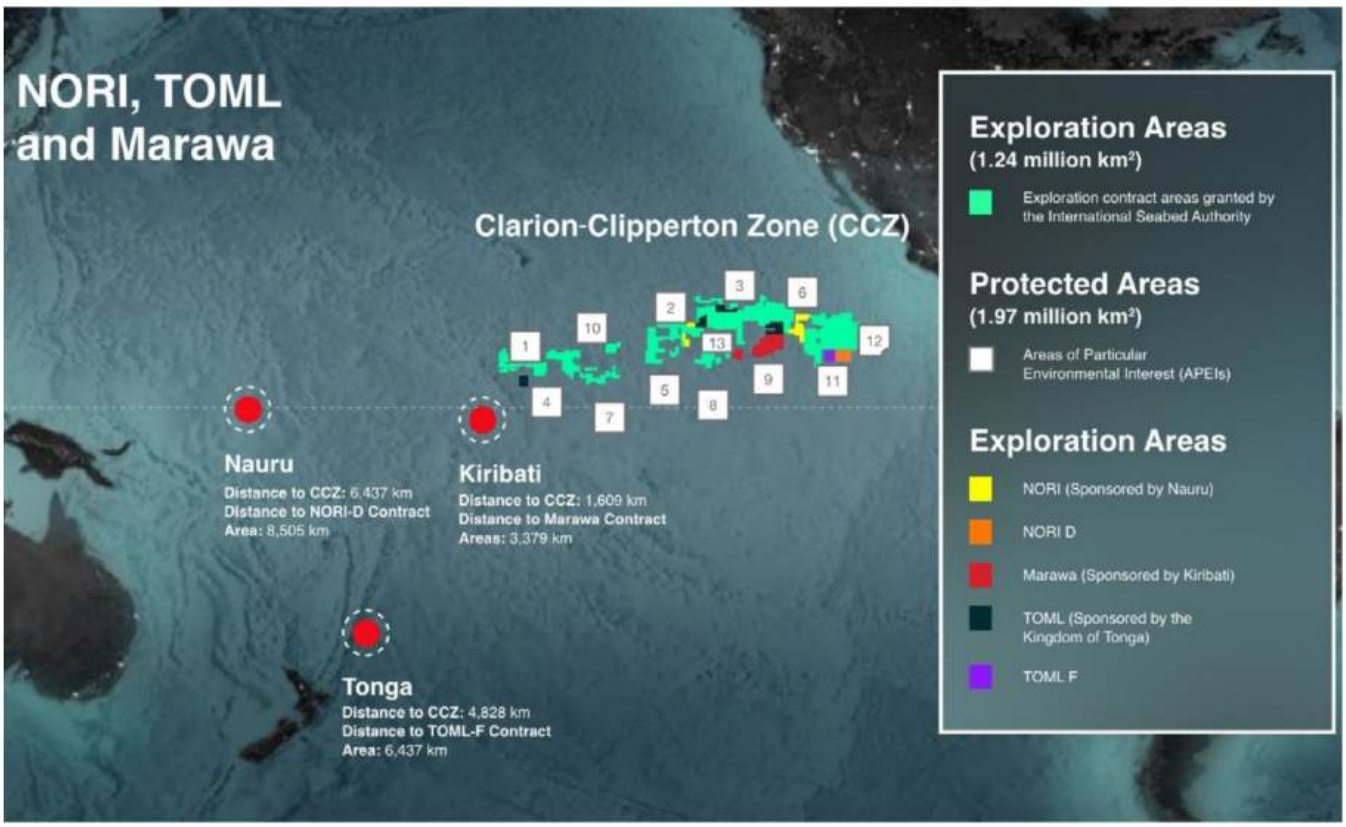
In addition to the vertical impacts within the water column and horizontal expansion of secondary impacts past the mining site, the horizontal geography of DSM is equally significant. Proposed mining activities are unfolding across multiple ocean basins and geopolitical regions, including the Pacific Ocean, Indian Ocean, Mid-Atlantic Ridge, and western Pacific volcanic systems.[21] Exploration is already happening now.

The Clarion-Clipperton Zone (CCZ) in the Pacific Ocean represents the largest and most commercially significant proposed mining region. Stretching across approximately 4.5 million square kilometers between Hawai'i and Mexico, the CCZ contains extensive polymetallic nodule fields and has become the focal point of international exploration activity. The region currently includes numerous ISA-sponsored exploration contract areas, reserved areas, and Areas of Particular Environmental Interest established through regional management planning processes.

The CCZ alone contains more than a dozen ISA-sponsored exploration contracts involving states and corporate entities connected to China, Canada, the United Kingdom, South Korea, France, Germany, Russia, India, Belgium, and additional sponsoring states. Its significance derives not only from mineral concentration, but also from its position within Pacific geopolitical and ecological systems.

The CCZ matters profoundly for Hawai'i and the broader Pacific region. Although much of the exploration activity occurs within Areas Beyond National Jurisdiction, the ecological, logistical, cultural, and geopolitical consequences would not remain geographically isolated. Hawai'i sits closer to the CCZ than many continental centers directing the current push toward seabed extraction and remains one of the principal military and maritime hubs in the Pacific. Expansion of commercial mining in the CCZ could increase vessel traffic, military DSM activity is also occurring or proposed within EEZs of Pacific Island states and territories. The Cook Islands has identified extensive polymetallic nodule resources within its EEZ and has issued exploration licenses through its seabed minerals authority. Papua New Guinea's Solwara 1 project, although never commercially realized, remains one of the most significant examples of proposed hydrothermal vent mining within national waters.[22]

Tonga, Kiribati, Nauru, and additional Pacific states have engaged ISA systems through sponsorship arrangements, exploration partnerships, or seabed-minerals development initiatives. American Samoa has also appeared within recent U.S. critical-minerals mapping and offshore resource discussions.[23]

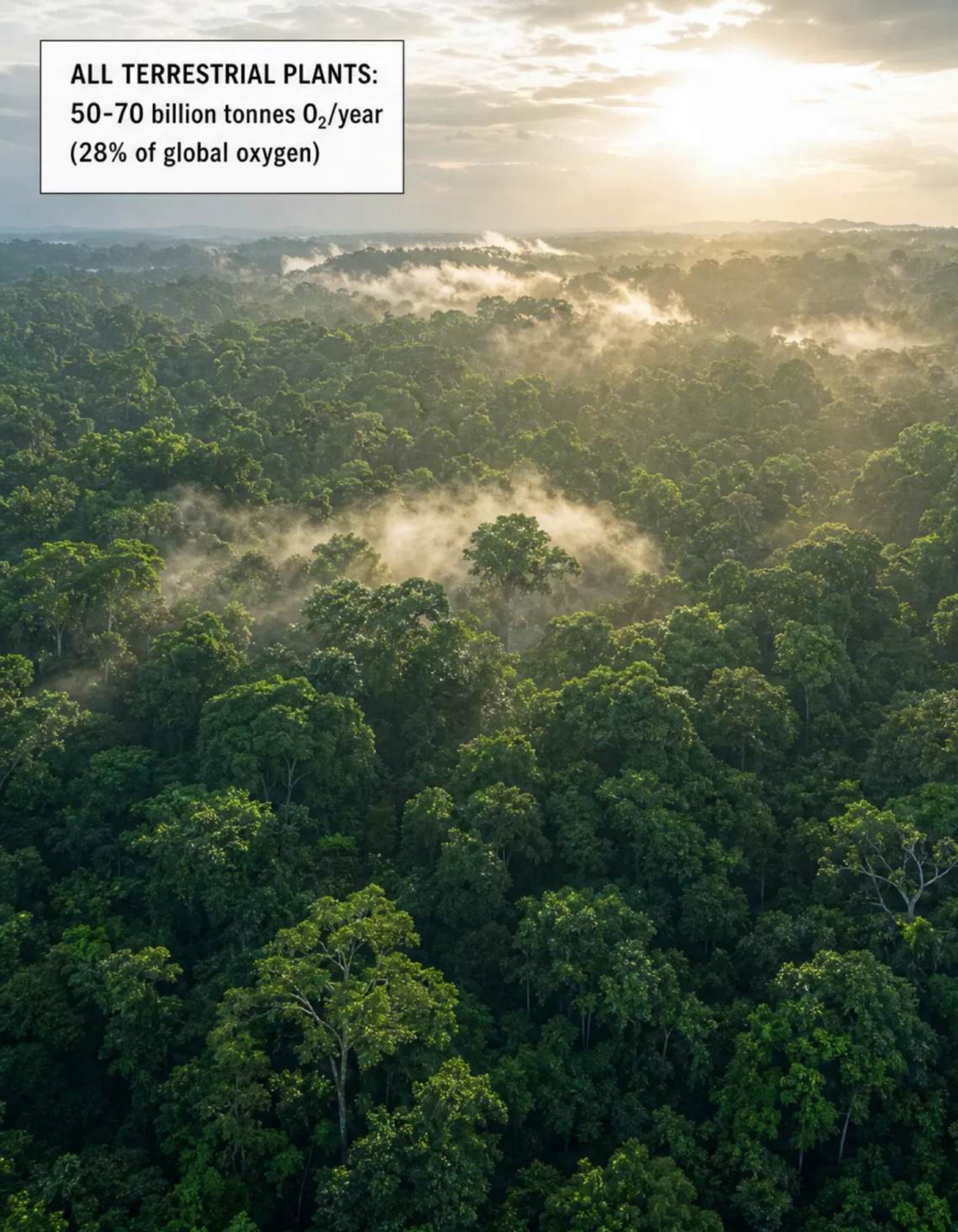


The Metals Company (TMC) subsidiaries NORI and TOML hold two exploration contracts in the CCZ, which Nauru and Tonga sponsor, respectively, with an exclusive commercial agreement through its subsidiary Marawa, a Kiribati state-owned entity, to explore and develop its contract area. *Source: The Metals Company, Impact Report.*

Hydrothermal (SMS) vent mining proposals are concentrated primarily around tectonic boundaries and mid-ocean ridges, including portions of the Mid-Atlantic Ridge, Indian Ocean ridges, and western Pacific volcanic systems. Seamount crust mining targets underwater volcanic mountains that frequently function as biodiversity hotspots, fish aggregation areas, and habitat systems connecting benthic life with migratory pelagic species.[24]

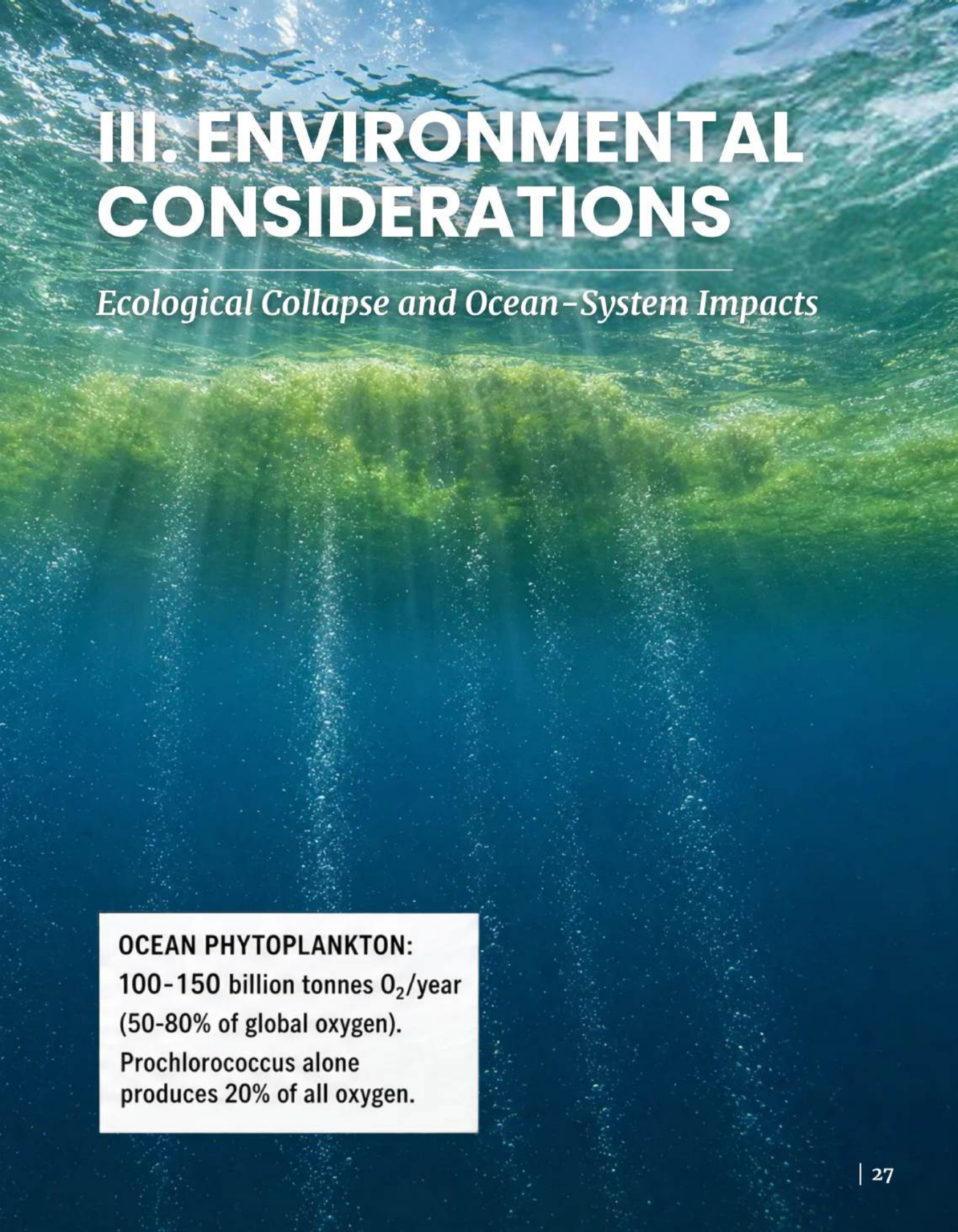
The geography of DSM also reveals uneven distributions of power, risk, and vulnerability. Exploration contracts, technological infrastructure, engineering capacity, and investment capital remain concentrated among industrialized states, corporations, and state-linked enterprises. Ecological exposure and governance burdens, however, often fall heavily upon Pacific communities and small island states with comparatively limited regulatory resources and deep dependence upon ocean health, fisheries, and marine ecosystems.

The Cook Islands, Nauru, Tonga, Kiribati, Papua New Guinea, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, (CNMI) and Hawai'i therefore sit within a geography where extraction proposals, strategic competition, militarization, and ocean vulnerability increasingly overlap. For U.S. territories like the CNMI, Guam and occupied Hawai'i, the ability to withhold consent is an uphill battle.[25]


ALL TERRESTRIAL PLANTS:
50-70 billion tonnes O_2/year
(28% of global oxygen)

III. ENVIRONMENTAL CONSIDERATIONS

Ecological Collapse and Ocean-System Impacts



OCEAN PHYTOPLANKTON:
100-150 billion tonnes O_2/year (50-80% of global oxygen).
Prochlorococcus alone produces 20% of all oxygen.

ENVIRONMENTAL IMPACTS

The environmental risk analysis surrounding deep-sea mining begins with a fundamental constraint: we cannot solve for what we do not know. The ecosystems targeted for industrial extraction remain among the least understood environments on Earth. In the Clarion-Clipperton Zone and other proposed mining regions, scientists continue documenting species previously unknown to science, while existing estimates suggest that the overwhelming majority of species recorded in these ecosystems remain undescribed. Environmental assessment under such conditions is inherently limited because baseline ecological knowledge remains incomplete. **Regulators cannot meaningfully measure biodiversity loss, recovery trajectories, cumulative impacts, or ecological thresholds when the underlying ecological inventory itself remains only partially known.**[26]

Nevertheless, industry narratives frequently characterize DSM impacts as manageable "disturbance" events capable of mitigation and eventual recovery. Existing scientific evidence raises substantial questions regarding those assumptions, particularly because the mineral deposits targeted for extraction are the habitat on which deep-sea ecosystems depend. What follows here is what we know about potential impacts – a fraction of what we do not know.

