OUTSIDE THE RULES

Why Unilateral U.S. Deep-Sea Mining Demands a Council Response

Briefing for ISA Council Delegations

July 2026

CENTER *for* BIOLOGICAL DIVERSITY

GREENPEACE

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Center for Biological Diversity · **Greenpeace Mexico**

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EXECUTIVE SUMMARY

The International Seabed Authority is not yet in a position to authorize deep-sea mining, and should not be pushed toward it. The Authority faces a direct collision between the established multilateral regime and unilateral domestic pathways for deep-sea mining. This is being driven primarily by the United States, which has created a parallel domestic track—through expedited U.S. regulations under NOAA's deep-seabed mining process—that bypasses the ISA framework and treats the seabed as open to unilateral exploitation rather than as part of 'the Area' under the common heritage regime of UNCLOS[1]. The environmental implications are severe: mining in the Clarion–Clipperton Zone (CCZ) would remove primary substrate and generate sediment plumes, with ecological effects lasting for many decades, if not longer, in ecosystems that have developed over geological timescales and may never fully recover. For coastal States such as Mexico, deep-sea mining poses transboundary risks to migratory species that connect protected areas like Revillagigedo National Park to the wider Pacific, and the risk is especially acute for the Reserva de la Biosfera Pacífico Mexicano Profundo, which protects ecosystems below 800 meters and lies nearer the CCZ contract areas than more distant island protected areas such as Revillagigedo. Deep-sea mining threatens to fragment global ocean governance and erode the common heritage of humankind principle—just as the BBNJ Agreement has raised the global bar for environmental precaution. The conclusion follows directly: A moratorium on deep-sea mining is the most responsible precautionary approach to address science gaps, protect the global ocean and uphold international law.

Actionable Recommendations to the Council

a) Refrain from adopting exploitation regulations or approving any plan of work for exploitation unless and until the Authority can demonstrate—in accordance with the precautionary principle—that deep-sea mining will not cause harm to the marine environment and that scientific gaps are addressed.

b) Support a precautionary pause or moratorium on deep-sea mining, given the unresolved scientific uncertainty, incomplete environmental standards, weak enforcement mechanisms, and risk of irreversible harm to deep-sea ecosystems; and, in the Assembly, support the Vanuatu proposal—for the Assembly to adopt a general policy for the protection and preservation of the marine environment—as a key element of progress toward a moratorium this year.

c) Reaffirm that all activities "in the Area" (as defined by UNCLOS) must be organized and controlled through the Authority under the UNCLOS and 1994 Agreement regime, and oppose unilateral national authorizations that purport to permit mining outside that multilateral framework.

d) Resolve that critical-minerals strategies, trade initiatives, industrial partnerships, or national action plans shall not be treated as grounds to approve, accelerate, or prejudice any decision on exploitation of the Area.

e) Recognize that the protection and preservation of the marine environment and common heritage must guide the Council's work, and that economic or supply-chain arguments cannot override the Authority's environmental obligations.

f) Ensure that coastal States and nationally protected areas are fully protected from transboundary harm, including impacts linked to ecological connectivity, migratory species, ocean currents, larval dispersal, sediment plumes, and cumulative biodiversity loss.

g) Require full public transparency of environmental data, independent scientific review, and meaningful participation by potentially affected States, Indigenous Peoples where relevant, scientists, civil society, and the public before any further step toward exploitation is considered.

h) Ensure rogue actors face consequences, including termination of contracts, and resist corporate interference with the ISA inquiry into unilateral mining.

i) Agree global pre-conditions to mining rather than fast-tracking a Mining Code.

2
BACKGROUND

2.1 Environmental Concerns with Deep-Sea Mining

Polymetallic nodule mining is expected to remove the primary hard substrate on large areas of abyssal seafloor and generate both near-bottom and water-column sediment plumes, with ecological effects that have been shown to persist for decades, some of which may be expected to persist over far longer timescales. A long-term field study in a Clarion–Clipperton Zone (CCZ) mining-test track found that many biological impacts remained detectable more than four decades after disturbance, even where some recolonization occurred.[2] Recent plume-tracer work from the CCZ shows detectable redeposition signals declining to background within roughly 1–2 km in a test setting, underscoring that impacts can extend beyond the direct track and that regulators will need enforceable thresholds and monitoring tools.[3] In addition, proposed midwater discharge of mining waste could disrupt mesopelagic and upper-bathypelagic food webs by diluting nutritionally important particles, with "bottom-up" effects that may propagate to larger predators.[4] These risks would arise in a region where baseline knowledge remains incomplete: the CCZ is a major exploration frontier between Hawaii and Mexico,[5] and ongoing taxonomy continues to reveal major novelty (e.g., 24 newly described amphipod species, including a new superfamily), reinforcing that science is still catching up to industrial timelines.[6]

2.2 Legal Framework for Deep-Sea Mining

2.2.a What the international regime says about "the Area" and why the ISA is the operational forum:

Under the United Nations Convention on the Law of the Sea (UNCLOS), "the Area" is defined as the seabed and ocean floor and subsoil beyond national jurisdiction.[7] The 1994 Agreement relating to the Implementation of Part XI clarifies that the International Seabed Authority is the organization through which States Parties organize and control activities in the Area, particularly to administer the resources of the Area.[8] This is why the International Seabed Authority (ISA or Authority) is the central institutional forum for regulating deep-seabed mining: it is the venue tasked with establishing a single, coherent framework for (i) environmental protection, (ii) environmental impact assessment and monitoring, (iii) compliance and enforcement, and (iv) consistent decision-making across contractors and sponsoring States. The ISA's own Environmental Impact Assessment (EIA) guidance highlights UNCLOS Article 145 (effective protection of the marine environment from harmful effects of activities in the Area) and the advisory role of the Legal and Technical Commission in assessing environmental implications and making recommendations.[9] Against this backdrop, the ISA Secretary-General's public response of 30 April 2025 is relevant because it treats unilateral attempts to authorize mining in areas beyond national jurisdiction as an institutional integrity issue for the global regime.[10]

2.2.b The High Seas Biodiversity Treaty (BBNJ Agreement) and why it matters for the ISA:

The Biodiversity Beyond National Jurisdiction (BBNJ Agreement)[11] or the High Seas Biodiversity Treaty entered into force on 17 January 2026 as the third implementing agreement under UNCLOS and establishes binding global rules for area-based management tools (including high-seas marine protected areas), environmental impact assessments, marine genetic resources/benefit-sharing, and capacity building/technology transfer in areas beyond national jurisdiction.[12] While BBNJ does not transfer seabed-mining authority away from the ISA (and reporting has emphasized that seabed mining remains with the ISA), it raises the political and normative baseline for precaution, transparency, science cooperation, and robust assessment in BBNJ—strengthening the case that ISA decisions on deep-seabed mining must be "rules and safeguards first" rather than accelerated exploitation under unresolved standards.[13]

3

WHAT MEXICO AND THE US ARE DOING

The United States and Mexico are particularly relevant to the deep-seabed mining debate because the Clarion–Clipperton Zone (CCZ) lies in the Eastern Pacific adjacent to their maritime areas, so decisions taken at the ISA bear directly on ecosystems and interests close to both States. Mexico has already articulated a clear public position—consistent with the precautionary principle and the need to protect the common heritage of humankind—it supports a moratorium on seabed mining until there is sufficient scientific information to provide certainty about environmental impacts and until rules and robust enforcement, inspection, monitoring, and compliance mechanisms are in place. Mexico also states it will not sponsor or support the ISA Council in granting exploitation licenses or plans of work for exploitation absent those conditions.[14]

The implications of CCZ mining for Mexico are real, even if the most direct physical impacts would occur far offshore. The CCZ is an abyssal region between Hawaii and Mexico spanning roughly 6 million km^2, and it is the world's largest frontier for polymetallic nodule exploration.[15] A key scientific constraint is that baseline biodiversity knowledge remains profoundly incomplete: the CCZ has thousands of recorded metazoan species, but the vast majority remain undescribed, limiting the ability to assess distribution, endemism, and recovery potential—core variables for environmental impact assessment and precautionary decision-making.[16] In practical terms for Mexico, this means governance choices that accelerate mining can outpace the science needed to identify what would be lost, what could recover, and what requires protection or avoidance measures. Mexico, as a nearby Pacific coastal State and ISA member State, has a direct stake in regional monitoring, cumulative-risk management, and the integrity of the multilateral regime.[17]