Ecological Uncertainty and Irreversibility

Polymetallic nodule mining would remove the nodules that serve as habitat structure across abyssal plains otherwise dominated by soft sediment. Sessile organisms attach directly to the nodules themselves, including sponges, corals, xenophyophores, microbial communities, anemones, and numerous additional abyssal organisms. Extraction therefore removes not only mineral deposits, but also the physical substrate required for ecological life within these environments.

Recovery timelines within abyssal ecosystems differ profoundly from many terrestrial systems. Deep-sea organisms frequently grow slowly, reproduce infrequently, and depend upon exceptionally stable environmental conditions shaped over geological timescales.[27]

In this context, the concept of "restoration" becomes difficult to reconcile with ecological timescales measured in millions of years.

Hydrothermal vent (SMS) ecosystems targeted through sulfide extraction present additional concerns. These vent systems sustain highly specialized chemosynthetic communities adapted to chemically and thermally extreme environments unlike those found at the ocean surface. Industrial extraction could destabilize vent ecosystems built upon highly specialized chemical relationships that many organisms cannot survive without. Even relatively small disruptions to vent chemistry, sulfide availability, temperature, or mineral composition may trigger cascading ecological effects across entire vent communities before science fully understands how these systems function. Seamount crust mining similarly threatens ecosystems characterized by deep-water corals, sponge fields, fish nurseries, and benthic communities that may require centuries or millennia to recover from physical disturbance.[28]

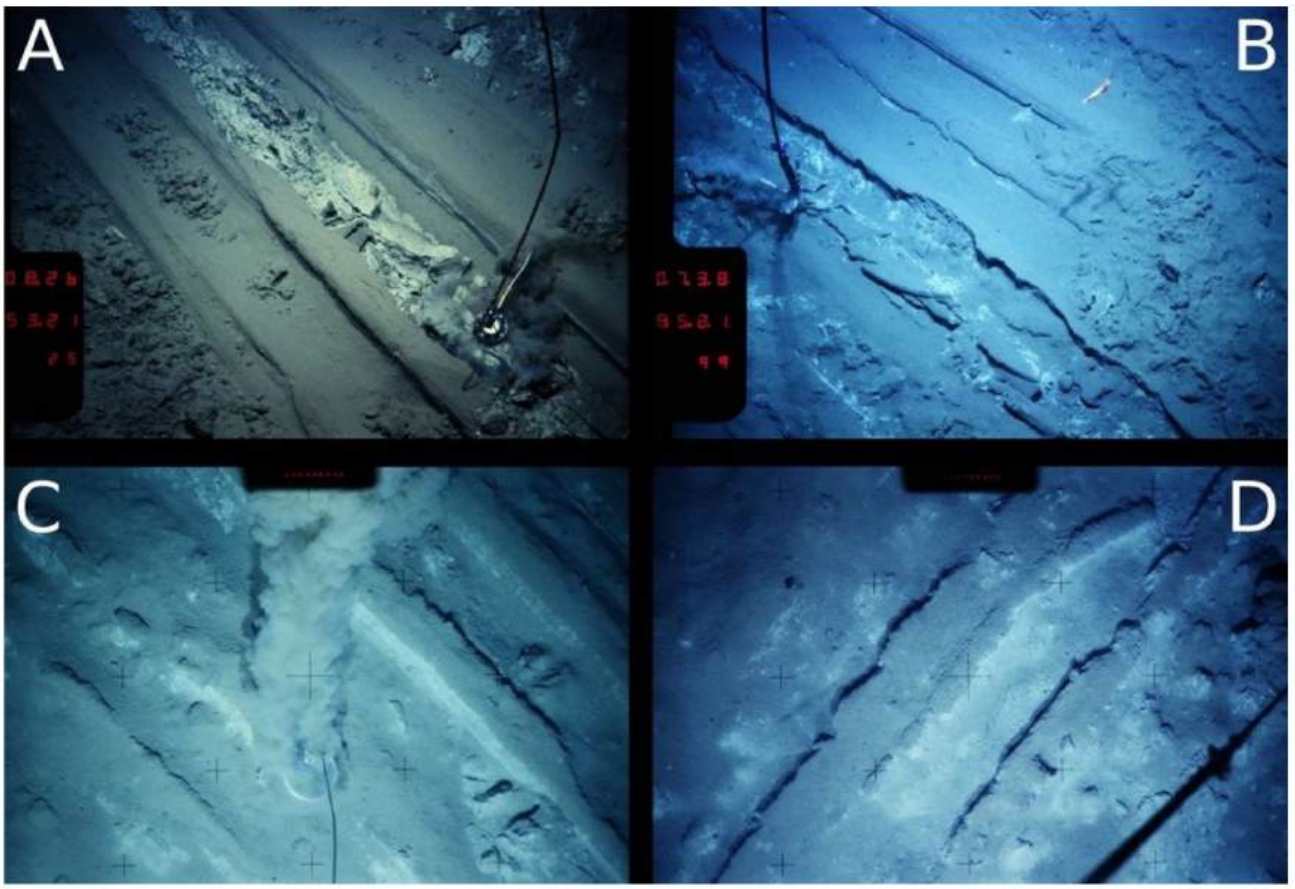
The strongest evidence against assumptions of rapid recovery comes from long-term disturbance experiments conducted within deep-ocean environments themselves.

Sediment Plumes, Physical Disturbance, and Recovery Failure

Experimental mining disturbance studies conducted through the DISCOL project in the Peru Basin remain among the most important scientific indicators of potential long-term impacts associated with DSM. During the late 1980s, researchers simulated aspects of polymetallic nodule mining disturbance across abyssal seafloor regions. Decades later, disturbance tracks remained visibly detectable, while biological communities continued to exhibit incomplete recovery.

Follow-up studies conducted more than twenty-six years after disturbance documented persistent physical alteration, reduced faunal activity, altered microbial ecosystem function, and long-term ecological disruption. In several disturbed regions, faunal recovery was nonexistent despite the comparatively smaller scale of the experimental impacts relative to projected commercial operations. These findings directly challenge claims that abyssal ecosystems can recover within ordinary human management timelines following industrial-scale extraction.[29]

Commercial mining would occur at scales vastly exceeding historical disturbance experiments.



Photograph of the seafloor in the DISCOL experimental area (Peru Basin) showing mining tracks still visible after 37+ years. *Source: Nature/DISCOL.*

Industrial nodule collection would likely involve repeated collector-vehicle passes, continuous scraping or suction across abyssal plains, riser transport systems, wastewater discharge, support vessels, and ore-transfer operations functioning continuously over extended periods.

Each phase introduces separate pathways of ecological harm. Impacts to benthic ("bottom dwelling") species include direct organism mortality, habitat removal, sediment compaction, microbial disruption, and elimination of nodule substrate. Water-column impacts include sediment plumes, turbidity, dissolved metals, chemical exposure, and discharge of processed wastewater at varying ocean depths depending upon project design and regulatory approval.

Sediment plumes remain among the most serious unresolved environmental risks associated with DSM. Collector vehicles scraping or vacuuming the seafloor would resuspend substantial quantities of fine sediment into deep-ocean currents, potentially smothering organisms and clogging filter-feeding structures. Surface production vessels may additionally discharge sediment-laden wastewater into midwater depths or near-surface ecosystems.[30]

Scientific uncertainty surrounding plume behavior remains extremely high because plume transport depends upon particle size, turbulence, current systems, discharge depth, chemistry, and the duration and intensity of mining operations.Because ocean ecosystems remain interconnected across the water column, these plumes may affect organisms far beyond the immediate extraction site, including filter feeders, zooplankton, fish larvae, migratory species, and mesopelagic ecosystems central to nutrient transport and

marine food webs. Disturbance introduced at abyssal depths may therefore propagate through broader ocean systems in ways that remain difficult to predict.[31]

Noise and light pollution also remain substantially under-examined within many policy discussions surrounding DSM. Deep-sea ecosystems evolved under conditions of perpetual darkness and comparatively low anthropogenic noise. Mining vehicles, pumps, riser systems, thrusters, surface vessels, and ore-transfer operations would introduce continuous industrial sound into environments where many organisms depend upon vibration, sound, pressure gradients, or chemical cues for survival.

Artificial light introduced into permanently dark ecosystems may disrupt species dependent upon bioluminescence for communication, reproduction, predator avoidance, or prey attraction. These forms of disturbance are difficult to monitor and may generate ecological stress even where immediate mortality is not visibly apparent. Many deep-sea organisms evolved under conditions of long-term environmental stability and may possess limited adaptive capacity to sustained industrial disturbance.[32]

The World's Oxygen Production

The climate risks associated with DSM extend beyond emissions generated by mining vessels and industrial processing systems. The ocean functions as one of the planet's primary life-support systems, regulating heat, carbon, oxygen, nutrient cycling, and atmospheric stability on a planetary scale.

Popular discourse frequently describes tropical rainforests as the "lungs of the Earth." Rainforests remain ecologically indispensable, yet this framing often obscures the foundational role of the ocean itself. Marine phytoplankton, algae, cyanobacteria, and other photosynthesizing marine organisms generate at least half (50%-80%) of Earth's atmospheric oxygen, with some estimates placing ocean oxygen production higher depending upon seasonal and regional conditions. Without the ocean, complex

terrestrial life—including human life—could not exist.

The ocean also absorbs approximately 90% of excess heat associated with greenhouse gas emissions and functions as one of the world's largest carbon sinks. Deep-ocean systems contribute to carbon sequestration, nutrient cycling, microbial regulation, and long-term ecological stability through processes that remain only partially understood by science.[33]

Emerging scientific data shows that polymetallic nodules also produce "dark oxygen" - oxygen generated in complete darkness without sunlight through natural electrochemical processes. This discovery has shifted the global discussion about the deep ocean, highlighting what we do not yet know about deep sea processes.[34]

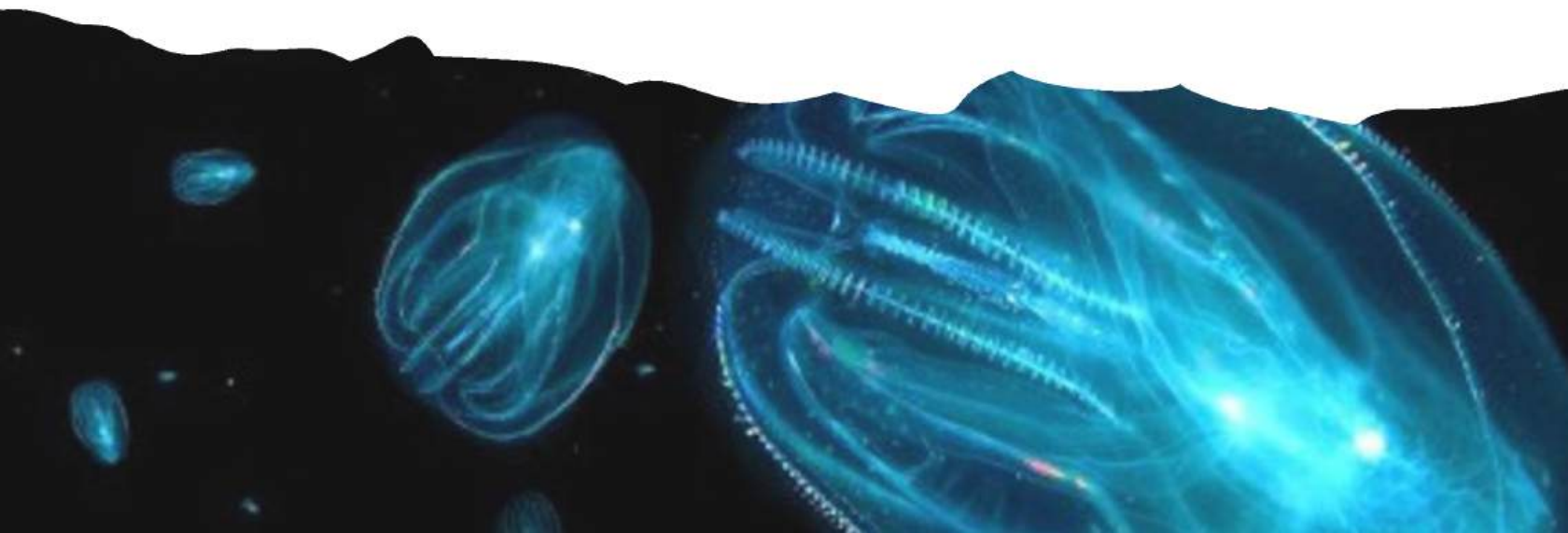
The Nippon Foundation, initially involved in supporting research connected to DSM, began supporting major international research projects to investigate how dark oxygen forms and what role it plays in sustaining life. Although this research remains preliminary and contested, it underscores a broader point central to the DSM debate: humanity's scientific understanding of deep-ocean ecological systems remains incomplete, even as industrial extraction proposals advance toward commercialization.[35]

The relevant issue is not whether DSM directly removes oxygen from the atmosphere. The concern is that ocean systems operate through interconnected biological and geochemical processes that we do not fully understand. Industrializing these systems under conditions of profound uncertainty carries risks that may extend beyond individual mining sites into broader planetary systems.

Fisheries, Food Security, and Cultural Survival

Marine ecosystems support global fisheries, nutrient systems, and food-security networks relied upon by billions of people. More than 3 billion people globally depend upon marine and coastal biodiversity for livelihoods and subsistence, while fish provide approximately 17% of the global population's animal protein intake, with substantially higher dependence rates across many coastal and island communities.[36]

The relationship between DSM and fisheries cannot be dismissed simply because mining operations occur below ordinary fishing depths. Ocean systems remain interconnected through currents, nutrient transport, migratory pathways, mesopelagic biomass movement, larval dispersal, and ecological food webs extending across vertical and horizontal scales.[37]



Where DSM affects planktonic systems, mesopelagic organisms, fish larvae, seamount ecosystems, migratory species, tuna pathways, or deep-water corals, the consequences may propagate through interconnected marine food webs and extend into commercial and subsistence fisheries. For Pacific communities and Small Island Developing States, fisheries are not merely economic sectors; they are foundational systems of nutrition, livelihood, ceremony, intergenerational knowledge, and cultural continuity.[38]

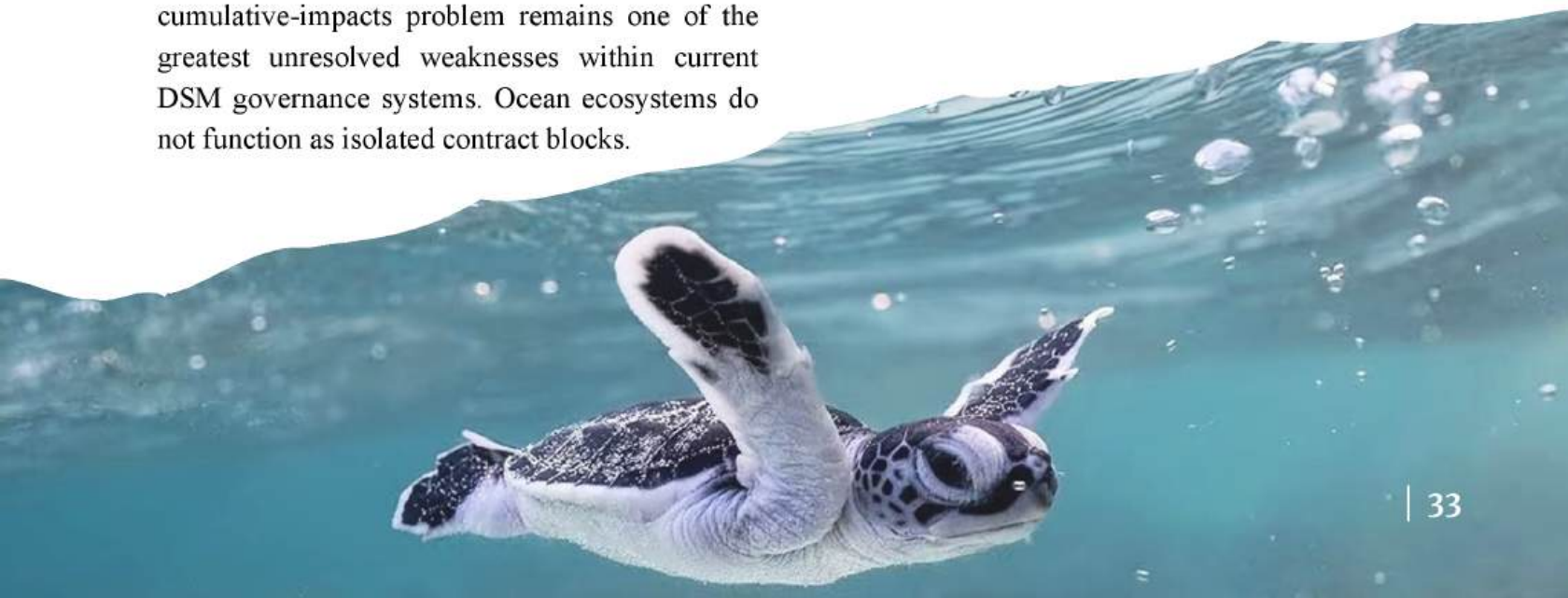
Human Rights and Cumulative Impacts

The human-rights implications of DSM are therefore inseparable from its ecological risks. These concerns include procedural exclusion, lack of meaningful participation, threats to food systems, interference with Indigenous relationships to ocean territories, and the transfer of ecological risk onto future generations.[39]

The right to a clean, healthy, and sustainable environment has gained increasing recognition within international human-rights frameworks.[40] Deep-sea mining raises serious questions regarding whether states and international institutions can authorize potentially irreversible environmental harm under conditions of acknowledged scientific uncertainty. The cumulative-impacts problem remains one of the greatest unresolved weaknesses within current DSM governance systems. Ocean ecosystems do not function as isolated contract blocks. Disturbance within one region may interact with broader systems of currents, migration, nutrient transport, carbon cycling, warming, acidification, and ecological stress across multiple ocean basins simultaneously. **What happens at the bottom of the ocean reverberates throughout interconnected ocean systems all the way to surface waters.**

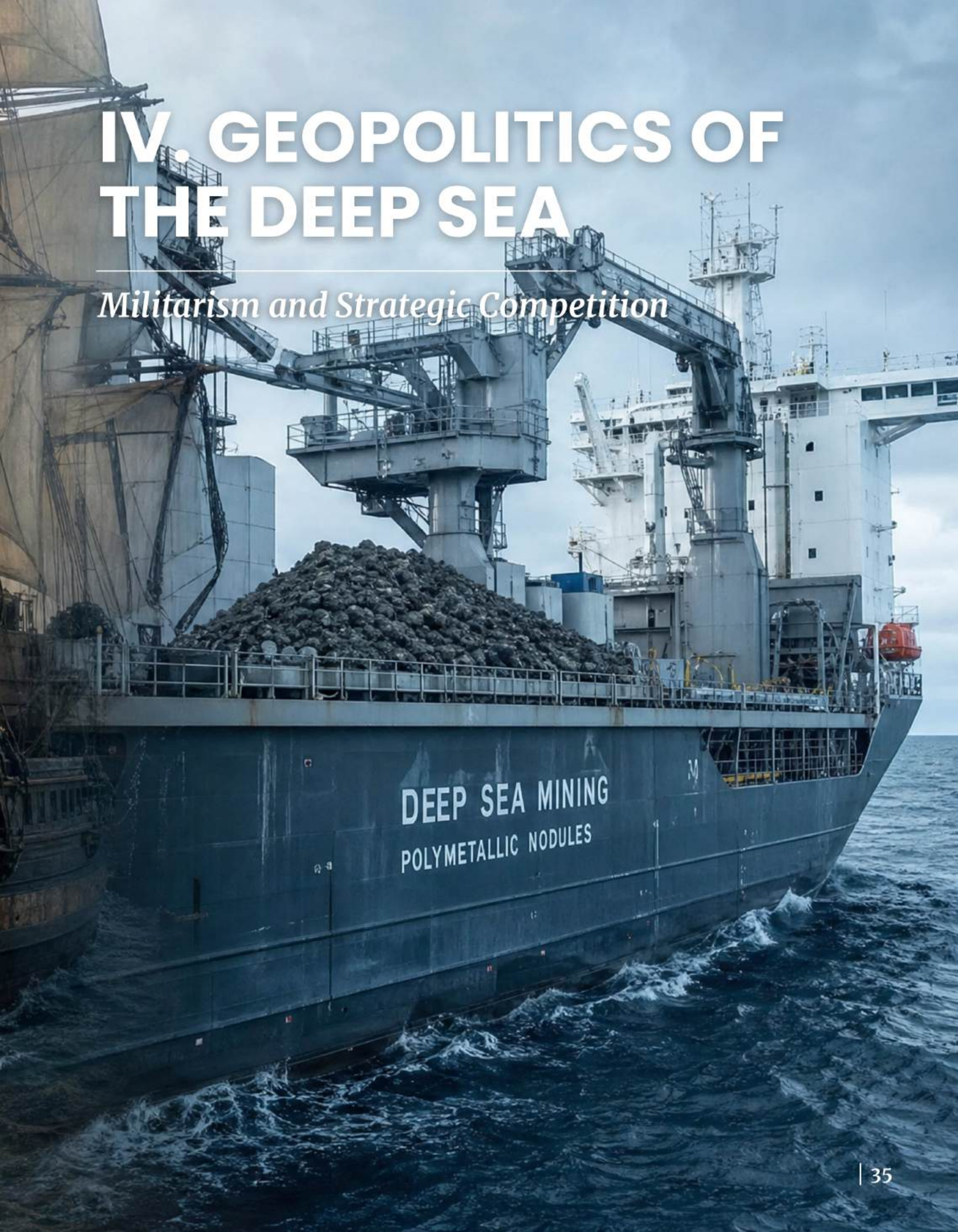
Environmental review processes may evaluate individual mining blocks or contractor operations, but commercial-scale extraction is not site-specific and would involve multiple contractors, overlapping industrial activity, transboundary currents, shared species, climate stress, ocean warming, acidification, deoxygenation, shipping routes, and existing fishing pressures operating simultaneously across interconnected ocean systems.

The central governance question is therefore not whether a single contractor can describe a localized project footprint. The question is whether regulators possess the scientific capacity, institutional independence, and long-term ecological understanding necessary to evaluate cumulative, transboundary, multi-decadal impacts across ocean systems that remain only partially understood.



IV. GEOPOLITICS OF THE DEEP SEA

Militarism and Strategic Competition



MILITARISM & GEOPOLITICS

Imagine this: Massive industrial collector machines descend into the abyss as a United States–backed deep-sea mining operation begins extracting minerals from the Pacific seabed bypassing the ISA. States party to the United Nations Convention on the Law of the Sea (UNCLOS), alongside countries supporting a global moratorium on deep-sea mining, condemn the operation as unlawful and destabilizing. Diplomatic protests escalate into maritime confrontation. Coast guard vessels and naval patrols are deployed to intercept or halt mining activities on the high seas to assert international law in the protection of the ocean and the "common heritage of humankind." The United States responds by sending naval assets to protect corporate operations. What began as a mining venture quickly transforms into a geopolitical flashpoint: military vessels facing off in contested waters, escalation risks rising by the hour, and the deep ocean becoming the newest frontier for international conflict.

In a world already marked by intensifying competition over resources, climate instability, and militarization, deep-sea mining carries the potential not only to devastate the ocean, but to ignite confrontation on the high seas with consequences far beyond the ocean floor.

The militarized dimensions of deep-sea mining are frequently understated in public debate. Industry narratives often emphasize renewable energy infrastructure, yet the minerals targeted through DSM also support military manufacturing and advanced communications technologies.[41]

Critical-minerals policy within the United States, China, Japan, the European Union, and other major economies increasingly treats mineral access as a matter of national security rather than solely industrial development. DSM is therefore emerging within a strategic-security framework shaped by geopolitical rivalry, supply-chain vulnerability, and military planning.

The contemporary race toward the seabed cannot be separated from broader struggles over maritime dominance and control over strategic infrastructure. The same ocean systems now being framed as essential under the myth of a "green transition" are also central to warfare, communications, security, and geopolitical influence across the Pacific and beyond.[42]

Imperial Oceanography and Strategic Knowledge

The strategic importance of the deep ocean predates the current minerals race by more than a century. Oceanographic exploration developed alongside imperial expansion. The HMS Challenger expedition of 1872 is frequently described as the foundation of modern oceanography because it mapped ocean depths, studied marine ecosystems, and collected seabed samples, including polymetallic nodules.

The expedition, however, also reflected the strategic priorities of the British Empire at the height of global maritime expansion. Knowledge of underwater terrain, currents, seabed composition, and ocean circulation supported submarine telegraph systems, naval mobility, maritime navigation, and imperial logistics.[43]

Deep sea minerals are used in modern military systems. *Source: RISE Earth Initiative, 2026.*

Oceanographic knowledge was therefore never purely scientific; it also functioned as strategic knowledge tied to territorial influence, military strategy, and control over global trade routes.

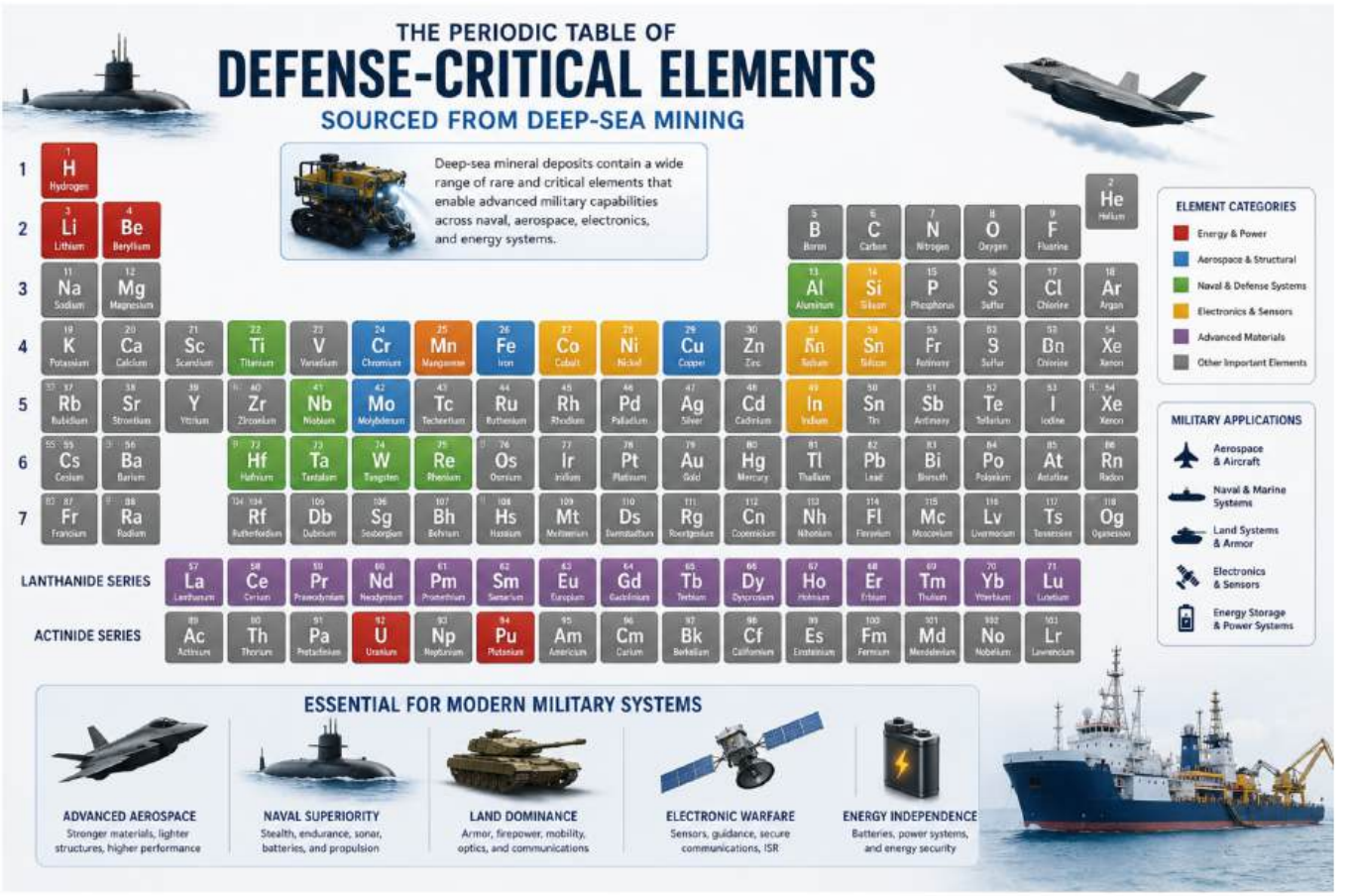
This relationship between ocean science and state power intensified during the twentieth century. The United States and Soviet Union invested heavily in deep-ocean mapping, sonar systems, and submarine detection technologies that became central components of military strategy during the Cold War.[44]

Many DSM technologies such as autonomous underwater vehicles, remotely operated systems, robotics, and sensor technologies, were developed through dual-use pathways serving both civilian and military purposes. The same systems capable of locating mineral deposits also support seabed warfare, intelligence operations, and undersea infrastructure monitoring.

Project Azorian remains among the clearest historical examples of this convergence between industrial narrative, ocean science, and military strategy. Publicly presented as a commercial deep-sea mining venture, the CIA-backed operation sought to recover a sunken Soviet submarine from the Pacific Ocean floor during the Cold War. The project demonstrated how commercial extraction narratives could operate simultaneously as a cover alongside intelligence and strategic military objectives.[45]

Critical Minerals and Strategic Rivalry

The current push toward DSM is unfolding within intensifying geopolitical competition over critical-mineral supply chains and technological



Periodic table of defense elements potentially sourced from deep-sea mining. *Source: RISE Earth Initiative, 2026.*

dominance. Deep-sea mineral deposits are seen as strategic assets because in addition to renewable energy infrastructure, they are necessary for key military manufacturing.

Political discourse in the United States describes DSM as necessary to reduce dependence upon Chinese-dominated mineral processing systems and terrestrial rare-earth supply chains. China currently maintains substantial influence across global critical-mineral processing and manufacturing sectors while also holding multiple ISA exploration contracts across different seabed resource categories. Chinese investment in deep-sea research and ocean technology has intensified concerns among U.S. policymakers regarding long-term strategic dependency.