Mexico's offshore Natural Protected Areas (NPAs/ANPs) add another layer of risk relevance because they protect highly migratory biodiversity and regional ecological processes that do not respect administrative boundaries. For example, Revillagigedo National Park (created in 2017)[18] is a major fully protected marine reserve and a recognized biodiversity stronghold for migratory sharks, whales, turtles, and pelagic fish.[19] Recent telemetry evidence shows long-distance connectivity across the Eastern Tropical Pacific: tracked sharks from Revillagigedo have been detected moving to Clipperton Atoll and even onward to Galapagos Marine Reserve, illustrating how protected populations can connect across oceanic "stepping-stones" and therefore remain vulnerable to pressures arising outside any single protected area.[20] Other Mexican protected areas such as the Isla Guadalupe Biosphere Reserve[21] reinforce that Mexico's conservation portfolio includes remote oceanic ecosystems whose value depends on broader regional governance and cumulative-impact control, not only on local rules.[22] Most directly relevant, the Reserva de la Biosfera Pacífico Mexicano Profundo (Deep Mexican Pacific Biosphere Reserve) protects the deep-sea environment from 800 meters below the surface down to the seabed—including abyssal plains, seamounts, and hydrothermal vents directly analogous to those of the CCZ—and lies nearer the CCZ contract areas than Revillagigedo and other protected areas, making it the Mexican protected area most directly relevant to the deep-seabed disturbance at issue.[23] For Council delegates, the core point is not that a sediment plume from one contract block will "reach Mexico," but that industrializing a large, connected Pacific deep-sea province creates transboundary governance and biodiversity risks—especially for migratory species, regional ecological connectivity, and the credibility of "common heritage" management in which Mexico is an engaged State.[24]

3.1 Potential implications of Clarion–Clipperton Zone mining for Mexico

3.1.1 Characterization and delimitation of the CCZ

The CCZ, located in the Pacific Ocean (0–20° N, 115–155° W), is a vast region covering approximately 6 million km^2. The CCZ can be divided into subregions based on latitudinal and longitudinal gradients in surface productivity and carbon flux to the seafloor (Fig. 1).[25] These gradients determine food availability, a key factor in controlling the structure of benthic communities.

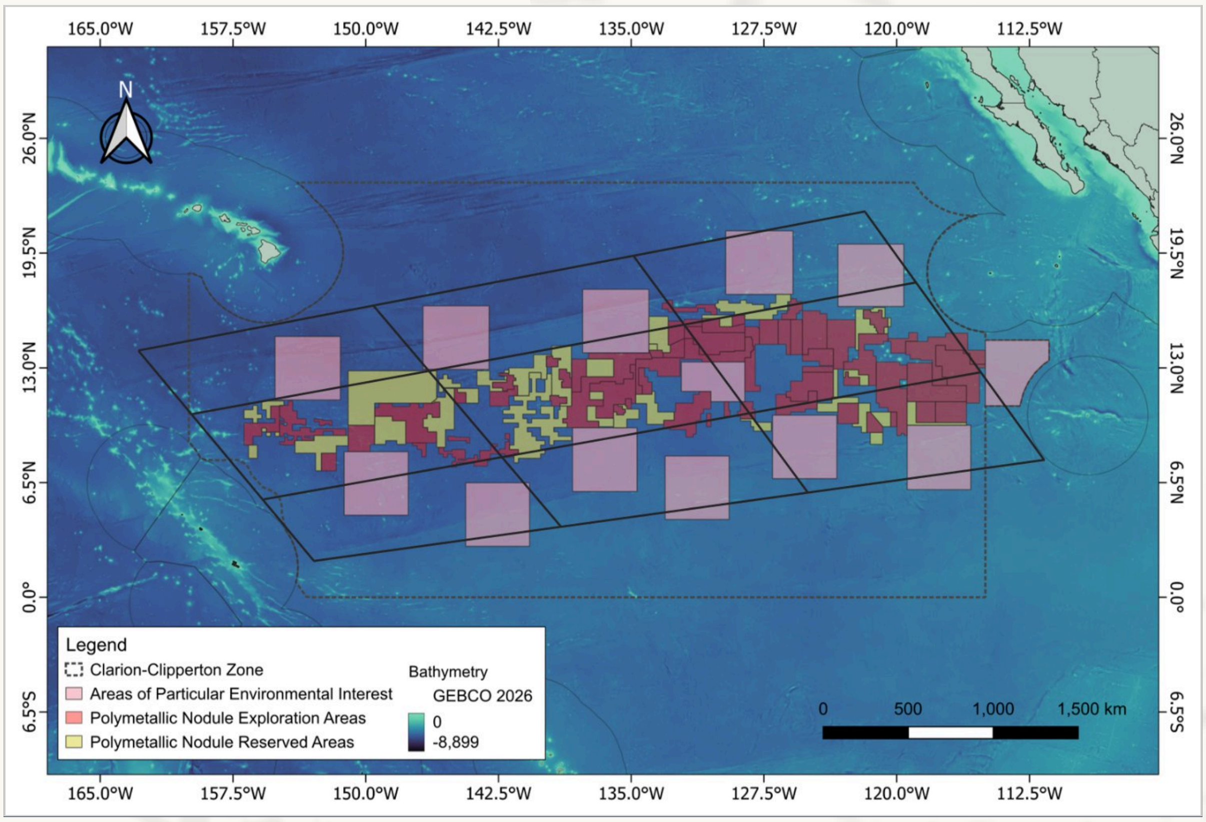

Figure 1. *Clarion–Clipperton Zone, location of Areas of Particular Environmental Interest (APEIs), Polymetallic Nodule (PMN), Exploration Areas, Polymetallic Nodule Reserved Areas (PMNres), and environmental subregions (black grid). Prepared by the author using information from International Seabed Authority (https://isa.org.jm), General Bathymetric Chart of the Oceans (https://www.gebco.net), Marine Regions (https://marineregions.org) and Wedding et al., 2013 (https://doi.org/10.1098/rspb.2013.1684).*

3.1.2 Polymetallic nodules of the CCZ

Polymetallic nodules are mineral concretions (or mineral masses about the size of a potato) found on the surface of fine sediments on the seabed.[26] They are composed mainly of manganese and iron, and also contain high-value metals such as nickel, copper, and cobalt.[27] These form from the precipitation of minerals from seawater (a hydrogenogenic and biogenic process), accumulating around an initial nucleus of organic origin.[28] Their growth is extremely slow, with rates ranging from approximately 1 to 12 mm per million years, making them a non-renewable resource on a human timescale.[29]

3.1.3 Distribution and abundance in the CCZ

In the CCZ, these nodules are typically distributed at abyssal depths between ~3,500 and 6,500 m, which host one of the most extensive fields on the planet.[30] Their abundance in the CCZ is highly variable, with densities ranging from areas with no nodules to regions exceeding 18 kg/m^2.[31] The highest average concentrations are recorded in the central-eastern subregion (~7.5 kg/m^2; ~12–18° N, ~125–110° W; Fig. 1).

Beyond their potential economic value, polymetallic nodules play a fundamental role in structuring the benthic habitat in the CCZ. They constitute one of the main sources of hard substrate, allowing the establishment of sessile organisms that could not attach to the sediment.[32] In general, areas with greater nodule cover (i.e., the central-east) have higher densities and diversity of epifaunal organisms compared to areas without nodules.[33]

3.1.4 Polymetallic nodule extraction system

The extraction of nodules relies on technological systems designed to operate in extreme abyssal conditions. These systems are composed of multiple elements that function in a coordinated manner from the seabed to the surface.[34] The main component is a self-propelled crawler mining vehicle, a vehicle that travels along the seabed collecting nodules using mechanical or hydraulic suction mechanisms. During this process, the nodules are partially or completely separated from the surface sediment, in some cases by integrated crushing systems that facilitate their subsequent transport.[35] The extraction process scars the seabed floor and creates sediment plumes. The extracted material is transported to the surface using vertical lifting systems (riser systems), connecting the seabed to a support vessel that serves as a central operations platform.[36] On the surface, the material undergoes initial separation processes to isolate the nodules from the water and sediments. Finally, the sediments and wastewater generated during the process are discharged back into the ocean through discharge systems, generally in the form of a suspension (tailings), at different depths depending on the operational design.[37]

3.2 Biodiversity

3.2.1 Benthos

The Clarion–Clipperton Zone (CCZ) harbors one of the most diverse benthic communities in the deep ocean, characterized by high species richness, low biomass, and marked spatial heterogeneity. To date, 436 species of benthic metazoans have been formally described; however, it is estimated that between 6,000 and 8,500 species may inhabit the CCZ. This fauna is primarily dominated by arthropods (27%), annelids (18%), nematodes (16%), echinoderms (13%), and poriferans (7%), in addition to other groups such as mollusks, cnidarians, and bryozoans.[38] This heterogeneity is reflected in diverse communities that encompass different trophic levels and sizes, which are mainly associated with nodules, serving as microhabitats for various sessile organisms.[39]

According to the CCZ species list[40] and the findings of these species over the years, the discovery of new species continues to increase exponentially (Fig. 2), with polymetallic nodule exploration areas being the sites with the highest number of discoveries. This trend coincides with the presence records, where 80% of the observations are located in the exploration areas, especially in the subregions near Mexico (Fig. 3), while the areas of special environmental interest account for the remaining 19% (724 records).