This framing transforms seabed governance into a theater of great-power competition in which environmental precaution is portrayed as a strategic disadvantage. As mineral access becomes tied to geopolitical rivalry and national security, pressure grows to accelerate licensing, weaken regulatory barriers, and treat environmental safeguards as obstacles to national competitiveness.[46]

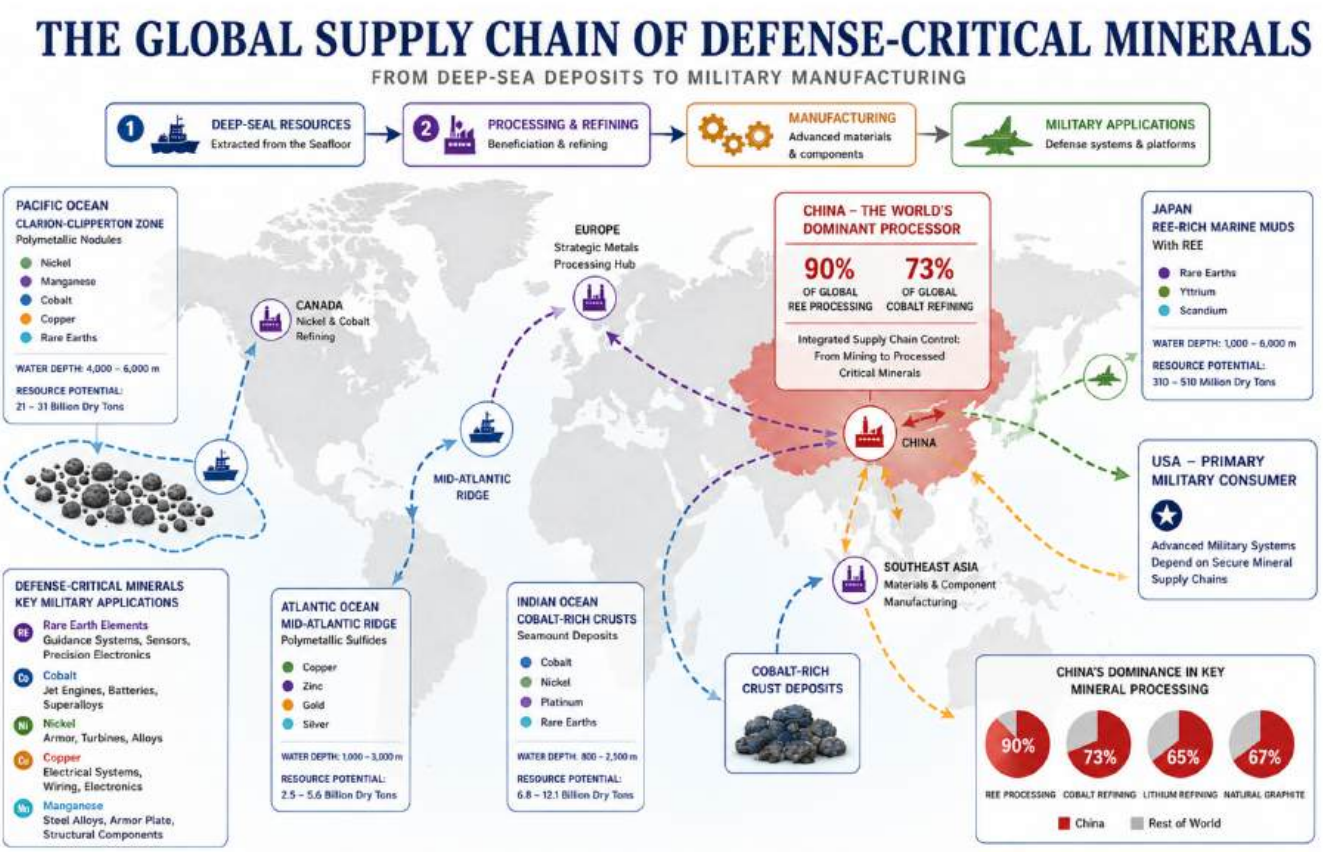
The policy question is therefore how much projected demand is being driven through militarized technologies, strategic stockpiling, and national-security planning. When DSM is justified publicly through climate-transition language while simultaneously serving military-industrial supply chains, the political framing of the debate becomes substantially softer and narrower than the underlying realities driving extraction pressure.

Ocean Governance of the Deep Sea and Impending Fragmentation

Ocean governance in areas beyond national jurisdiction is formally administered through the International Seabed Authority (ISA), established in 1994 under the United Nations Convention on the Law of the Sea (UNCLOS), adopted in 1982.[47] Under UNCLOS, the ISA was created both to regulate mineral-related activities in the international seabed as the "common heritage of humankind" and to ensure the effective protection of the marine environment from harmful effects arising from those activities, while states party to the Convention are also bound by broader obligations to protect and preserve the ocean.

Central to this framework is the precautionary principle, which holds that where scientific uncertainty and the risk of serious or irreversible harm remain profound, restraint should prevail over potentially destructive activity. These principles were intended to prevent the deep ocean from becoming a site of unilateral extraction, geopolitical conflict, and ecological destruction.

More recently, the adoption of the Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ Agreement)[48] strengthened the broader international framework governing the high seas by expanding emphasis on biodiversity protection, ecosystem conservation, environmental impact assessment, and international cooperation in areas beyond national jurisdiction. Together, these frameworks reflect



Global supply chain map of deep-sea deposits to military manufacturing. *Source: RISE Earth Initiative, 2026.*

an ongoing effort within international law to expand collective stewardship and governance of the global ocean commons.

Recent executive actions within the United States, however, have intensified concerns that this international governance system may be entering a period of accelerating fragmentation.

Bypassing the ISA: The United States Executive Action, Project Vault & the NDS

On April 24, 2025, President Trump signed the Executive Order "Unleashing America's Offshore Critical Minerals and Resources," directing federal agencies to expedite the issuance of exploration and commercial recovery licenses under the Deep Seabed Hard Mineral Resources Act (DSHMRA) of 1980.[49]

Enacted prior to the creation of the International Seabed Authority (ISA), DSHMRA authorizes the United States to issue licenses and permits for the exploration and potential commercial recovery of hard mineral resources from the deep seabed beyond national jurisdiction. Because the United States has never ratified UNCLOS and is not formally a member of the ISA, U.S.-connected actors have historically looked to DSHMRA as a domestic legal pathway for authorizing seabed mining activities outside the ISA framework. The statute, long largely dormant, effectively establishes a parallel regulatory structure through which the United States can authorize mining in international waters under domestic law rather than multilateral governance. Recent executive actions and NOAA regulatory reforms signal an increasing willingness to operationalize DSHMRA as an alternative legal regime for deep-sea mining authorization.

Crucially, the Executive Order explicitly directed an evaluation of the National Defense Stockpile (NDS) for the "physical and virtual storage of minerals derived from the seabed and entering into offtake agreements for the minerals," while simultaneously instructing the Department of Defense to explore the use of the Defense Production Act (DPA) and other procurement and financing programs to advance seabed mineral development. This single order established both the legal pathway for extraction and the guaranteed purchase mechanism for the product.[50]

The financial engine of this strategy is Project Vault, a $10 billion public-private partnership announced in February 2026 and financed by the Export-Import Bank (EXIM), designed to create

the U.S. Strategic Critical Minerals Reserve. Under this structure, participating companies commit to purchasing critical minerals at fixed prices, with the stockpile procuring and storing materials on their behalf based on "upfront purchase commitments". As the Atlantic Council noted, "long-term offtake is the holy grail for companies looking to develop a Western critical minerals supply chain," and in the absence of commercial contracts, "direct purchasing through a government stockpile is often cited as the next best alternative to provide project developers with the cash flow certainty needed to secure financing". Project Vault thus functions not merely as a reserve, but as a guaranteed market, insulating deep-sea mining companies from the commercial risk that would otherwise make extraction financially unviable.[51]

The Defense Production Act provides the legal authority for the government to act as a buyer of last resort. DPA Title III, Section 303 (50 U.S.C. § 4533) authorizes "purchases or purchase commitments" that can include direct government purchases or the government establishing a viable market price, while Section 302 authorizes loans specifically for "the exploration, development and mining of strategic and critical metals and minerals".

The Executive Order waived the preconditions normally required for these authorities, and directed the DoD to "add mineral production as a priority industrial capability development area for the Industrial Base Analysis and Sustainment Program" within 30 days. The precedent for how these tools are deployed is already established: in July 2025, the DoD provided MP Materials with a 100% offtake commitment for 10 years, a price floor at nearly double the market rate ($110/kg versus $60/kg), and a guaranteed minimum of $140 million per year in raw profits — including for "excess materials that are stockpiled".[52]

This model is now being directly applied to deep-sea mining. In February 2026, the Defense Industrial Base Consortium (DIBC), managed on behalf of the Department of Defense, issued a Request for Project Proposals (RPP-CM-26-01) focused on domestic processing capabilities for critical minerals. In direct response, Deep Sea Minerals Corp. submitted a bid in March 2026 to provide the United States with "a reliable supply of critical minerals, focusing on Nickel (Ni), and a complementary commercialization plant" sourced from the deep ocean. The DIBC explicitly provides "non-dilutive financing for key contractors," meaning the government pays mining companies to produce, absorbing the financial risk entirely. This confirms that deep-sea mining companies are already actively bidding on defense contracts to supply the military with nodule-derived metals under a framework where

the government guarantees both the purchase and the profit.[53] The ISA has responded unequivocally. Secretary-General Leticia Carvalho stated that "no entity alone, no country alone, no investor alone has the right to benefit or tap into resources in the areas outside of its jurisdiction," and warned that companies proceeding under U.S. permits face a "blizzard of litigation" for what she characterized as "unlawful activity".[54] Yet the U.S. strategy is designed to render this opposition irrelevant in practice.

By relying upon DSHMRA as a domestic legal basis for authorizing extraction outside the ISA system, while simultaneously guaranteeing that military and government-backed stockpiles will purchase and store production at fixed prices through Project Vault, the NDS, and DPA purchase commitments, the United States has constructed a self-contained economic and legal ecosystem for deep-sea mining that operates largely beyond international oversight. Rather than openly rejecting the ISA, these procurement structures and domestic licensing mechanisms make the multilateral framework structurally irrelevant: the permits are domestic, the demand is guaranteed, the financing is secured, and the market is state-backed.

The machinery of this parallel system is already in motion. On January 21, 2026, NOAA issued a final rule modernizing and streamlining the permitting process under DSHMRA, consolidating exploration licenses and commercial recovery permits into a single application framework.

The following day, The Metals Company's U.S. subsidiary (TMC USA) filed the world's first consolidated deep-seabed mining application, expanding its proposed commercial recovery area in the Clarion-Clipperton Zone to approximately 65,000 square kilometers. On March 9, 2026, NOAA determined that TMC USA's application is in "substantial compliance" with regulatory requirements, a key procedural milestone toward the issuance of the first U.S. commercial recovery permit for deep-sea mining in international waters.[55]

Simultaneously, exploration is advancing within national jurisdictions: the Cook Islands has issued three deep-sea mining exploration licenses (two held by U.S. companies), with exploration expeditions actively mapping the seafloor; Deep Sea Minerals Corp. submitted its own NOAA application under DSHMRA on March 23, 2026; and China holds five ISA exploration contracts across the Pacific, Indian, and Atlantic Oceans.[56]

The convergence of these activities demonstrates that the United States is not merely theorizing a bypass of the ISA — it is actively operationalizing one through domestic law,

Pentagon procurement structures, and state-backed financial guarantees, with DSHMRA functioning as the legal foundation for a parallel seabed mining regime outside the UNCLOS system.

Regulatory Arbitrage & Fragmentation

The implications extend beyond DSM alone. If powerful states increasingly bypass multilateral governance structures where strategic interests are perceived to be at stake, ocean governance may become progressively fragmented, competitive, and militarized. The resulting system could incentivize regulatory arbitrage, accelerated extraction, and weakened environmental oversight.

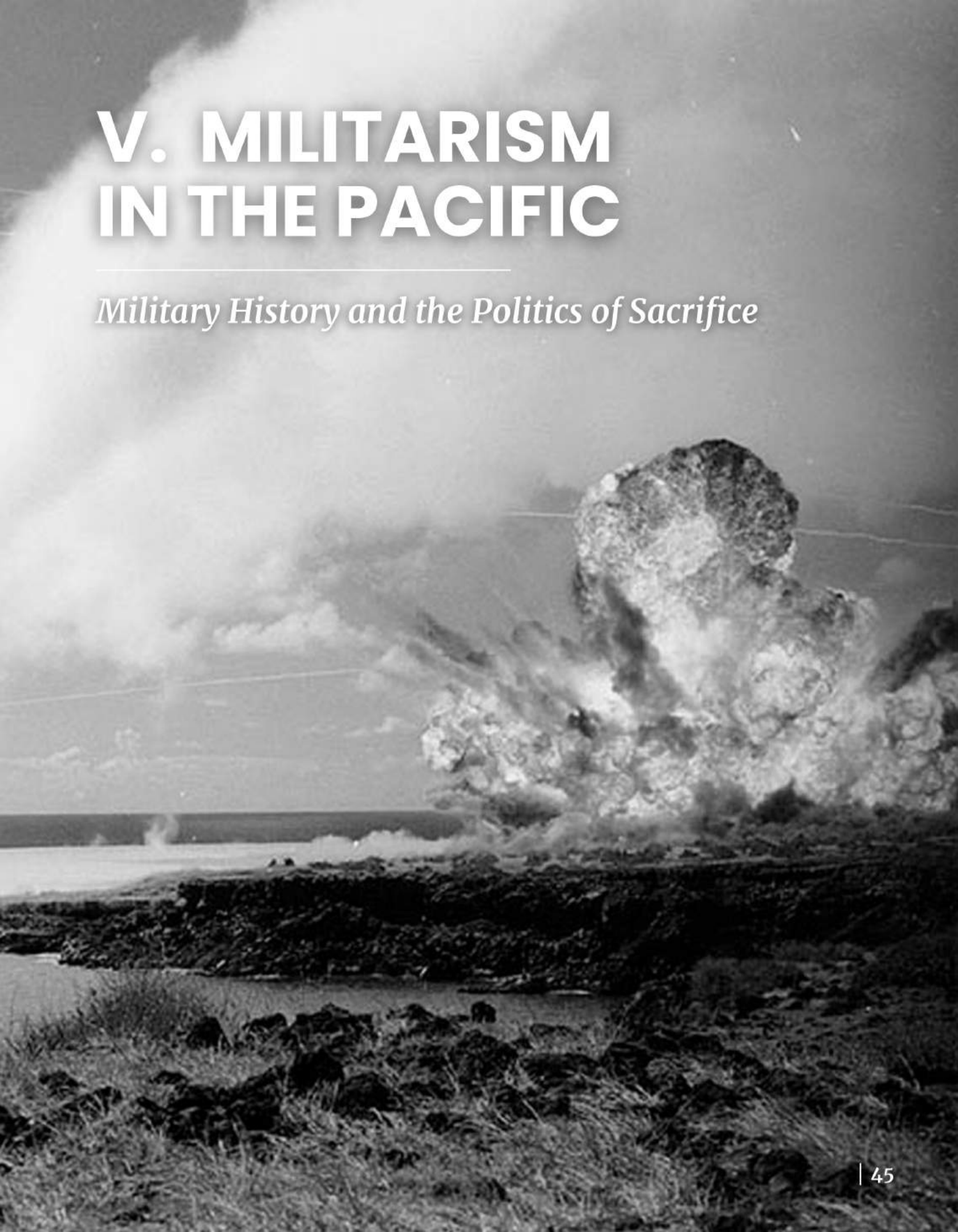
Militarism also changes the tempo and logic of decision-making. National-security frameworks frequently prioritize speed, strategic advantage, secrecy, executive discretion, and resource securitization. Environmental governance, by contrast, depends upon baseline science, transparency, cumulative-impact assessment, public participation, independent review, and enforceable liability systems.

These governing logics are fundamentally in tension. When deep-ocean minerals are framed primarily as strategic assets within geopolitical rivalry, precautionary ecological governance may increasingly be portrayed as delay, dependency, or weakness. That reframing carries substantial risks because it lowers the evidentiary threshold required before potentially irreversible harm is authorized within ecosystems central to planetary ecological stability.

Treating DSM solely as a battery-minerals issue obscures the deeper dynamics of maritime power, militarized extraction, strategic competition, and ocean governance that continue shaping the contemporary race toward the seabed.