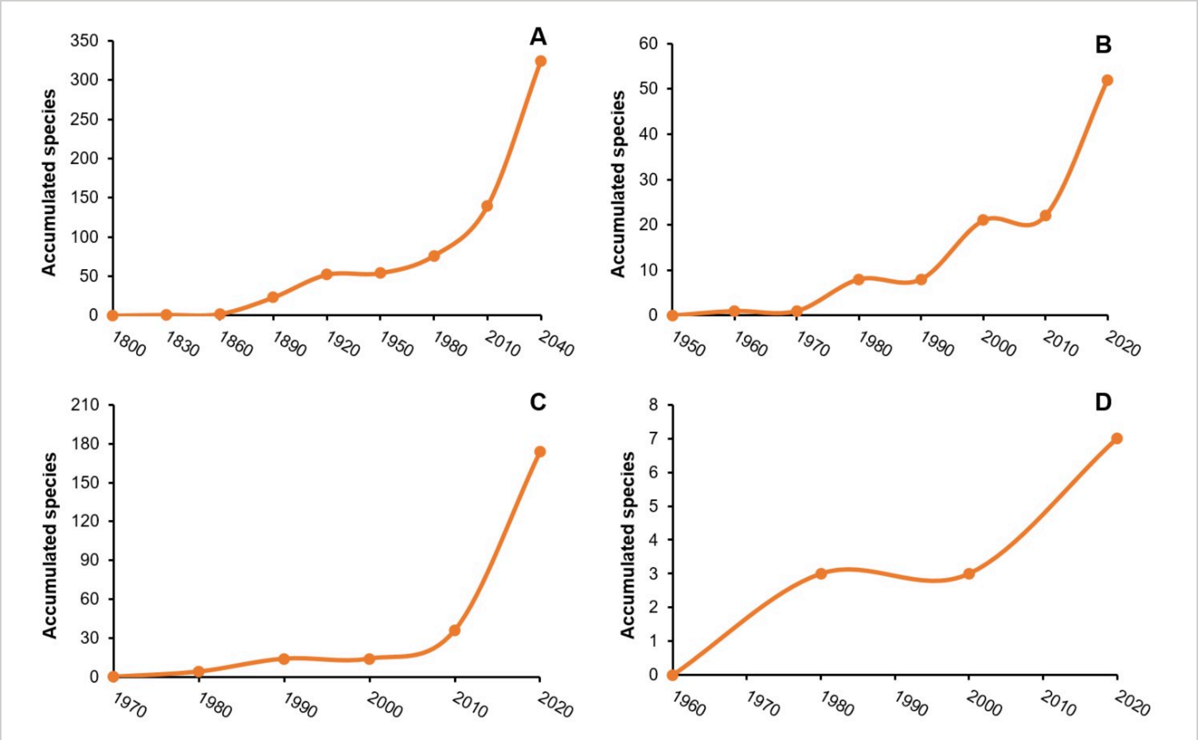

Figure 2. *Number of species recorded over time in the CCZ (A), Areas of Particular Environmental Interest (B), Polymetallic nodule exploration areas (C), and Polymetallic nodule reserved areas (D). Prepared by the author using information from Global Biodiversity Information Facility (gbif.org/es/) and World Register of Marine Species (https://www.marinespecies.org/deep-sea/CCZ/index.php).*

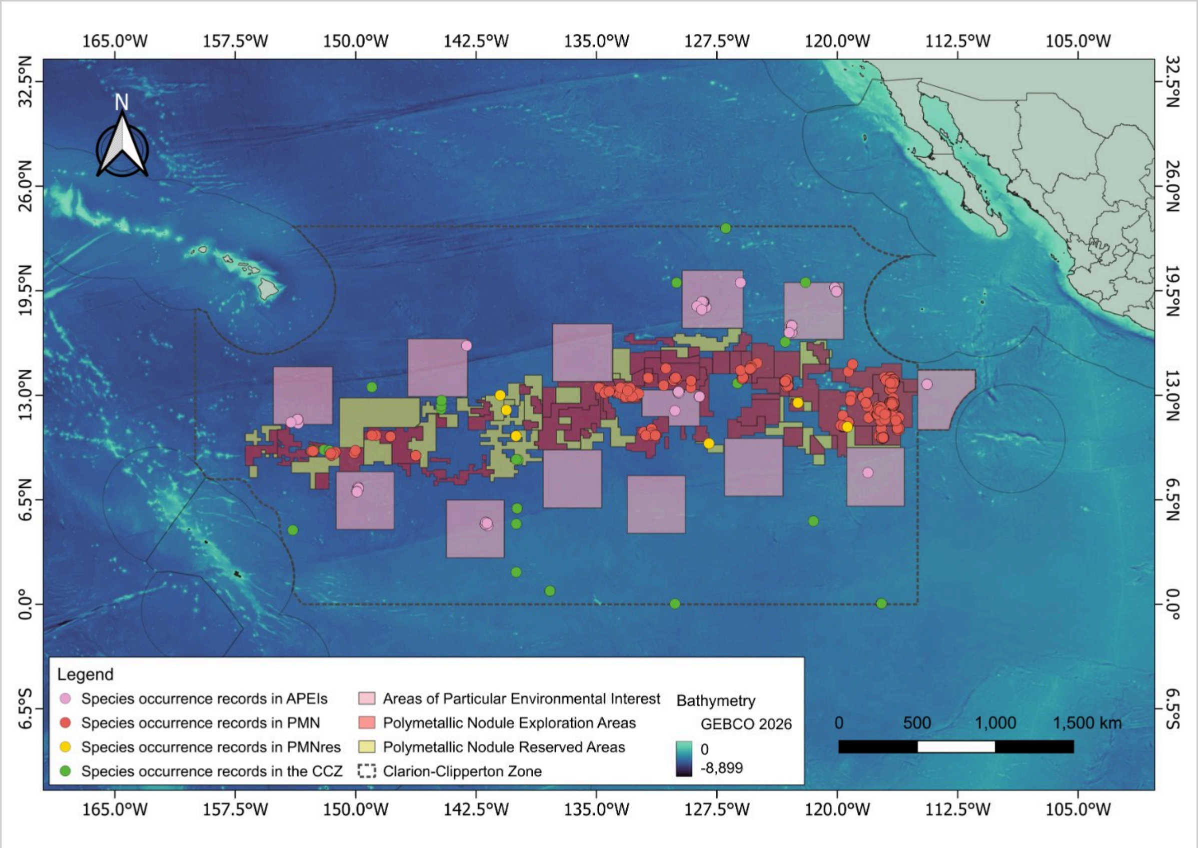

Figure 3. *Records of the presence of the species found in the CCZ. Prepared by the author using information from Global Biodiversity Information Facility (gbif.org/es/), World Register of Marine Species (https://www.marinespecies.org/deep-sea/CCZ/index.php), International Seabed Authority (https://isa.org.jm), General Bathymetric Chart of the Oceans (https://www.gebco.net), Marine Regions (https://marineregions.org) and the Commission of Natural Protected Areas (https://sig.conanp.gob.mx/Shape).*

Benthic biodiversity is organized into different size classes, including meiofauna, macrofauna, and megafauna. Megafauna (>1 cm) exhibits high diversity, with numerous novel morphotypes.[41] Within this category, polychaetes constitute the most abundant and diverse group, representing between 36% and 55% of the abundance, followed by crustaceans such as isopods and tanaids.[42] In particular, a significant fraction of this megafauna is associated with nodules, which provide the substrate for other organisms to attach to or grow on, such as soft corals (Abyssoprimnoa gemina) and sponges (Plenaster craigi), anemones, echinoderms, and crustaceans, which represent 56% of the species directly linked to the nodules.[43] Ophiuroids are also noteworthy, with at least 43 species identified in the region, many of them with restricted distributions.[44] Finally, within the benthic food web, the main predators include fish (~32 species, e.g., Ipnops meadi, Coryphaenoides spp.) and invertebrates.[45]