V. MILITARISM IN THE PACIFIC

Military History and the Politics of Sacrifice



THE POLITICS OF SACRIFICE

The Pacific as Militarized Ocean Space

The Pacific holds a central position within this militarized geography. Occupied Hawai'i hosts major U.S. Indo-Pacific military infrastructure and functions as a logistical, operational, and command center for U.S. military activity throughout the region. The Hawaiian Islands are also central to maritime exercises, naval logistics, and defense coordination extending across the Pacific basin. RIMPAC, hosted in and around Hawai'i, is the world's largest international maritime exercise. The exercise brings together naval forces, submarines, aircraft, surface vessels, and military personnel from numerous countries in the same ocean region where seabed mapping, mineral competition, and strategic infrastructure development are intensifying. This overlap matters because it situates DSM within an already militarized Pacific ocean space rather than an empty commercial frontier.[57]

The relationship between militarization and extraction in the Pacific is not new. Pacific islands and ocean territories have repeatedly been transformed into sacrifice zones in the name of national security and military readiness.[58]

Kaho'olawe, an island sacred to Kanaka Maoli, was used for decades as a U.S. military bombing range, resulting in ecological destruction, unexploded ordnance contamination, and making it uninhabitable. Guam continues to experience extensive military buildup and strategic positioning within U.S. Indo-Pacific planning. The Commonwealth of the Northern Mariana Islands (CNMI) occupy similarly important positions within regional military infrastructure and strategic ocean geography. The Marshall Islands, made up of atolls and individual islands in the central Pacific, was also the site of U.S. nuclear weapons testing between 1946 and 1958, where the United States detonated 67 nuclear weapons there after World War II as part of Cold War weapons development, including Castle Bravo hydrogen test bomb in 1954, the largest nuclear explosion conducted by the United States. Effects from the radioactive fallout are still studied today.[59]

At the same time, Pacific Island states such as Nauru have already experienced devastating histories of extractive exploitation. Colonial phosphate mining on Nauru stripped much of the island's interior, generating profound ecological destruction and long-term economic dependency.[60]

Contemporary DSM sponsorship arrangements involving Pacific Island states therefore unfold within longer histories in which extraction projects were justified through narratives of development and progress while environmental risk and long-term consequences were externalized onto island communities. Pacific lands and waters have been treated as spaces available for sacrifice in the name of development.

For many Pacific communities, skepticism toward DSM is rooted in lived historical experience, not hypothetical risks.

Nuclear Colonialism and Pacific Sacrifice Zones

During the twentieth century, Pacific islands became central sites for nuclear testing programs conducted primarily by the United States, France, and the United Kingdom. The Marshall Islands, French Polynesia, Kiribati, and additional Pacific territories experienced radioactive contamination, forced displacement, ecological destruction, illness, and long-term intergenerational harm associated with nuclear weapons development.

Entire communities were displaced from ancestral territories as a result of military activities . Environmental contamination and health consequences persisted long after testing programs formally ended, while affected communities still struggle for recognition, compensation, remediation, and political accountability.

These histories remain directly relevant to contemporary DSM debates because Pacific communities continue confronting proposals framed through broader global imperatives—whether national security, development, scientific progress, or climate transition—while ecological uncertainty and long-term risk are treated as acceptable tradeoffs.[61]

The Pacific has repeatedly been asked to absorb forms of risk and sacrifice defined elsewhere.

Colonial Economies of Extraction

Nauru remains one of the starkest warnings of what extractive economies leave behind. Nauru was once described as one of the wealthiest nations per capita in the world. Vast phosphate profits flowed through the island during the twentieth century, generating immense revenues tied to the agricultural demands of industrial powers abroad.

For decades, colonial phosphate mining carved through the island with near total disregard for ecological survival or long-term self-determination. What was once a lush Pacific island was transformed into a fractured limestone wasteland: approximately 80 percent of Nauru's interior was stripped bare by open-cast mining, leaving behind jagged pinnacles of exposed coral rock, destroyed ecosystems, contaminated soils, and land rendered largely uninhabitable. The environmental devastation was so extreme that the island's population became increasingly concentrated along a narrow coastal strip vulnerable to overcrowding, erosion, rising seas, and climate impacts.[62]

Nauru presents a profound example of colonial extraction economies structured for external benefit rather than the long-term wellbeing. Nauru's present role as a sponsoring state for DSM is part of this history of exploitation. After one extractive economy left the island ecologically devastated and economically vulnerable, DSM now appears as an economic life raft. The tragedy is difficult to ignore: a nation already sacrificed to one era of extractivism is now being positioned at the center of another era of extractivism and militarization.

Nauru, pictured in 2001. *Source: Torsten Blackwood/AFP via Getty Images*

Through Nauru Ocean Resources Inc. (NORI), connected to The Metals Company, Nauru has sponsored polymetallic nodule exploration activities in the Clarion-Clipperton Zone under the ISA framework. In 2025, The Metals Company and Nauru announced an updated sponsorship agreement tied to continued seabed-minerals development.

This history creates profound unease. A state already shaped by extractive devastation is now positioned within a new mineral frontier promising future revenue while transferring significant regulatory and environmental risks onto a small island nation with limited capacity relative to multinational corporate actors.[63]

The Cook Islands, Tonga, Kiribati, and Papua New Guinea similarly illustrate how Pacific states and territories are increasingly incorporated into seabed-minerals governance systems through exploration agreements, licensing structures, or ISA sponsorship arrangements.[64]

Papua New Guinea's Solwara 1 project remains particularly significant. The proposed hydrothermal vent mining project became an international cautionary example after Nautilus Minerals obtained a mining lease within Papua New Guinea's waters, faced substantial opposition regarding fisheries and marine ecosystems, and ultimately collapsed financially before commercial extraction began.[65] The project nevertheless demonstrated how quickly industrial seabed extraction proposals could move into Pacific governance systems despite unresolved scientific and environmental concerns.

Kaho'olawe, Hawai'i, and Militarized Ocean Space

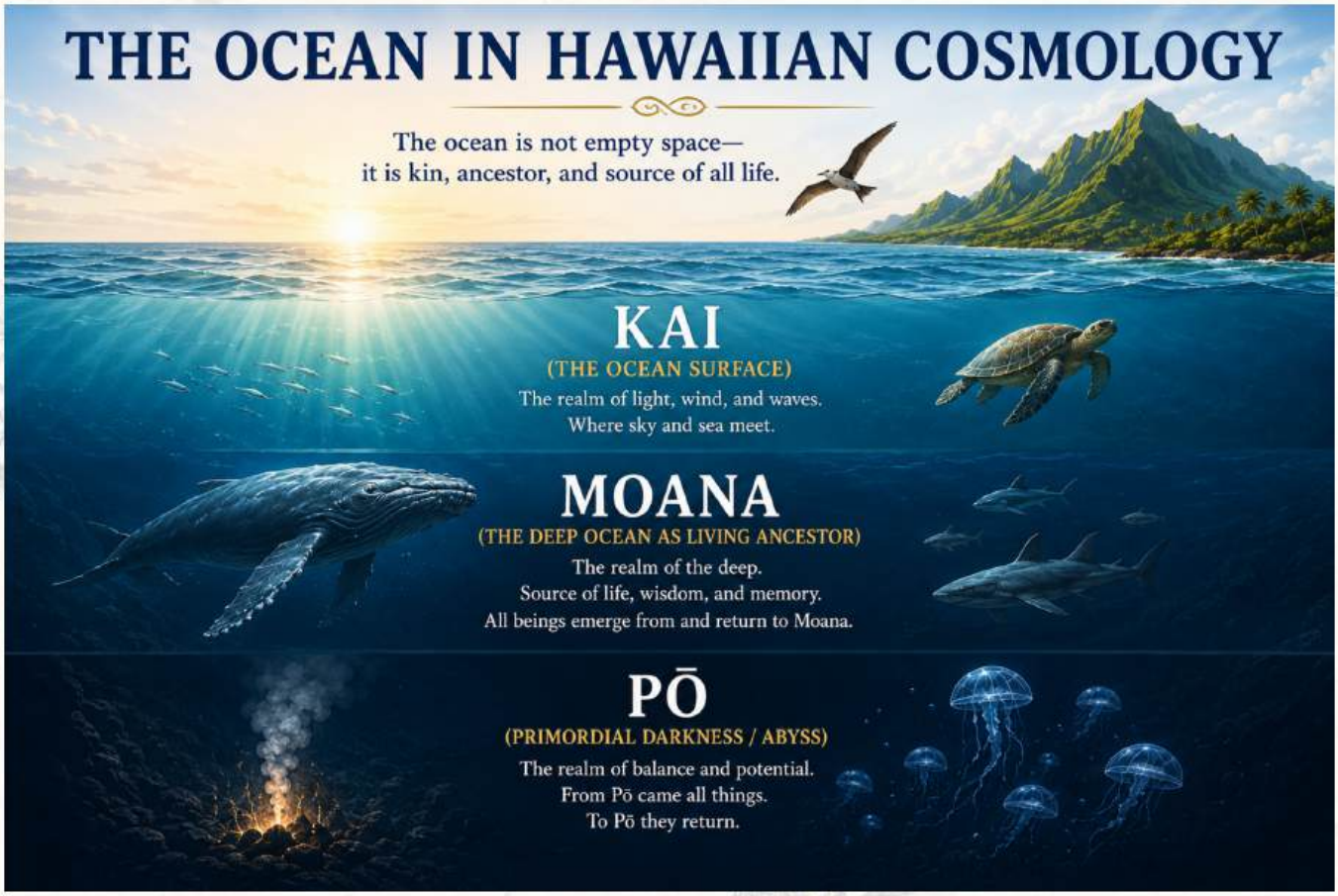
Kaho'olawe provides another critical example of militarism in the Pacific. The island was used by the U.S. military for bombing and live-fire training exercises for decades, causing extensive ecological destruction, unexploded ordnance contamination, and rendering it uninhabitable.

The Protect Kaho'olawe 'Ohana organized occupations, direct action, and legal advocacy during the 1970s to challenge continued military use of the island. Federal litigation ultimately resulted in court orders requiring environmental review, historic-site inventory processes, and return to Hawaiian stewardship. Cleanup ordered under CERCLA/Superfund, the primary U.S. legal framework for cleaning up heavily contaminated lands, military sites, industrial facilities, and abandoned hazardous waste locations.[66]

The history of Kaho'olawe demonstrates how militarized uses of Pacific lands and waters have repeatedly been justified through narratives of national security while imposing long-term ecological and cultural damage upon Indigenous territories and sacred sites.

The bombing of Kaho'olawe and the modern push for DSM are inextricably linked by a pattern of converting Pacific islands into "sacrifice zones" for geopolitical and industrial dominance. For decades, the U.S. military used Kaho'olawe bombing, leaving the island contaminated. Hawai'i has since become one of the most heavily militarized regions in the Pacific, with 11 active military bases and controversial use of Crown lands for 65-year $1 military leases. DSM now threatens to extend this same extractive logic to the ocean, as states and corporations treat Indigenous lands and fragile marine ecosystems as expendable in the pursuit of resource and strategic supremacy.[67]

1970s aloha 'āina defenders work to protect Kaho'olawe from sustained bombing. Unexploded ordnance (bottom right) can still be found on the now uninhabitable island. *Source: Franco Salmoiraghi / Courtesy Arts and Letters Nu'uanu*



The ocean is an ancestral source of life. *Source: RISE Earth Initiative, 2026.*

If commercial extraction within the CCZ proceeds, Hawai'i would likely become one of the Pacific regions most affected. The same ocean region already structured through militarized governance and strategic competition would increasingly function as a staging ground for industrial seabed extraction.

Guam and the Commonwealth of the Northern Mariana Islands (CNMI) also sit within this broader Pacific geography of militarization and extraction. Both territories occupy strategically significant positions within U.S. Indo-Pacific military planning, where naval mobility, airpower, missile systems, and logistics infrastructure remain central to regional policy.

DSM proposals and offshore critical-minerals mapping within U.S.-associated Pacific waters raise urgent questions regarding consultation, consent, environmental review, and territorial self-determination.[68]

The history of U.S. territorial governance in the Pacific makes those questions impossible to separate from broader structures of colonial power.

The Womb of the World

For Kanaka Maoli and many Indigenous Pacific communities, the ocean carries genealogical, spiritual, and ancestral significance extending far beyond concepts of resource extraction or territorial control.

The Hawaiian Kumulipo describes life emerging from *Pō*, the primordial generative darkness associated with the deep ocean. The chant establishes genealogical relationships with implications extending beyond marine organisms, coral, humans, ancestors, ecosystems, and the cosmos within an interconnected system of emergence and continuity.

The coral polyp appears within the Kumulipo as among the earliest ancestral life forms. Marine ecosystems are seen not as inert resource zones, but as living relatives embedded within genealogical relationships of reciprocity and responsibility.

Deep-ocean disturbance thus extends beyond environmental degradation alone. Industrial extraction within abyssal ecosystems may also interfere with ancestral relationships and cultural continuity connected to ocean space itself.[69]

Kuleana, Aloha ʻĀina, and Reciprocal Responsibility

Traditional Hawaiian concepts such as *kuleana* (responsibility), *aloha ʻāina* (love for the land), and *mālama i ke kai* (care for the ocean), emphasize reciprocal responsibility between people and ecological systems. These frameworks approach the ocean through relationship, stewardship, restraint, and interdependence rather than extractive entitlement.

Traditional ecological knowledge systems developed through generations of observation, navigation, fishing, ceremony, and relationship with marine ecosystems across the Pacific. Such frameworks differ fundamentally from industrial approaches that treat the deep seabed primarily as a strategic mineral frontier or underutilized economic space.

Across Pacific histories, extraction has repeatedly been justified through promises of prosperity, development, security, modernization, or progress. Phosphate mining promised economic advancement while leaving Nauru ecologically devastated. Military bombing was justified through defense while leaving Kahoʻolawe scarred and contaminated. Nuclear testing was framed as strategic necessity while imposing intergenerational harm across Pacific communities.[70]

Deep-sea mining now arrives through the language of green transition, critical minerals, and economic opportunity. The historical record requires serious scrutiny toward proposals asking Pacific peoples to accept irreversible ecological risk for benefits often defined elsewhere and controlled by more powerful states, corporations, or geopolitical actors.

A serious Pacific analysis therefore connects seabed mining to colonialism, militarization, climate vulnerability, fisheries, cultural survival, and self-determination. Small island states are frequently described as beneficiaries or sponsors within DSM governance systems, yet many simultaneously confront climate impacts, debt pressures, limited economic alternatives, and unequal bargaining relationships with multinational corporations and industrialized states.

Meaningful consent requires more than formal sponsorship agreements or procedural participation. It requires transparent information, independent science, community authority, cultural respect, ecological protection, and the ability to refuse extraction without economic coercion or geopolitical pressure.[71]


ISA
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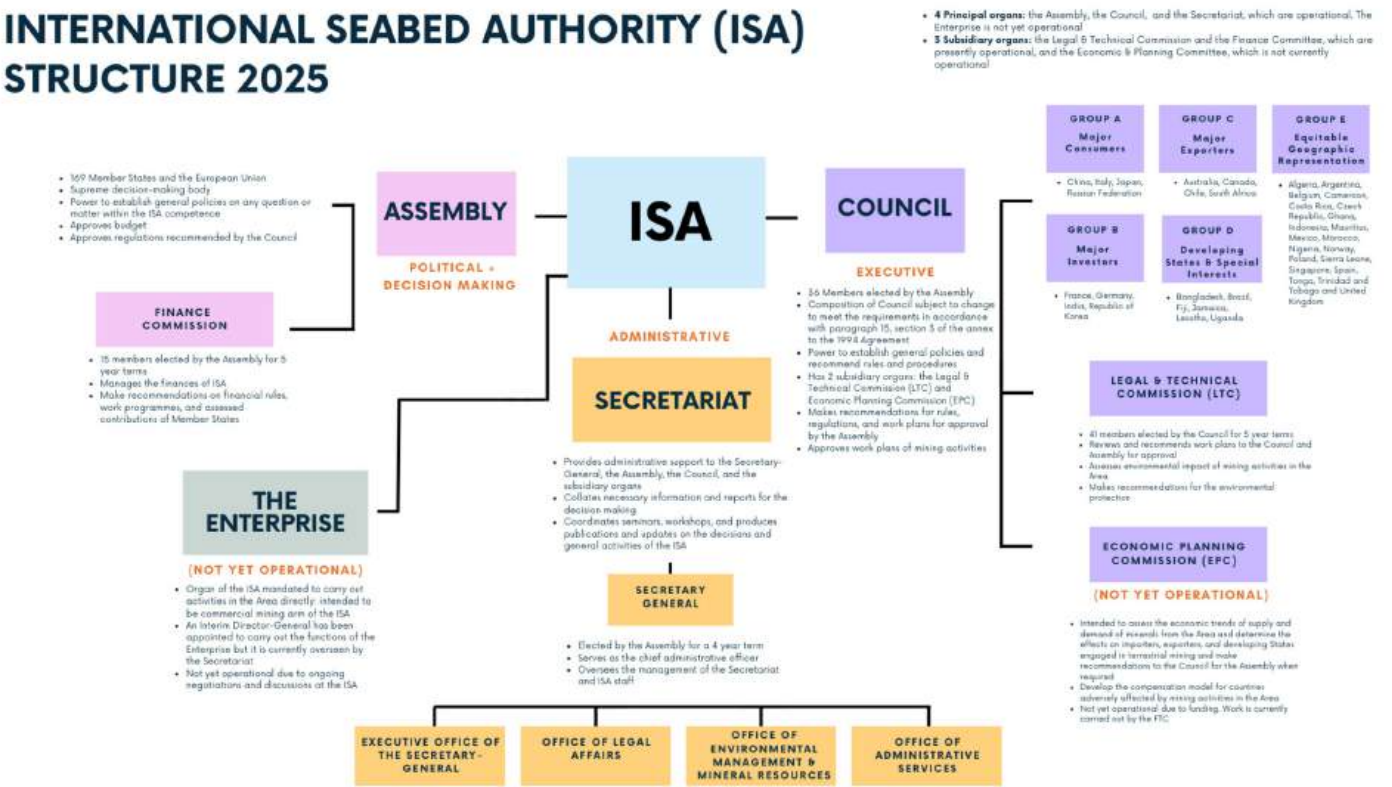
VI. CORPORATE CAPTURE AT THE ISA

Who Controls the Deep Sea?

WHO CONTROLS THE DEEP SEA?



Organization of the International Seabed Authority. As of 2026, there are 171 member states and the European Union. *Source: Teague, Alexandra (2024) International Seabed Authority Structure 2025*

Deep-sea mining governance is built upon a complex interweaving of international law, institutional regulation, sponsoring-state obligations, and national licensing frameworks. Under the United Nations Convention on the Law of the Sea (UNCLOS), adopted in 1982 and entering into force in 1994, the seabed beyond national jurisdiction and its resources are designated as the "common heritage of humankind." The International Seabed Authority (ISA) was established in 1994, to organize, regulate, and control mineral-related activities in these international seabed areas, referred to under UNCLOS as the Area and to ensure the "effective protection for the marine environment from harmful effects which may arise from activities in the Area."[72]

UNCLOS also imposes obligations upon states to protect and preserve the marine environment, including obligations relating to pollution prevention and harmful effects arising from seabed activities.[73] Geopolitical competition over strategic minerals has raised questions of institutional legitimacy, conflicts of interest, unequal regulatory capacity, fragmented legal authority, and the future governance of the global commons.

A Conflict of Interest at the ISA

The ISA occupies a structurally contradictory role. The institution is charged with protecting the deep seabed as the common heritage of humankind while at the same time administering a system designed to facilitate exploration and

THE GOVERNANCE CRISIS IN TODAY'S ISA

DECISIONS IN THE HANDS OF JUST 15 PEOPLE

A small, unelected working group—the Finance Committee—carries the immense responsibility of deciding how benefits will be shared.

CLOSED DOORS, LIMITED OVERSIGHT

The Finance Committee meets in private, with minimal public reporting. Observers and civil society have called for greater transparency.

TWO MAIN OPTIONS FOR SHARING FINANCIAL BENEFITS (ACCORDING TO ISA TECHNICAL STUDY)

1 DISTRIBUTE LEFTOVER PROCEEDS TO WORLD GOVERNMENTS

Countries with large populations and low incomes would receive more than smaller, wealthier ones.

But the money available is what's left after:

- The mining company and its sponsoring state have made their profits
- ISA administrative costs are covered
- Any compenstation to affected states is paid

2 CHANNEL PROCEEDS INTO A FUND FOR RESEARCH AND ENVIRONMENTAL PROTECTION

The fund could support scientific research and help address environmental harms caused by seabed mining.
But experts warn the money could end up cleaning up the problems mining creates.

HOW MUCH MONEY ARE WE REALLY TALKING ABOUT?

ISA uses **US $500 MILLION** as a benchmark for equitable benefit-sharing discussions.

Independent economic forecasts estimate actual annual amounts available could be between **US $14 MILLION–$228 MILLION.**

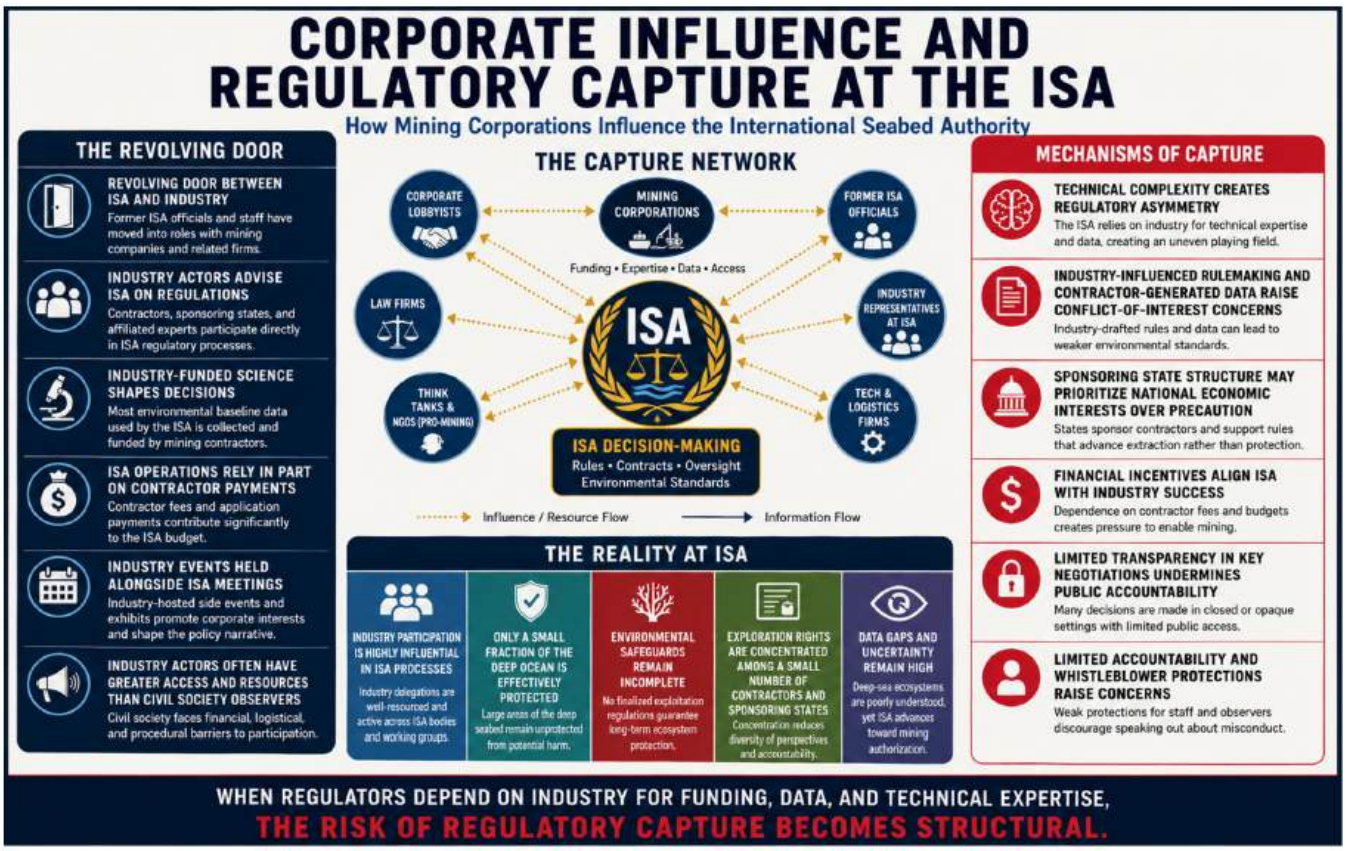
Example projected annual shares:

India: ~ US $1 MILLION

Kiribati (and some Pacific Island nations): ~ US $7,500

A FUNDAMENTAL QUESTION REMAINS

As Neil Craik, international environmental law expert, notes:
"With so much uncertainty around the environmental consequences of seabed mining, and limited information on the economic benefits, one of the big questions states must ask themselves is if [seabed mining] is worth it."



Corporate influence and interests weigh heavily at the ISA. *Source: RISE Earth Initiative, 2026.*

eventual commercial exploitation.

If commercial mining moves forward, the ISA would also administer financial mechanisms tied to extraction, including royalties, fees, and benefit-sharing arrangements connected to industrial seabed operations. The institution responsible for safeguarding deep-ocean ecosystems would also become institutionally linked to revenue generation from the industry it regulates.

This tension is structural. Commercial contractors cannot independently obtain exploration or exploitation rights within the Area. Instead, they must operate through ISA-approved sponsorship arrangements with member states. The ISA consequently functions both as environmental regulator and as the institution through which industrial extraction is authorized and administered.

The inherent institutional conflict runs deeper still. Under Part XI of UNCLOS, the ISA was not designed solely as a neutral regulator. The Convention also established "the Enterprise," a mining arm intended to carry out seabed resource activities directly on behalf of the Authority. Although the Enterprise has never become fully operational commercially, its continued existence within the legal architecture of the ISA underscores a deeper structural problem: the institution responsible for regulating extraction was simultaneously conceived as an entity with a direct interest in the development of seabed mining itself.[74]

These overlapping mandates raise serious questions regarding impartiality, regulatory independence, and whether a governance body structured around eventual resource extraction can simultaneously function as an independent guardian of ecosystems characterized by

Limited transparency at the ISA raises structural concerns. *Source: RISE Earth Initiative, 2026.*

profound scientific uncertainty and irreversibilty.

The Problem with Sponsorship

The sponsorship system adds an additional layer of complexity and inequity. Under UNCLOS and ISA procedures, sponsoring states must exercise due diligence and maintain "effective control" over contractors operating under their sponsorship. States ultimately retain liability for any damage resulting from activities in the Area.

The Seabed Disputes Chamber of the International Tribunal for the Law of the Sea has clarified that sponsoring states bear obligations to adopt laws, regulations, administrative measures, and oversight mechanisms capable of securing contractor compliance with environmental and regulatory obligations.[75]

In theory, sponsoring governments retain responsibility for oversight, environmental regulation, and compliance enforcement. In practice, asymmetries exist between multinational extraction of corporations and sponsoring states.

This problem is particularly acute where small island developing states sponsor or partner with multibillion-dollar corporations possessing vastly greater technical expertise, engineering capacity, financial resources, and political influence than the sponsoring state itself. States such as Nauru, Tonga, and Kiribati may formally sponsor contractors, yet their practical ability to monitor, regulate, investigate, and enforce obligations against industrial extraction systems operating thousands of meters beneath the ocean surface remains deeply constrained.

Sponsoring states may still face legal or financial

consequences associated with environmental damage connected to sponsored activities.[76] This governance structure risks transferring disproportionate exposure onto vulnerable states while corporate actors and industrialized powers retain substantial control over technological systems, investment capital, and operational decision-making.

ISA Legitimacy and the Erosion of Multilateral Ocean Governance

Transparency and meaningful participation remain major weaknesses within existing DSM governance systems. ISA processes have repeatedly been criticized for confidentiality surrounding contracts, technical complexity, limited public accessibility, and decision-making structures difficult for civil society organizations, Indigenous communities, journalists, and many developing states to navigate effectively.

Regional environmental management plans remain incomplete or non-binding across several areas of interest, while enforcement capacity for remote deep-ocean industrial activity remains uncertain. Questions also persist regarding liability systems, emergency response capability, independent scientific review, and long-term monitoring capacity should ecological harm occur.

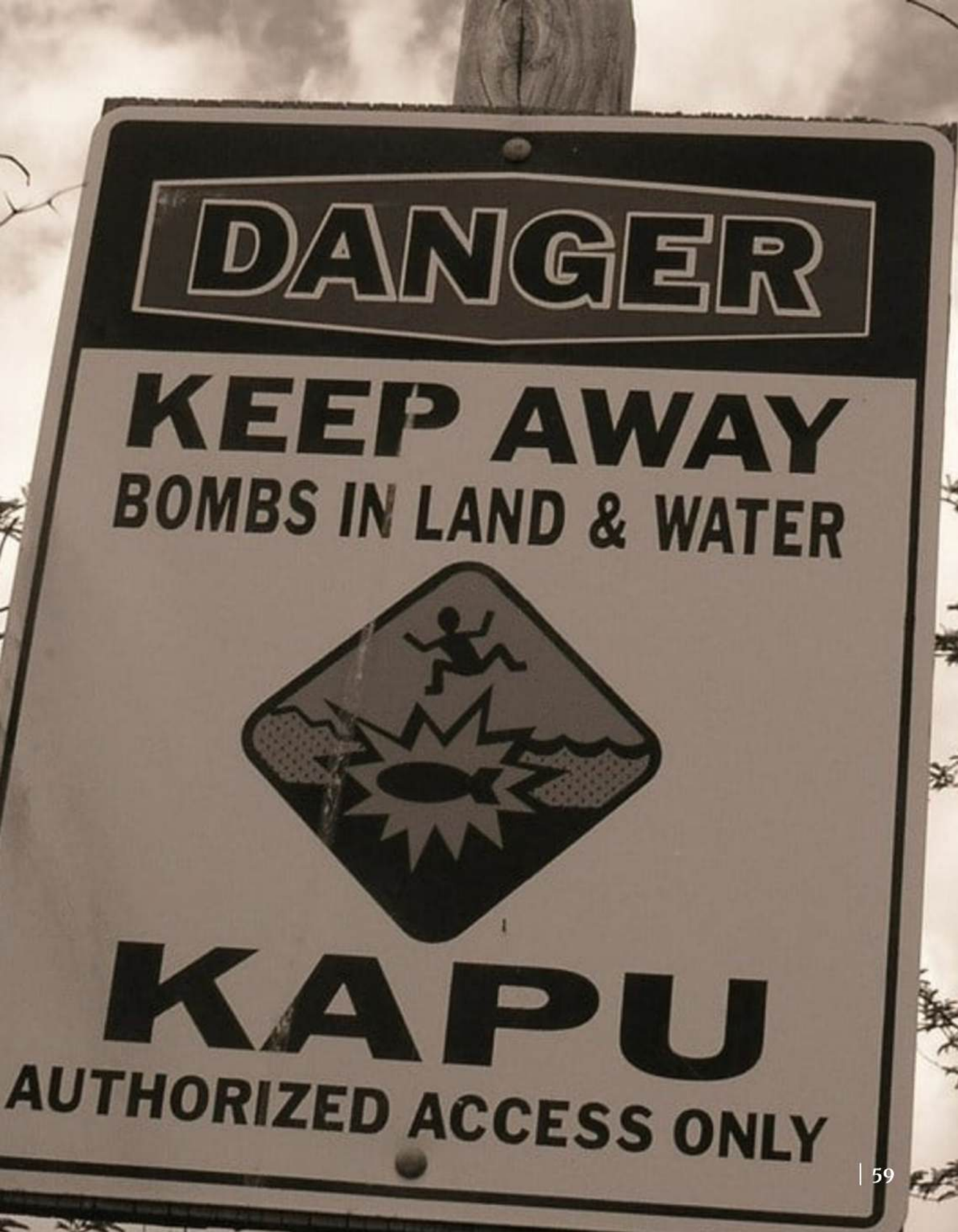
Pacific communities, Indigenous organizations, scientists, and civil-society coalitions continue raising concerns regarding whether existing governance systems are capable of protecting ecosystems operating on geological timescales from industrial extraction driven by commercial and geopolitical urgency.[77]

The governance debate surrounding DSM therefore concerns legitimacy itself: who exercises decision-making power over the deep ocean? whose knowledge systems are recognized? who bears ecological risk? can international law meaningfully govern extraction in the ocean before irreversible harm occurs?