The macrofauna, defined as organisms larger than 300 µm, mainly includes isopods and tanaids. In terms of abundance, average densities of approximately 217 ± 72 individuals per m^2 have been recorded, with local samples containing between 22 and 55 species per 0.25 m^2 box-core sample.[46] Furthermore, a significant proportion of species are rare, with up to 45% of taxa recorded as singletons, and between 58% and 70% of species restricted to a single site or area, suggesting either high levels of endemism or significant undersampling to date.[47]

The meiofauna, dominated mainly by nematodes and copepods, constitutes the most abundant fraction of benthic organisms, with densities ranging from 50 to 550 individuals per 10 cm^2.[48] Furthermore, some meiofauna taxa exhibit specific associations with nodules, occupying crevices and surfaces, which demonstrates habitat differentiation at the microscale.[49] Foraminifera (xenophyophores) represent a significant component of the biomass, making up more than 50% of it in the meiofauna and playing an important role in the carbon cycle.[50]

At the microbial level, diversity is equally remarkable. More than 12,800 bacterial and archaeal OTUs have been identified in sediments of the Clarion–Clipperton Zone (CCZ), with communities dominated by groups such as Proteobacteria, Thaumarchaeota, and Planctomycetes.[51] These communities exhibit strong differentiation according to substrate type (sediment, nodule, or water), with only about 3.2% of variants shared among them, indicating a high degree of habitat specialization. Furthermore, these microorganisms play key roles in biogeochemical processes, such as the nitrogen cycle, organic matter degradation, and nodule biomineralization.[52]

3.2.2 Pelagic biodiversity

Various pelagic species have been recorded in the CCZ, demonstrating that the CCZ is part of an oceanic system used by multiple species during their movements, migratory routes, and feeding activities. Among the most prominent species are marine mammals, with the potential presence of up to 30 cetacean species documented, of which at least 16 have confirmed sightings at different times of the year. Groups of dolphins, including Delphinus delphis and Grampus griseus, were recorded (IUCN: Least Concern; NOM-059: Special Protection), as was the sperm whale (Physeter macrocephalus), listed as Vulnerable by the IUCN and subject to special protection under Mexico's endangered species law NOM-059. Previous records also suggest the presence of beaked whales and species of the genus Kogia, although their detection is complex due to their deep-diving habits.[53]

Among the large migratory cetaceans, both the blue whale (Balaenoptera musculus) and the humpback whale (Megaptera novaeangliae; IUCN: Least Concern; NOM-059: Under special protection) exhibit movements that cross areas near and even within the CCZ. In the northeastern Pacific, these blue whales undertake annual migrations between highly productive feeding grounds at high latitudes (California, Oregon, and the Gulf of Alaska) and breeding and wintering grounds in Baja California, the Gulf of California, and the eastern tropical Pacific.[54] Likewise, recent evidence demonstrates connectivity between humpback whale breeding sites in Mexico and Hawaii, with individuals recorded in both Revillagigedo and Maui traveling distances of between 4,500 and almost 6,000 km.[55] These oceanic trajectories spatially coincide with sectors of the CCZ, suggesting that this region forms part of the migratory corridors used by large cetaceans of the North Pacific (Fig. 4).

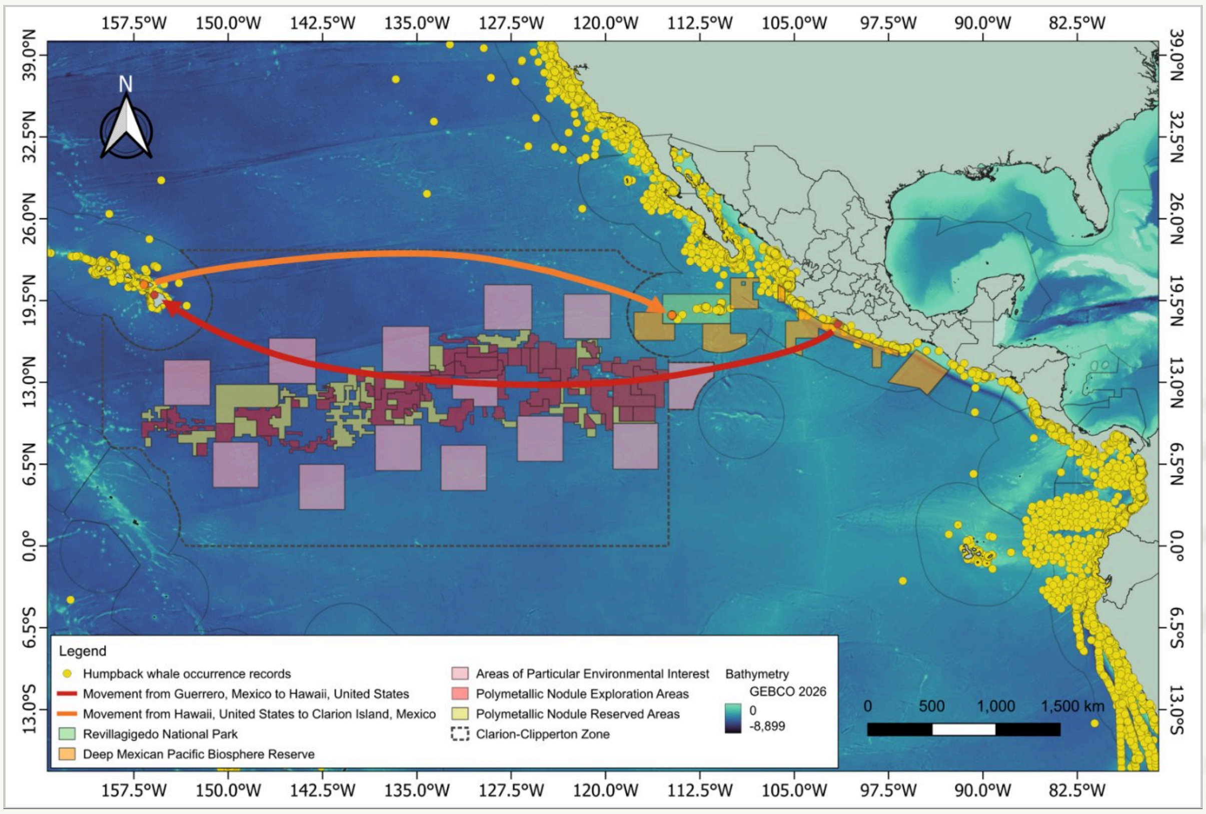

Figure 4. *Records of humpback whale presence (Megaptera novaeangliae) and recorded oceanic trajectory in the Pacific Ocean. Prepared by the author using information from Global Biodiversity Information Facility (https://www.gbif.org/es/), International Seabed Authority (https://isa.org.jm), Darling et al., 2022 (https://doi.org/10.1098/rsbl.2021.0547), General Bathymetric Chart of the Oceans (https://www.gebco.net), Marine Regions (https://marineregions.org) and the Commission of Natural Protected Areas (https://sig.conanp.gob.mx/Shape).*

From an ecological perspective, cetaceans play an important role within pelagic and mesopelagic food webs, acting as predators and linking different levels of the marine ecosystem. Their prey ranges from small organisms (plankton) to mesopelagic fish, organisms that are themselves part of complex food webs throughout the water column.[56] In this context, the upper layers of the CCZ (~700–1500 m) harbor diverse communities of zooplankton and micronekton, which are fundamental to the ecological functioning of the system. Recent studies have identified at least 79 zooplankton taxa and 80 micronekton taxa in these strata, dominated mainly by calanoid copepods, euphausiids, ostracods, mesopelagic shrimp, and gelatinous organisms.[57] These pelagic and mesopelagic assemblages support the presence of highly mobile organisms, including cetaceans, oceanic fish, and other large-scale predators that use the region as a transit, feeding, or ecological connectivity zone within the eastern Pacific.

In addition to cetaceans, several species of oceanic sharks use the CCZ region as part of connectivity corridors within the eastern tropical Pacific. Among them, the whale shark (Rhincodon typus, IUCN: Endangered; NOM-059: Threatened) stands out, whose transoceanic movements demonstrate the spatial scale of the migratory routes that cross this region. Satellite tracking of a female tagged on Coiba Island, Panama, documented a movement of approximately 20,142 km over 841 days, connecting the eastern Pacific with the western Indo-Pacific. During this journey, the individual traveled through oceanic sectors between ~10–15° N and 115–155° W, spatially coinciding with areas of the CCZ (Fig. 5). The route included movements near Cocos Island, Darwin (Galápagos Marine Reserve), Clipperton Atoll and later regions south of Hawaii and the western Pacific, mainly following the North Equatorial Current, which highlights the importance of current systems in the connectivity of highly migratory species.[58]

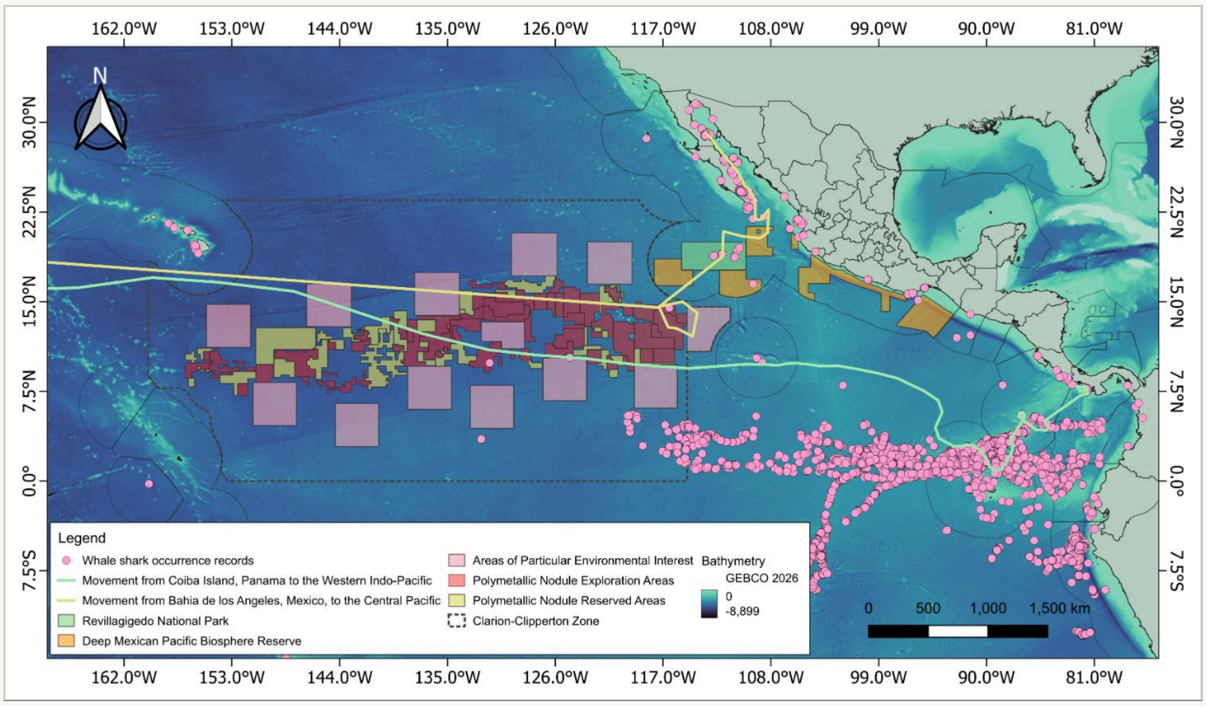

Figure 5. *Records of whale shark presence (Rhincodon typus) in the Pacific Ocean and transoceanic movements. Prepared by the author using information from Global Biodiversity Information Facility (https://www.gbif.org/es/), International Seabed Authority (https://isa.org.jm), General Bathymetric Chart of the Oceans (https://www.gebco.net), Marine Regions (https://marineregions.org), Commission of Natural Protected Areas (https://sig.conanp.gob.mx/Shape), Eckert and Stewart, 2001 (https://doi.org/10.1023/A:1007674716437) and Guzmán et al., 2018.*

Similar connectivity patterns have been documented in highly mobile sharks of the tropical eastern Pacific, such as the silky shark (Carcharhinus falciformis, IUCN: Vulnerable) and the Galapagos shark (Carcharhinus galapagensis, IUCN: Vulnerable). Recent acoustic telemetry studies show movements between different Marine Protected Areas (MPAs), including the Revillagigedo Archipelago, Clipperton Atoll, and the Galápagos Marine Reserve.[59] Some individuals traveled distances exceeding 3,000 km, spatially coinciding with sectors of the CCZ, particularly between ~15–22° N and 115–120° W. Key sites that function as “stepping stones” or regional connectivity nodes include Roca Partida, San Benedicto and Socorro within the Revillagigedo Islands, as well as Clipperton and various locations in the tropical eastern Pacific.[60] Notably, these CCZ sectors lie adjacent to Mexico's Reserva de la Biosfera Pacífico Mexicano Profundo, the deep-sea protected area (waters below 800 m) that lies nearer the CCZ contract areas than these more distant islands.

For sea turtles, the North Pacific population of Caretta caretta (IUCN: Vulnerable; NOM-059: Endangered) undertakes migrations that encompass virtually the entire North Pacific basin. During their juvenile stages, they utilize ocean current systems as dispersal mechanisms, moving from the western Pacific to central and eastern ocean regions. Dispersal models developed by Briscoe et al. (2016)[61] show pelagic trajectories adjacent to sectors of the northern and western CCZ (Fig. 1), particularly in ocean regions near Hawaii and in areas of the eastern Pacific off Baja California. Although the study does not directly refer to the CCZ, the modeled routes cross sectors of the eastern Pacific adjacent to this region, particularly in areas within the oceanic corridors used by juveniles during their pelagic phase.[62]

Records exist of migratory routes of commercially important pelagic fish that spatially coincide with the CCZ. Recent studies on connectivity and fisheries management have identified the CCZ as part of the so-called "blue corridors," that is, ocean corridors essential for the migration, reproduction, and connectivity of large pelagic species.[63] This highlights the ecological relevance of the region not only as a benthic area of mining interest, but also as a functional component within the connectivity and reproduction dynamics of commercially important pelagic fish in the Pacific.[64] Furthermore, many of these pelagic species are commercially important to international fisheries, as shown in the fishing effort map (Fig. A.2).[65] The CCZ coincides spatially with one of the regions with the highest concentration of fishing activity in the eastern Pacific.

There are also records of larval dispersal of corals and fish[66] between the Central Pacific (CP) and the Tropical Eastern Pacific (TEP), via surface currents such as the North Equatorial Countercurrent (NEC), which increases its speed, transport capacity, and duration during El Niño (ENSO) events. Furthermore, this long-distance connectivity is facilitated by the larval (teleplanar) stage of these species and by stepping-stone oceanic islands such as Clipperton and the Revillagigedo Archipelago, the regions closest to the CCZ.[67] Studies based on biophysical models suggest that the most likely connectivity occurs westward, from the TEP to islands in the CP, and that successful transoceanic dispersal events are rare due to oceanographic and biological constraints; despite this, the route taken by larvae remains adjacent to the CCZ.[68] Although this connectivity is limited, the mere fact that a small fraction manages to establish itself is sufficient to homogenize the genetic makeup of populations over large distances.[69] These dispersal corridors are also relevant to Mexico's Reserva de la Biosfera Pacífico Mexicano Profundo, the deep-sea protected area below 800 m that lies nearer the CCZ contract areas.

Finally, other studies of satellite tags and telemetry have documented the presence or transit of multiple marine predators in ocean regions related to the CCZ, mainly the mako shark (Isurus oxyrinchus), blue shark (Prionace glauca), common thresher shark (Alopias vulpinus) and leatherback sea turtle.[70] The ecological relevance of these routes is related to the existence of highly productive ocean hotspots, such as the California Current and the North Pacific Transition Zone, which support large biomasses of krill, pelagic fish, and squid, functioning as key feeding areas for numerous marine predators.[71] The CCZ should be understood not only as a potential mining region but also as part of an interconnected ocean system used by multiple migratory species and marine predators in the Pacific.[72]

3.3 Impacts of deep seabed mining

Polymetallic nodule mining causes direct disturbances to the seabed through harvesting vehicles that remove nodules and sediments, resulting in immediate mortality of benthic organisms and habitat destruction.[73] Because numerous organisms use nodules as substrate and shelter, their extraction reduces the structural heterogeneity of the habitat and alters the composition and diversity of benthic communities.[74] Depending on the equipment used, the scarring of the seabed from extraction activities may vary and could take decades or longer to recover.