These tensions deepen as some states, including the United States, pursue pathways designed to bypass or weaken multilateral governance mechanisms altogether. The growing willingness of powerful states to advance unilateral licensing systems where strategic or geopolitical interests are perceived to be at stake, raises broader concerns about fragmentation of the international legal order. A fragmented system could incentivize regulatory arbitrage, allowing companies to seek favorable national jurisdictions with weaker oversight or accelerated approval pathways. It could also weaken international environmental standards before mining regulations are fully developed.

Importantly, states that are not parties to UNCLOS, remain bound by customary international law, which carries binding legal force through longstanding and consistent practice accepted as legally obligatory by the international community. Many foundational principles reflected in the broader Law of the Sea regime, are widely understood to carry customary force of law. Unilateral seabed extraction through domestic licensing systems also challenge principles in the United Nations Charter itself, including sovereign equality, good-faith international cooperation, and the maintenance of peace and stability beyond national jurisdiction.[78]

The consequences of governance failures and disregard for customary international law may extend beyond seabed minerals to broader governance questions concerning marine genetic resources, Arctic governance, outer-space resources, and the future management of the global commons.


DANGER
KEEP AWAY
BOMBS IN LAND & WATER
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VII. THE CASE FOR A PERMANENT BAN

Global Opposition to Deep Sea Mining

GLOBAL OPPOSITION

Opposition to deep-sea mining has expanded significantly across scientific institutions, Indigenous movements, environmental organizations, and governments supporting precautionary approaches. Resistance to DSM is not grounded in a single concern. Rather, it reflects overlapping objections regarding biodiversity loss, fisheries impacts, scientific uncertainty, Indigenous rights, governance failure, militarization, and the danger of reproducing extractive sacrifice-zone politics within the deep ocean.

Moratorium campaigns and precautionary initiatives have increasingly reshaped international discussions surrounding DSM governance. A growing number of states have expressed support for precautionary pauses, moratoriums, or bans on commercial seabed mining until stronger scientific understanding and governance systems are established.[79]

The rapid growth of global opposition has significantly altered the political landscape surrounding DSM.

Precautionary Principle and Scientific Opposition

Scientific opposition is significant because it directly challenges industry narratives claiming that ecological risks can be adequately mitigated through technological management and regulatory oversight.

Hundreds of scientists and marine experts have called for precautionary pauses or moratoriums on commercial DSM until the deep ocean is better understood and effective environmental protections can be guaranteed. Their concerns include biodiversity loss, sediment-plume transport, species extinction, habitat destruction, carbon-cycle disruption, cumulative ecosystem impacts, and the absence of reliable recovery data for abyssal environments.[80]

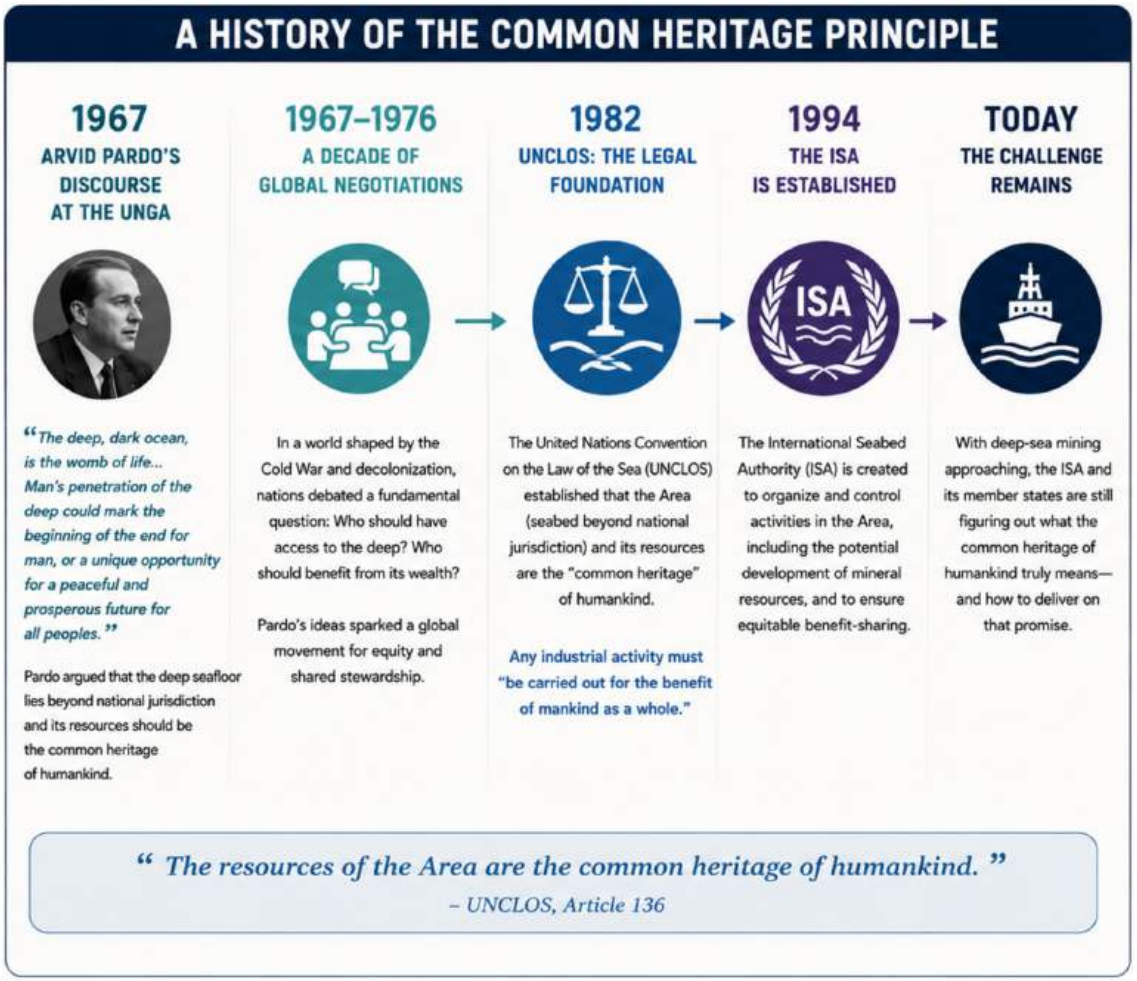
The precautionary principle has become central to these arguments. Under precautionary approaches, the absence of full scientific certainty cannot justify proceeding with activities carrying risks of serious or irreversible environmental harm.[81] This framework is particularly relevant where ecosystems remain poorly understood and where ecological recovery may require centuries, millennia, or geological timescales.

Scientific evidence from biodiversity surveys, DISCOL disturbance studies, deep-sea ecology, and plume modeling continues to support caution rather than acceleration. Baseline ecological knowledge remains insufficient to justify industrial extraction across ecosystems where most species remain undocumented and incompletely understood.

The opposition emerging reflects growing concern that commercial pressures are advancing more rapidly than scientific understanding.

A Compounding Threat: Data Centers

Beyond the military-industrial drivers documented here, the explosive growth of AI and data centers, represents yet another source of



Maltese Diplomat Arvid Pardo's speech is often seen as a galvanizing moment in the history of the common heritage principle and normative frameworks in UNCLOS. *Source: RISE Earth Initiative, 2026.*

demand for the same critical minerals found on the deep-sea floor. Every data center requires copper, cobalt, nickel, rare earth elements, tantalum, and platinum for its serverboards, semiconductors, heat sinks, and storage systems.[82]

By 2030, AI data centers alone are projected to account for 2–3 percent of global copper and rare earth demand. Data centers already consume 12 percent of total U.S. electricity and up to 5 million gallons of water per day per facility. This industry's appetite for the exact minerals contained in deep sea minerals provides yet another powerful commercial incentive for extraction, ensuring that once the door to DSM is opened under the guise of renewable energy and driven by national security, it will never close.[83]

The technology sector will lock in demand that far outlasts any single administration's defense policy. The threat compounds further when the same industry moves its infrastructure directly into the ocean. Rather than constrain its growth, the technology sector is now sinking data centers onto the seabed — using seawater as a coolant to avoid the costs of terrestrial power and water.

Microsoft deployed an unpermitted server capsule off California in 2015 and a 450-kilowatt facility off Scotland in 2018, built by France's Naval Group, a nuclear submarine manufacturer.[84] China has deployed a 1,400-ton commercial underwater data center off Hainan and is

constructing a $223 million facility off Shanghai.[85] Scientists warn that heat discharged from these facilities reduces dissolved oxygen, triggers toxic algae blooms, and destabilizes marine ecosystems.[86]

The ocean is thus being attacked from two directions: its minerals extracted from the seafloor to build the machines, and its water heated to cool them. This is why a permanent ban, not a moratorium, is the only adequate response. If deep-sea mining is permitted for any reason, the precedent will be seized by every industry with a use for seabed minerals. The military opens the door; the technology sector ensures it can never be shut.

Pacific Leadership, Consent, and the Right to Say No

Pacific Indigenous communities and frontline ocean peoples remain among the strongest voices calling for a permanent prohibition on deep-sea mining. Their opposition reflects a fundamental issue of free, prior, and informed consent (FPIC). Deep-sea mining projects advancing across the Pacific, including within and surrounding the Clarion-Clipperton Zone, threaten ecosystems tied to food systems, cultural practices, voyaging traditions, and relationships with the ocean that have existed for generations.[87]

Yet these industrial mining frameworks continue advancing without the meaningful consent of many Indigenous Peoples and Pacific communities who will bear the consequences. This constitutes a direct violation of international human rights standards, including the United Nations Declaration on the Rights of Indigenous Peoples, which affirms Indigenous Peoples' rights to free, prior, and informed consent regarding activities affecting their lands, territories, resources, and cultural survival.[88]

The political structure surrounding deep-sea mining further concentrates decision-making power away from many Pacific Peoples themselves. Numerous Pacific Island nations remain economically vulnerable due to colonial extraction histories and unequal global economic arrangements. Several Pacific territories directly impacted by militarization, extraction, and ocean degradation remain under U.S. or other foreign control without full sovereignty or equal decision-making authority in international forums.

Hawai'i sits at the center of the Pacific and carries a long history of militarization, occupation, and U.S. control over ocean territories. Kanaka Maoli never relinquished their national sovereignty, and Hawai'i remains an occupied nation under international law despite its treatment by the United States and much of the international community as a U.S. state.[89] For many Kanaka Maoli, struggles over the ocean are inseparable from struggles for land, sovereignty, and the defense of what was never willingly surrendered. These realities shape whose voices carry political weight within global seabed governance systems and whose opposition can be overridden.

This imbalance becomes especially significant in the Pacific because the Clarion-Clipperton Zone — widely expected to become the first region opened to commercial polymetallic nodule mining — sits within the broader Pacific Ocean region that Pacific Peoples have stewarded, navigated, and depended upon for millennia. Pacific communities continue warning that the deep ocean is being positioned as another sacrifice zone for outside industrial powers, military interests, and corporate extraction. A permanent ban on deep-sea mining therefore

Nations, States & Territories Opposing Deep-Sea Mining

Over 40 countries and multiple sub-national jurisdictions have formally taken legislative positions against deep-sea mining (2024-2026)

1. BANNED (1 Nation)

France (full legislative ban, 2025)

2. MORATORIUM / PRECAUTIONARY PAUSE (40 Nations)


Antigua & Barbuda

Austria

Brazil

Canada

Chile

Costa Rica

Croatia

Cyprus

Dominican Republic

Ecuador

Fed. States of Micronesia

Fiji

Finland

Germany

Greece

Guatemala

Honduras

Ireland

Denmark

Latvia

Luxembourg

Malawi

Malta

Marshall Islands

Mexico

Monaco

New Zealand

Palau

Panama

Peru

Portugal

Romania

Samoa

Slovenia

Spain

Sweden

Switzerland

Tuvalu

United Kingdom

Vanuatu

3. U.S. STATES & TERRITORIES

California (ban)

Hawai'i (ban)

Oregon (ban)

Washington (ban)

American Samoa (moratorium)

Guam (ban)

4. INTERNATIONAL REGIONAL TERRITORIES

New Caledonia (50-year moratorium)

Wallis & Futuna (50-year moratorium)

Northern Territory, Australia (permanent ban)

New South Wales, Australia (prohibition)

Tristan da Cunha, UK (ban)

Source: Deep Sea Conservation Coalition, 2026

As of 2026, France is the only country to enact a full legislative ban on DSM. *Source: RISE Earth Initiative, 2026.*

becomes not only an environmental necessity, but a matter of Indigenous rights, self-determination, and the collective right of Pacific Peoples to say no to irreversible industrialization of the ocean.

The Ocean Pharmacy: Life Saving Medicine

Marine organisms have already transformed modern medicine. As of 2026, eighteen approved pharmaceutical drugs derived from marine compounds are treating leukemia, metastatic breast cancer, lymphoma, chronic pain, viral infections, cardiovascular disease, and multiple forms of aggressive cancer. Additional marine-derived compounds are advancing through Phase I, II, and III clinical trials. Researchers have identified approximately 30,000 marine natural products so far, while the overwhelming majority of deep-ocean species remain unknown to science. Pharmaceutical companies including Pfizer, GlaxoSmithKline, AbbVie, AstraZeneca, PharmaMar, and Eisai are already developing and manufacturing medicines derived from marine organisms.[90]

Some of the most promising discoveries are emerging directly from deep-sea organisms. Scientists at Scripps Institution of Oceanography identified Salinispora tropica, a deep-sea bacterium that produces Marizomib, now in Phase III clinical trials for glioblastoma, one of the deadliest forms of brain cancer. Deep-water sponges have yielded approved anticancer drugs now used worldwide. Researchers studying hydrothermal vents, deep-sea corals, and abyssal microbes continue to uncover entirely new biochemical pathways with potential applications for cancer treatment, immunotherapy, and antibiotic-resistant infections. Deep-sea mining threatens these ecosystems before science has even documented most of the life they contain.[91]

Metals targeted through deep-sea mining can be recycled, substituted, or sourced through less destructive means. A lost medicine cannot. The deep ocean represents one of the most significant frontiers in pharmaceutical discovery on Earth. Destroying it for short-term mineral extraction risks sacrificing irreplaceable medical breakthroughs for generations to come.

The Contested Future of the Ocean

Commercial seabed extraction no longer operates within a consensus of inevitability. The future of the deep ocean remains politically contested.

The next several years will be decisive. Decisions made by governments, international institutions, sponsoring states, corporations, and civil society movements will shape whether industrial extraction becomes normalized within one of the least understood ecosystems on Earth or whether precautionary governance prevails before irreversible ecological harm occurs.

The struggle over DSM is therefore also a struggle over how humanity defines progress, transition, responsibility, and the limits of extraction within planetary systems already under profound ecological strain.


CHINA
SOUTH AFRICA
REFORM PROPOSALS
INTERNATIONAL SEABED AUTHORITY
INSTITUTIONAL REFORM
REFORM PROPOSALS

VIII. POLICY RECOMMENDATIONS

A Moratorium is Not Enough

RECOMMENDATIONS

The governance, ecological, human-rights, and intergenerational harms associated with deep-sea mining compel one clear conclusion: deep-sea mining should not proceed. The deep ocean cannot be treated as a new industrial frontier for minerals, military supply chains, or speculative transition markets. Scientific uncertainty remains profound, the risk of irreversible harm is undeniable, and existing governance systems are incapable of ensuring meaningful protection, accountability, or justice. The recommendations below support a permanent prohibition on deep-sea mining and a necessary shift away from extraction toward ocean protection, Indigenous rights, and intergenerational responsibility.