Sediment plumes are expected to be generated both near the seabed and in the water column.[75] Some effects have been shown to persist for decades due to the slow recovery of abyssal ecosystems and the extremely slow growth of polymetallic nodules.[76] In the water column, plumes that would be generated by harvesters and wastewater discharge from mining vessels could disperse over long distances, affecting mesopelagic and bathypelagic ecosystems not just in the areas being mined or explored.[77] Suspended sediments can cause respiratory stress, reduce feeding efficiency, and disrupt pelagic food webs by incorporating suspended particles and metals. Likewise, the noise and artificial lighting generated during operations could modify the behavior and communication of pelagic organisms and highly migratory species.[78]

Since benthic fauna is closely dependent on processes occurring in the water column, including the flow of organic matter, nutrients, and prey, several authors have pointed out that effective seabed protection requires simultaneously considering associated pelagic and mesopelagic ecosystems.[79]

In conclusion, the potential effects of deep-sea mining in the CCZ must be understood at the ecosystem scale. Removing polymetallic nodules would cause direct habitat loss, mortality, and structural change on the seabed, while sediment plumes in the water column could alter the planktonic and mesopelagic communities that underpin oceanic food webs (Fig. A.1)—extending impacts to pelagic fish, sharks, sea turtles, and cetaceans that use the region as a migratory corridor. The CCZ is also a fundamental part of Pacific connectivity, carrying the larval transport and migratory "teleconnections" that have flowed uninterrupted for millions of years; mining infrastructure, vessel traffic, noise, light, and pollution could disrupt these pathways, with implications for population structure, resilience, and long-term biodiversity conservation. This runs counter to Mexico's own conservation commitments—the Mexico–France effort to expand the Clipperton protected area within an Eastern Pacific Corridor, and the Reserva de la Biosfera Pacífico Mexicano Profundo (RBPMP), Mexico's deep-sea protected area below 800 meters, which lies near the eastern CCZ contract areas. This concern is reinforced by the spatial relationship between the RBPMP, Revillagigedo and Clipperton: the reserve is largely contiguous with the deep waters surrounding the Revillagigedo Archipelago, covering almost the entirety of its adjacent deep-sea environment, while also forming part of a broader ecological corridor that connects Mexico's offshore protected areas with Clipperton and the eastern CCZ. Revillagigedo is especially significant in this context because it is recognized as the largest fully protected no-take marine national park in North America, and its conservation effectiveness is visible in Global Fishing Watch data (Fig. A.2), which shows no apparent fishing effort inside its boundaries despite intense fishing activity in the surrounding Pacific waters. Therefore, the proximity and ecological connectivity among Revillagigedo, Clipperton, RBPMP, and the CCZ show that deep-sea mining would not only threaten abyssal habitats in areas beyond national jurisdiction, but could also compromise all biodiversity that relies on these corridors, including both the pelagic species protected by Revillagigedo and the deep-sea ecosystems protected below 800 meters.

3.4 The United States unilateral decisions

The United States, meanwhile, has set a clear domestic policy direction to accelerate access to deep-sea minerals, including in areas beyond national jurisdiction, effectively bypassing the ISA's multilateral framework. On April 24, 2025, President Trump signed Executive Order 14285, "Unleashing America's Offshore Critical Minerals and Resources," published in the Federal Register on April 29, 2025 (90 Fed. Reg. 17735).[80] The Executive Order directs the Secretary of Commerce, acting through NOAA, to expedite seabed mineral exploration licenses and commercial recovery permits in areas beyond national jurisdiction under The Deep Seabed Hard Mineral Resources Act (DSHMRA).[81] The same Executive Order separately directed the Secretary of the Interior, acting through the Bureau of Ocean Energy Management (BOEM), to expedite critical-mineral leasing within the U.S. Outer Continental Shelf under the Outer Continental Shelf Lands Act (OCSLA)—a domestic track distinct from the areas beyond national jurisdiction addressed here; pursuant to that direction, BOEM has opened public-comment processes toward potential mineral lease sales, including a January 2026 Request for Information covering the Alaska (Arctic) "extended" Outer Continental Shelf.[82]

To implement this direction, NOAA finalized revisions to its DSHMRA regulations effective January 21, 2026 (91 Fed. Reg. 2642–2677),[83] including a "consolidated license and permit application process" enabling an eligible applicant to pursue an exploration license and a commercial recovery permit through a combined procedural pathway. Because it is a final rule, the comment period is closed and the focus is now on application-by-application implementation.[84] NOAA's framework is also explicitly time-bounded: it anticipates expedited certification once an application is deemed fully compliant and provides accelerated handling for amended applications, including an "endeavor" timeline of 50 days for certification of an amended application.[85] NOAA's public explainer frames the U.S. position clearly: as the U.S. is not a party to the Law of the Sea Convention, the ISA regulates deep seabed mining beyond national jurisdiction for States Parties, while the U.S. may issue licenses and permits to U.S. companies under DSHMRA for areas beyond national jurisdiction if U.S. requirements are met.[86]

NOAA has already moved from rulemaking to a growing pipeline of CCZ exploration-license applications that create "test cases" for this parallel pathway. NOAA announced on December 23, 2025 that it had received two amended exploration-license applications from The Metals Company USA, LLC (TMC USA) for CCZ exploration, found them fully compliant, opened public comment through February 23, 2026, and scheduled hearings on January 27–28, 2026.[87] NOAA then announced on March 23, 2026 that it had received two additional fully compliant CCZ exploration-license applications from American Metal Resources, LLC (AMR) and SeaX, Inc. (SeaX), and noted potential "priority of right" conflicts with earlier applicants.[88] Most recently, on June 2, 2026, NOAA published a notice of receipt of an exploration-license application from American Deep Sea Minerals, Inc. (ADSM) for the South Penrhyn Basin in the South Pacific—extending the domestic pipeline beyond the CCZ—and scheduled a public hearing for July 1, 2026, with written comments due by August 3, 2026, placing a further DSHMRA application directly within the July Council window. Importantly, none of these applications has resulted in an exploration license or a commercial recovery permit; each remains under notice, comment, hearing, and review, and should not be described as a final authorization for commercial recovery. The public process around each of these applications so far reveals significant environmental and legal concerns under U.S. law (to say nothing of international law) which, taken together with the economic and logistical constraints (e.g., the need for non-U.S.-flagged vessels) associated with each application, raise serious questions about the validity of any of these efforts.

These developments matter for the ISA because they establish a parallel, seemingly fast-moving domestic track for authorizing activity in the Area even though the ISA has not adopted any exploitation regulations—and a substantial and growing bloc of members supports a precautionary pause or moratorium; NOAA explicitly distinguishes its domestic track from ISA governance for States Parties, increasing risks of fragmentation and market confusion and generating pressure as domestic timelines create "facts on the water." That said, these efforts should not pressure ISA action. The various US processes and applications are in early stages, and all are potentially subject to litigation in US courts, political responses, and other externalities that are likely to delay any U.S.-led exploration.

At the same time, U.S. trade policy may amplify investment signals: on February 26, 2026, the Office of the United States Trade Representative (USTR) sought comments on a plurilateral critical minerals agreement and related policy actions, including "minimum prices or other price mechanisms" and "appropriate border measures," explicitly seeking input on price mechanisms to enable investment and returns across the supply chain.[89] The combined effect is likely to sharpen the political and narrative collision the ISA faces in 2026.

The United States is simultaneously building a trade-and-partnership architecture on "critical minerals" outside the ISA process that—while broader than seabed minerals—would underpin demand and pricing for the metals that polymetallic nodules contain, with partners such as the European Commission and Japan, explicitly aimed at coordinating trade tools such as border-adjusted price floors and laying the groundwork for a binding plurilateral agreement on trade in critical minerals—an effort distinct from Mexico's posture, given Mexico's public support for a precautionary moratorium on seabed mining.[90] Japan and the United States also announced a critical minerals action plan and a memorandum of understanding to establish a joint working group on deep-sea mineral resource development, underscoring that seabed-mineral cooperation is advancing through bilateral/plurilateral channels even as ISA rules remain contested.[91]

3.5 The Secretary-General's public response (April 2025)

In her public statement of 30 April 2025, the ISA Secretary-General, Ms. Leticia Reis de Carvalho, took note of U.S. Executive Order 14285 (issued 24 April 2025) and of The Metals Company USA's subsequent submission seeking commercial recovery in the high seas under a U.S. seabed mining code, and explicitly flagged concerns because references to applicability "in areas beyond national jurisdiction" implicate the global rule-of-law framework associated with UNCLOS—particularly given that the permit request concerned mining outside U.S. jurisdiction. The statement is important for delegations because it places the issue squarely in institutional terms: a domestic policy instrument becomes a multilateral governance issue the moment it purports to authorize mining in the Area, where UNCLOS/Part XI and the 1994 Agreement establish a specific international regime administered through the ISA.

4

MINIMUM PACKAGE OF RECOMMENDATIONS

From a precautionary perspective, the minimum package should not be framed as a pathway to improve deep-sea mining approvals. It should be framed as a package to protect the integrity of the international regime, prevent unilateral action from prejudicing ISA negotiations, protect humankind's common heritage, and reinforce that no exploitation should proceed. The subsections below develop the priority asks for this Council meeting as proposed decision language, and are a focused subset of the Executive Summary recommendations rather than a point-by-point restatement of each.