Precautionary State Action and Environmental Protection

- States should prohibit DSM exploration and extraction within Exclusive Economic Zones.

Deep-sea mining should not proceed in national waters or Exclusive Economic Zones. Ocean impacts do not remain confined to isolated mining sites. Sediment plumes, noise, light, waste discharge, habitat destruction, fisheries impacts, and disruption to migratory species can move across ecological and political boundaries. States should prohibit DSM exploration, test mining, and extraction in their EEZs and reject the fiction that seabed mining can be contained within a single permit area.

- Governments should adopt domestic laws banning DSM.

This should include exploration, extraction, processing, import, and commercialization of minerals sourced from the deep seabed.

- States should reject unilateral licensing systems designed to bypass international law.

Domestic permitting regimes should not be used to authorize mining in areas beyond national jurisdiction or to undermine multilateral ocean governance.

- States should remove seabed minerals from critical-minerals and national-security strategies.

Energy-transition, industrial-policy, military, and strategic stockpile frameworks should not rely on minerals obtained through deep-sea mining.

- States should invest in alternatives that reduce extraction pressure.

Public policy should prioritize recycling, repair, reuse, substitution, alternative battery chemistries, public transit, reduced material demand, and circular-economy infrastructure.

- States should strengthen marine protections.

This includes protected areas, biodiversity protections, and regional fisheries management systems across vulnerable ocean regions.

Governance Reform of the ISA and International Accountability

- The ISA should resolve its institutional conflict by shifting away from mining.

The ISA's current structure creates an unavoidable tension between promoting resource development and protecting the marine environment. That conflict should be resolved in favor of protection. The ISA should move away from finalizing mining regulations, and instead focus on safeguarding the ocean floor as part of the common heritage of humankind.

- The ISA should rescind existing exploration contracts and stop issuing new ones.

Exploration contracts have already allowed companies and sponsoring states to stake claims over vast areas of the deep seabed before the science, governance, and human-rights questions have been resolved. The ISA should rescind existing exploration contracts and stop issuing new contracts for exploration, test mining, or exploitation. Protecting the Area as the common heritage of humankind requires ending the pipeline that turns exploration into extraction.

- International law should recognize deep-sea mining as incompatible with the protection of the Area.

The common heritage of humankind cannot mean permission for irreversible extraction by a small group of states and corporations.

- The ISA must adopt stronger transparency safeguards.

This includes independent scientific oversight, public access to environmental data, binding regional environmental management plans, and enforceable accountability mechanisms for transboundary and long-term ecological harm.

- States should prevent regulatory fragmentation and ISA bypass strategies.

No country should create or rely on parallel seabed mining regimes that allow companies to evade UNCLOS principles, multilateral accountability, or broader duties to protect the marine environment.

- States and international regulatory bodies should establish a prohibition on the expansion of AI.

This should include both land-based and underwater data centers, that depend on newly extracted deep-sea minerals or marine cooling systems. No data infrastructure project should be permitted to externalize its environmental costs onto terrestrial sacrifice zones or deep-ocean ecosystems in order to sustain unlimited computational growth.

Corporate & Financial Institutions

- Banks, insurers, investors, and export-credit agencies should adopt no-DSM policies.

No financing, underwriting, investment, insurance, or credit support should be provided for deep-sea mining projects, related infrastructure, or companies profiting from DSM. Institutions should treat DSM as a high-risk activity carrying unresolved legal, ecological, governance, and reputational consequences.

- Corporate climate commitments should reject DSM.

Companies should meet transition goals through reduced demand, recycled minerals, circular design, repairability, safer material choices, and substitution technologies.

- Climate-risk accounting frameworks should factor more than carbon transition metrics.

These should incorporate biodiversity loss, fisheries impacts, ocean carbon-system uncertainty, cumulative ecosystem disruption, and potential harm to Pacific communities.

Human Rights and Ocean Justice

- Deep-sea mining should not proceed without free, prior, and informed consent.

Where FPIC has not been obtained from affected Indigenous Peoples, seabed mining violates Indigenous rights and lacks legitimacy.

- The right to say no must be respected.

Indigenous Peoples, Pacific communities, fishers, coastal communities, and frontline ocean peoples must be able to refuse deep-sea mining without coercion, economic pressure, or political marginalization.

- Pacific opposition by the Peoples, territories and states of the Pacific Islands must not be drowned out by states and corporations.

Many Pacific Island nations face intense economic pressure. Some Pacific territories have no full vote in international decision-making. Hawai'i remains an occupied nation under international law while being treated by the United States as a state. These political realities shape who is heard, who is ignored, and whose ocean futures are placed at risk.

- Ocean protection must include food sovereignty and cultural survival.

Deep-sea mining threatens fisheries, migratory species, cultural relationships with the ocean, and intergenerational responsibilities that cannot be reduced to technical impact categories.

- A just transition must not sacrifice the ocean.

The transition away from fossil fuels must also move away from colonial extraction, militarization, overconsumption, and sacrifice-zone economics. Climate justice cannot be built through deep-sea mining.

Bottom Line

The recommendation is not better regulation, delayed extraction, or a temporary pause. The recommendation is no deep-sea mining. The risks are irreversible, the governance systems are compromised, the human-rights concerns are unresolved, and less destructive alternatives already exist.

IX. CONCLUSION

The Common Heritage of Humankind

CONCLUSION

Right now, while most of the world sleeps unaware of what is unfolding beneath the ocean surface, governments, corporations, and international institutions are debating whether one of the least understood ecosystems on Earth should be opened to industrial extraction. The decisions being made over the next several years may shape the future of the deep ocean for generations, perhaps far longer. Yet much of this debate continues to move forward under conditions of profound scientific uncertainty, accelerating geopolitical rivalry, and growing pressure to secure strategic minerals at industrial scale.

This report does not argue for a pause. It does not call for better regulations, stronger oversight, or improved environmental impact assessments. It calls for a permanent end to the pursuit of deep-sea mining, in all jurisdictions, under all legal frameworks, and by all actors. Not because the science is incomplete, though it is. Not because the governance is broken, though it is. But because the deep ocean is not ours to mine. It never was.

Deep-sea mining risks are not confined to isolated mining sites on the seabed. They extend across interconnected ocean systems through biodiversity loss, sediment plumes, fisheries disruption, carbon-cycle uncertainty, governance fragmentation, and the industrialization of environments operating on geological timescales. The debate surrounding DSM therefore concerns far more than whether mining technology can reach the ocean floor. It concerns what kinds of futures are being constructed in the name of transition, security, and economic necessity.

Governments and corporations increasingly frame seabed extraction as unavoidable, yet the scale of projected mineral demand is itself shaped by political choices involving militarization, consumption, transportation systems, industrial policy, and models of economic growth.

Historical experience requires careful scrutiny toward claims that new extractive frontiers are necessary for collective progress. Across the Pacific, projects justified through the language of development, national security, scientific advancement, or modernization have repeatedly imposed long-term ecological and cultural harm on Indigenous lands, island communities, and ocean systems. Phosphate extraction devastated Nauru. Nuclear testing contaminated Pacific territories across generations. Military occupation and bombing scarred islands such as Kaho'olawe. Those histories continue to shape contemporary concerns regarding seabed mining, ocean governance, and sacrifice-zone politics.

Every extractive frontier in history has been justified by the same logic: this time it is necessary, this time the technology is ready, this time the benefits will be shared. Every time, the destruction was permanent and the benefits flowed elsewhere. DSM is not an exception to this pattern.

The Failure of Consent

No Indigenous People whose survival is bound to the Pacific Ocean was ever asked whether the deep sea should be mined. Free, prior, and informed consent (FPIC) is not a courtesy extended after decisions have already been made. Under the United Nations Declaration on the

Rights of Indigenous Peoples (UNDRIP), FPIC has been affirmed by the UN Human Rights Council, and recognized as a fundamental principle of international human rights law. FPIC requires that Indigenous Peoples have the right to give or withhold consent to any project that may affect their lands, territories, waters, or resources before that project begins, free from coercion or manipulation, and with transparency of information about its scope and consequences.

Even if consent were sought, the answer must still be no. Because consent frameworks assume that the activity in question can be done responsibly. Deep-sea mining cannot. There is no version of industrial-scale nodule collection that does not destroy ecosystems that took millions of years to form. Consent to irreversible destruction is not consent, it is coercion.

In Hawai'i, DSM is a continuation of occupation that began when the Hawaiian Kingdom was overthrown in 1893, and the United States has occupied its territory ever since in violation of international law.

The waters surrounding Hawai'i that carry ancestral and ecological meaning are now a staging ground for deep-sea mineral extraction authorized by an occupying power. NOAA can issue permits under DSHMRA without any FPIC process. Meanwhile, the Hawaiian people and other Pacific peoples, whose relationship to the ocean predates every institution now claiming jurisdiction over it, are not consulted, not informed, and not asked.

This is the architecture of erasure operating in real time.

Across the Pacific, the colonial pattern repeats. Nauru and Tonga sponsor mining applications under conditions of extreme financial vulnerability. No amount of process can legitimize the permanent destruction of a living system that belongs to no generation, no government, and no corporation.

The ocean is not distant from human survival. It produces oxygen that sustains life on Earth, regulates climate systems, absorbs excess heat, supports fisheries relied upon by billions of people, and carries ancestral meaning for Indigenous Peoples and coastal communities across the world. And yet the deep ocean remains among the least understood ecosystems on the planet. Science continues to reveal new species , new solutions and medicines from the ocean depths, and raise new questions concerning the functioning of ocean systems themselves.

The Right to Say No — Permanently

The ocean does not belong to the International Seabed Authority. It does not belong to The Metals Company. It does not belong to the United States, China, or any state that refused to ratify UNCLOS and now claims the right to mine without permission. The deep ocean is the common heritage of humankind, and that phrase means nothing if it does not include the right of peoples to refuse its destruction. Not temporarily or conditionally, permanently.

Indigenous Peoples have the right to say no. Pacific Islanders have the right to say no. Coastal communities whose fisheries depend on healthy ocean systems have the right to say no.

Scientists who have spent decades discovering life-saving medicines in deep-sea organisms have the right to demand that their living laboratories not be bulldozed for minerals. Future generations have the right to inherit an ocean that is whole.

That right is not granted by the ISA nor contingent on the completion of mining regulations. It is not subject to the approval of mining corporations or the geopolitical calculations of great powers. No institution created in the last fifty years has the authority to authorize the irreversible destruction of the ocean.

No Machines in the Deep

There is no version of DSM that is safe and no regulatory framework that makes it acceptable. There is no technology that makes it reversible and no timeline on which destroyed abyssal ecosystems recover. There is no moral calculation in which minerals outweigh the destruction of the planet's largest living system.

The position of this report is unequivocal: deep-sea mining must not happen. Not now. Not in ten years. Not under better regulations. Not with improved technology. Not with Indigenous consent, because the destruction it causes cannot be consented to, only imposed.

The future of the deep ocean has not yet been decided. DSM has not begun. There remains time, but only barely, to choose a different path. Not one grounded in the logic of endless extraction dressed in the language of transition, but one that recognizes a simple truth: some things are not resources. Some systems are not frontiers and some places must remain beyond the reach of industry — because reaching them would be an act of destruction from which there is no return.

The deep ocean is often described as remote, dark, and unreachable. In truth, it is already inside every breath we take and every system upon which life depends. The question before us is whether humanity will mistake the ocean, that sustain life, for a frontier to be consumed — or whether, before the first industrial machines descend into the abyss, we will finally learn to leave some parts of the Earth alive, whole, and beyond extraction.

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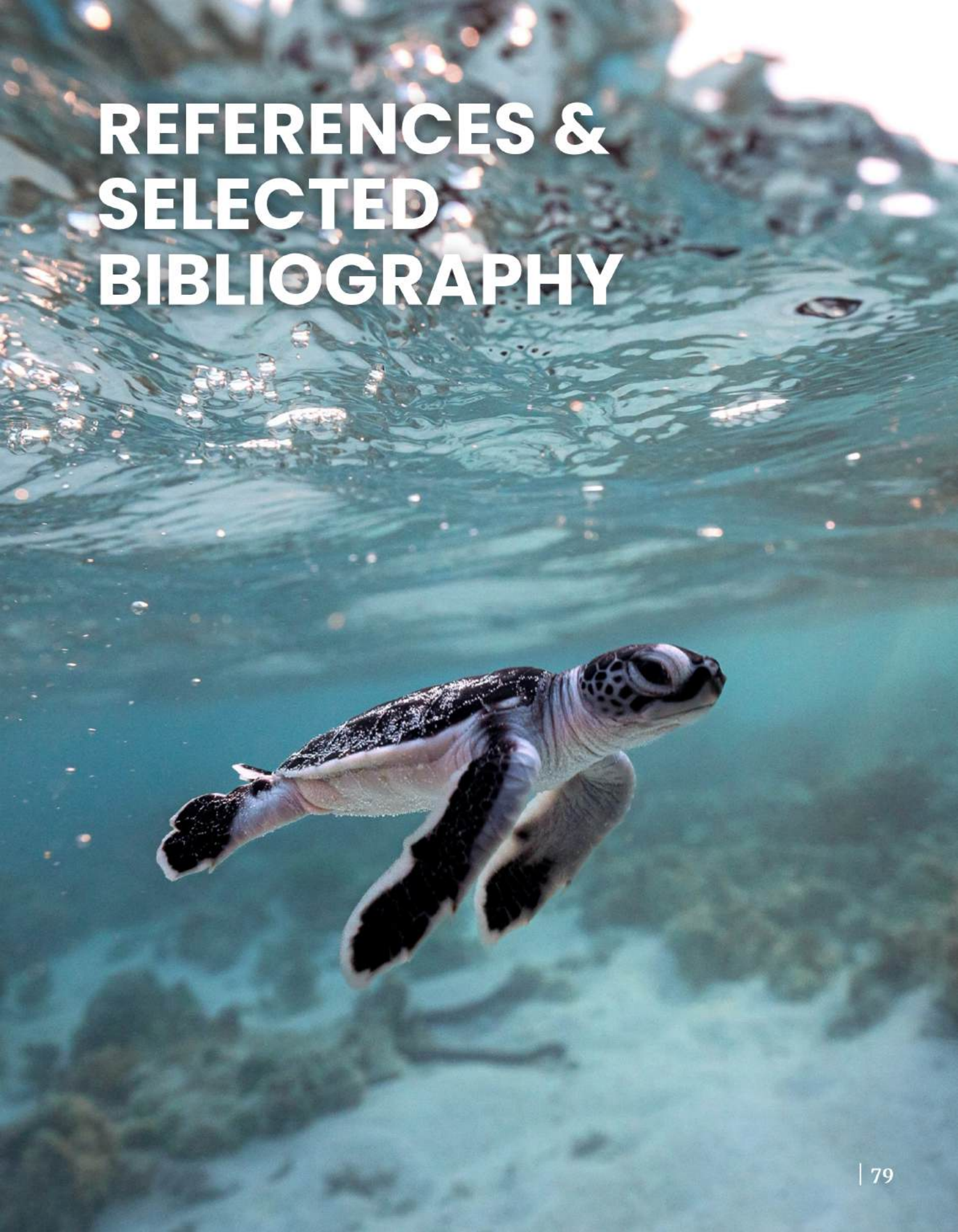

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Chapter VII - The Case for a Permanent Ban

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We are deeply grateful that you spent time with this work.

We hope this report leaves you with more than information. We hope it leaves you with urgency. With questions. With conviction. With a deeper understanding of what is at stake if industrial extraction reaches the deep sea.

If these pages moved you, we ask that you carry this message forward. Speak about it. Share it. Help build the public understanding and collective action needed to protect the ocean before irreversible harm is done.

If you feel called to support this work, please consider making a contribution to RISE Earth Initiative and Water Protector Legal Collective. Your support helps sustain research, advocacy, legal work, and movement support alongside frontline communities protecting land, water, and future generations.

The future of the ocean is still being written.

Let us make it one worth inheriting.

RISE Earth Initiative

Water Protector
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