4.1 Reaffirm regime integrity and oppose unilateral pathways

The Council should reaffirm that activities in the Area must be organized and controlled through the Authority and conducted consistently with the UNCLOS and 1994 Agreement regime. Domestic authorizations that purport to permit activities in areas beyond national jurisdiction create serious institutional, environmental, and rule-of-law risks.[92]

> **PROPOSED LANGUAGE**
>
> *"The Council reaffirms that activities in the Area shall be organized and controlled through the Authority and conducted under the UNCLOS and 1994 Agreement regime, and expresses concern regarding domestic authorizations that purport to permit mining activities in areas beyond national jurisdiction outside that multilateral framework."*

4.2 Prevent parallel critical-minerals initiatives from prejudicing ISA decisions

Critical-minerals trade and industrial initiatives among market-oriented economies should not create market expectations, political pressure, or de facto legitimacy for seabed mining before the Authority has resolved fundamental environmental, legal, and governance questions.

> **PROPOSED LANGUAGE**
>
> *"The Council emphasizes that critical-minerals trade, industrial, or supply-chain initiatives shall not prejudice the Authority's negotiations, environmental obligations, or decision-making regarding activities in the Area, and Parties reaffirm their commitments to the multilateral process."*

4.3 Request legal analysis on unilateral authorizations

The Authority should assess the implications of national authorizations that purport to permit mining in the Area, including risks to regime integrity, market confusion, environmental governance, and the rights and interests of States Parties.

PROPOSED REQUEST

"The Council requests the Secretariat to prepare a legal and risk analysis on the implications of national authorizations purporting to permit mining activities in the Area, including options available to the Authority and to States Parties to protect the integrity of the international regime and prevent market confusion."

4.4 Put the U.S. domestic pathway on record as a governance risk

The Council should recognize that the U.S. domestic process is no longer hypothetical. NOAA has created a consolidated domestic process for deep seabed mining applications in areas beyond national jurisdiction, and multiple CCZ-related applications have already moved through public notice and review steps. This creates a governance risk because domestic timelines may advance independently of, and potentially ahead of, ISA decision-making.[93]

SUGGESTED FRAMING

"The Council should note that domestic authorization pathways for activities in areas beyond national jurisdiction create a risk of parallel decision-making outside the multilateral regime, and that such processes must not be allowed to prejudice the Authority's negotiations, environmental safeguards, or decisions on whether exploitation should proceed."

4.5 Apply spatial precaution near national protected areas

The Council should apply a precautionary approach to all activities in the Area, with heightened spatial precaution where such activities may affect national protected areas. This is particularly relevant to Mexico, given the Reserva de la Biosfera Pacífico Mexicano Profundo and the ecological connectivity between deep-sea areas, migratory species, water-column processes, and benthic ecosystems.[94]

PROPOSED LANGUAGE

"The Council recognizes that activities in the Area may create risks for areas under national jurisdiction, including national protected areas, and affirms that no exploitation should proceed, particularly where transboundary ecological risks have not been assessed, disclosed, prevented, and made subject to meaningful consultation with potentially affected coastal States."

CLOSING LINE

"These recommendations are not a pathway to authorize deep-sea mining. They are minimum safeguards to protect the integrity of the international regime and to ensure that unilateral action, market pressure, or incomplete rules do not push the Authority toward exploitation before harm can be prevented."

4.6 Ensure rogue actors face consequences, including termination of contracts

The Council members should ensure the ISA inquiry leads to punitive consequences for any contractors supporting unilateral mining. Termination of contracts makes full use of the powers of the ISA[95] and sends the strongest signal that unilateral deep-seabed mining outside of UNCLOS will not be tolerated and will lead to material consequences for companies involved.

4.7 Resist corporate interference with ISA inquiry into unilateral mining

Wholly owned subsidiaries of The Metals Company (TMC), NORI and TOML, have initiated legal proceedings[96] before the Seabed Disputes Chamber of the International Tribunal for the Law of the Sea (ITLOS) against the International Seabed Authority (Cases No. 34 and No. 35, filed 30 May 2026), seeking to suspend, through provisional measures, the inquiry that the ISA Council unanimously launched in July 2025 to identify any contractors participating in or supporting unilateral mining, in violation of their contracts.

These first-ever contentious cases brought by NORI and TOML do not themselves suspend the LTC inquiry or Council consideration. Suspension would require an order of provisional measures from the Chamber. If no order is made, the LTC and Council remain bound to act under the Convention, the 1994 Agreement, the regulations, the contracts, and consistently with relevant Council decisions, and should continue to work to conclude the inquiry, name any contractors in non-compliance and support meaningful consequences.

5

KEY ISSUES BEFORE THE COUNCIL AND ASSEMBLY

The central issue before the Council and Assembly is not how to finalize a workable mining code, but whether deep-sea mining should be allowed to proceed at all. The unresolved issues before the Authority confirm that exploitation cannot be authorized without unacceptable risk to the marine environment, biodiversity, and the common heritage of humankind.

There is common ground across delegations that the international community does not want mining to start right now, and is not ready to adopt a Mining Code that would open the gates to exploitation applications. A moratorium is the policy tool to operationalize this precautionary approach, enabling more time for independent research to inform decision-making before irreversible damage is done. Furthermore, supporting a global moratorium is the clearest way for governments to isolate and contain unilateral deep-seabed mining, making it riskier and less attractive for investors and insurers.

Fast-tracking an ISA Mining Code is not a neutral administrative step; it is a monumental, irreversible trigger that opens the door for commercial mining applications to be received and approved. The only way to finish a Mining Code this year would be for governments to abandon their own obligations to protect the marine environment and global equity. This would further erode multilateral norms, and validate more lax unilateral mining pathways.

5.1 The consolidated text does not resolve the core environmental problem

The further revised consolidated text remains the main negotiating document, but the existence of a text does not mean the regulatory system is ready. Core environmental standards, guidelines, thresholds, monitoring rules, compliance mechanisms, and liability tools remain incomplete or unresolved.[97]

A precautionary position should be clear: it is vital to act in line with the precautionary principle, and to support resolutions that emphasize the necessity of sufficient scientific knowledge as a precondition for exploitation. Accordingly, no exploitation regulations should be adopted, and no plan of work should be approved, unless the Authority can demonstrate that harm to the marine environment will be prevented. At present, that showing has not been made.

5.2 Coastal States must be protected from transboundary harm

The provisions on the rights and legitimate interests of coastal States are directly relevant to Mexico and other States potentially affected by activities in the Area. These provisions should not be limited only to adjacent coastal States or narrow economic interests.

Mexico and other States should support strong notification and consultation rights for all potentially affected coastal States, including where ecological connectivity, migratory species, larval corridors, ocean currents, sediment plumes, or biodiversity impacts may connect activities in the Area to areas under national jurisdiction.

5.3 Environmental safeguards remain inadequate

Several environmental safeguards remain unresolved, including the Environmental Compensation Fund, test-mining or pilot-mining requirements, Regional Environmental Management Plans, environmental thresholds, baseline-data requirements, monitoring obligations, and enforceable halt criteria.

The point is not to design a better mining system. The point is that these gaps confirm that the Authority is not ready to authorize exploitation. Damage to deep-sea ecosystems may persist for decades or longer, and polymetallic nodules form over geological timescales. A compensation fund cannot substitute for prevention of irreversible harm.[98]

5.4 BBNJ coordination must strengthen, not weaken, ocean protection

The entry into force of the BBNJ Agreement reinforces the need for precaution and coherent ocean governance. ISA decision-making should not undermine biodiversity protection, area-based management tools, environmental impact assessment standards, or scientific cooperation under the BBNJ framework.[99]

Consistent with the BBNJ Agreement, the Authority should strengthen—not weaken—environmental protection, and should not regard compliance with the Agreement as sufficient to justify the authorization of deep-seabed mining.

5.5 Support science for informed decision-making

The Government of Vanuatu launched at the recent Our Ocean Conference in Mombasa, Kenya, an initiative to review deep-sea science available as well as gaps in our knowledge of the deep sea. In connection to that initiative, Vanuatu tabled an agenda item for the ISA Assembly on the importance of science-based decision-making. This provides an opportunity for all governments to show their support for the centrality of science-based decision-making at the ISA and demonstrate collective agreement on the need to exercise precaution in relation to deep-sea ecosystems we have yet to fully understand. It can signal that in the face of corporate pressure, governments will act in line with their international obligations and the precautionary principle.

5.6 The Assembly should address the broader legitimacy of the regime

The Assembly's consideration of the periodic review, the advisory-opinion item on activities in the Area by non-States Parties, and the need for adequate scientific understanding all point to the same conclusion: the international regime for the Area is not ready to authorize commercial exploitation.[100]

The Assembly should use its authority to reaffirm that the protection and preservation of the marine environment is a core obligation of the Authority and that no exploitation should proceed unless and until the science, governance, enforcement, liability, and environmental-protection systems are demonstrably adequate.

SUGGESTED INTERVENTION LINE

> *"From a precautionary perspective, the unresolved issues before the Council and Assembly are not technical details on the path to adoption. They are evidence that the Authority is not ready to authorize deep-sea mining. Until harm can be prevented, environmental standards are complete and enforceable, scientific uncertainty is resolved, and affected States and ecosystems are fully protected, no exploitation regulations should be adopted and no plan of work should be approved."*

5.7 Prevent corporate capture of the ISA by restricting mining company influence

Unless and until all governments of the ISA Assembly are satisfied with guardrails against corporate influence, the ISA Assembly should not approve the observer applications from mining company contractors.

6

APPENDICES

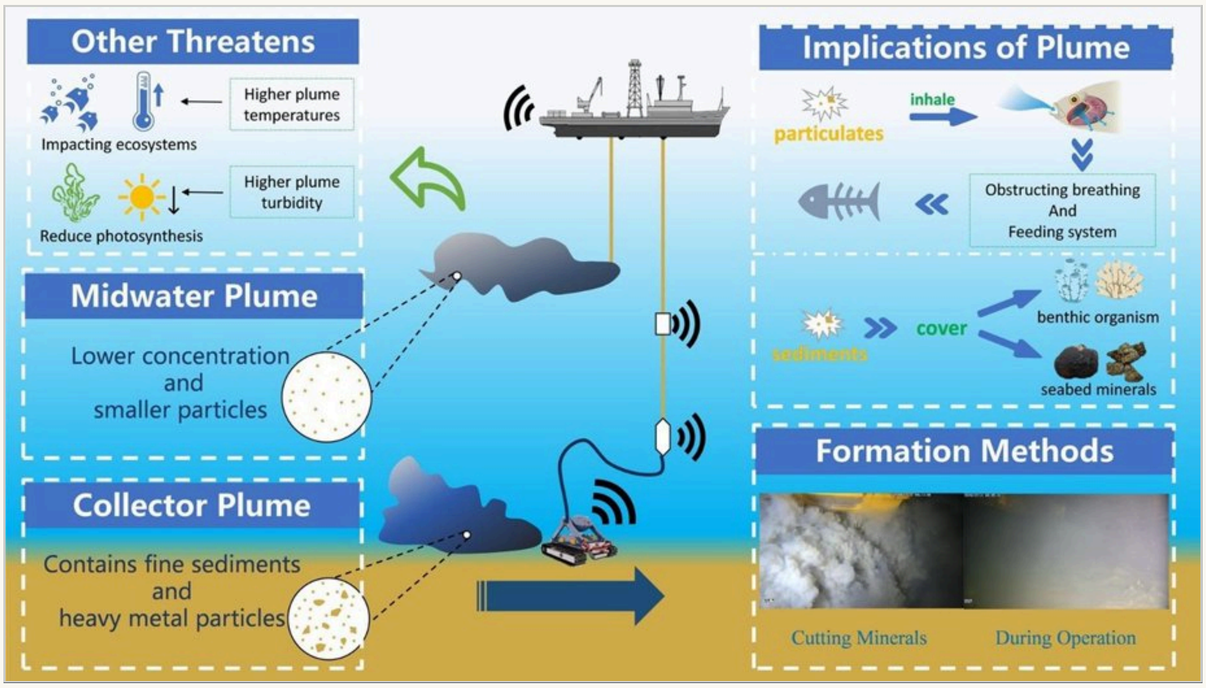

Figure A.1. *Schematic diagram of the impacts of sediment plumes generated by nodule extraction. Adapted from Yao et al., 2025, "Environmental impacts of deep-sea mining: A review of plume dynamics and mitigation strategies".*

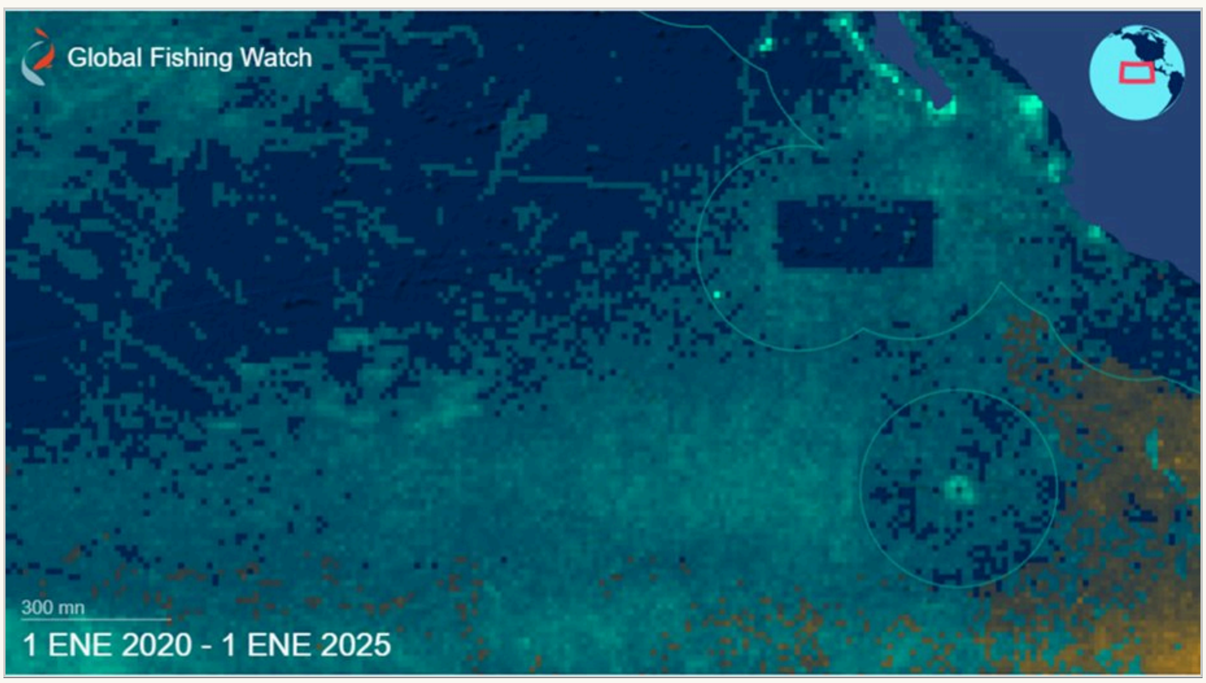

Figure A.2. *Map of apparent fishing efforts in the Pacific for the period 2020–2025. Source: Global Fishing Watch.*

Table A.I. *Representative corals and fishes used in the CCZ–Eastern Pacific connectivity analysis, with source references.*

SCIENTIFIC NAME	REFERENCE
CORALS	
Pavona varians	Ketchum & Reyes Bonilla, 1997; Wood et al., 2016
Pavona minuta	Ketchum & Reyes Bonilla, 1997
Pavona maldivensis	Ketchum & Reyes Bonilla, 1997
Porites lobata	Ketchum & Reyes Bonilla, 1997; Wood et al., 2016; Glynn, 2017;
Porites lichen	Ketchum & Reyes Bonilla, 1997
Pocillopora verrucosa	Ketchum & Reyes Bonilla, 1997
Pocillopora meandrina	Ketchum & Reyes Bonilla, 1997; Wood et al., 2016
Pocillopora eydouxi	Ketchum & Reyes Bonilla, 1997; Wood et al., 2016
Pocillopora damicornis	Ketchum & Reyes Bonilla, 1997; Wood et al., 2016; Glynn, 2017;
FISHES	
Acanthurus triostegus	Glynn, 2017
Arothron meleagris	Glynn, 2017
Calotomus carolinus	Glynn, 2017
Cantherhinus dumerilii	Glynn, 2017
Heteropriacanthus cruentatus	Glynn, 2017
Myripristis berndti	Glynn, 2017
Novaculichthys taeniourus	Glynn, 2017
Ostracion meleagris	Wood et al., 2016; Glynn, 2017
Scarus rubroviolaceus	Glynn, 2017
Zanclus cornutus	Glynn, 2017

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A MORATORIUM IS THE PRECAUTIONARY PATH

A briefing prepared for delegations to the Council of the International Seabed Authority.

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