



PART 3

Read the text below and answer questions 27–40.

THE LEGAL AND ENVIRONMENTAL QUAGMIRE OF DEEP-SEA MINING

Deep-sea mining has moved from speculative geology to near-term policy choice because the metals embedded in polymetallic nodules, cobalt-rich crusts, and seafloor massive sulphides are now framed as inputs for decarbonisation. Supporters describe the abyssal plains as a new resource frontier that could supply nickel, cobalt, manganese and copper for batteries and renewable-energy *infrastructure*. Critics respond that the rhetoric of “green extraction” obscures a core contradiction: these deposits sit within ecosystems that are sparsely mapped, slow to recover, and largely absent from public imagination. The resulting controversy is not simply environmental; it is also epistemic and institutional, because decisions must be made under profound uncertainty while economic expectations escalate.

Most commercial targets lie beyond national jurisdiction in the “Area” under the United Nations Convention on the Law of the Sea (UNCLOS). Within this treaty architecture, seabed resources are designated the “common heritage of mankind,” and the International Seabed Authority (ISA) is tasked with regulating activities on behalf of all states. The ISA’s design, however, contains an inherent tension: it must both facilitate resource development and ensure environmental protection. This dual mandate is a recipe for *conflict*, not necessarily because individual officials are negligent, but because the institution is required to pursue two goals that can become mutually exclusive when harm is plausible but profits are projected. The governance problem is therefore structural: the same body is expected to encourage an industry and to restrain it.

A legal flashpoint within this structure is the so-called “two-year rule,” a provision that enables a sponsoring state to request that the ISA complete exploitation regulations within a defined timeframe. To industry, the rule is a mechanism of procedural clarity: it prevents open-ended delay, stabilises investment expectations, and signals that the regime is operational rather than purely aspirational. To critics, it functions like a loophole that converts uncertainty into pressure, because it risks accelerating approval before baseline science is adequate and before monitoring systems can demonstrate that “serious harm” is avoidable. Even when formal deadlines are missed, the political effect remains: the rule shifts bargaining power toward proponents of rapid commencement, and it intensifies calls for a precautionary pause or moratorium.

Environmental impact pathways are multiple, and they are unusually hard to reverse. In nodule fields, extraction would remove the very substrate on which many organisms live,



while in crust mining, mechanical cutting could strip slow-growing surfaces from seamounts. Mining vehicles would disturb sediments and resuspend fine particles into benthic plumes that may drift beyond the immediate operation area. These plumes can smother *filter feeders*, clog feeding structures, and alter microbial and biogeochemical processes that regulate carbon cycling on the seafloor. Additional stressors—noise, vibration, artificial light, and chemical releases—would be introduced into habitats adapted to stable darkness. Unlike many coastal disturbances, these impacts occur in environments where energy flows are low and biological turnover is slow, meaning that disruption can persist long after the machinery leaves.

The passage emphasises that recovery is not merely uncertain; it may be fundamentally constrained by deep-sea life history. Many abyssal organisms grow slowly, reproduce infrequently, and rely on fragile habitat structures that take centuries to form. Nodules themselves accumulate at geological rates, so a site stripped today may remain altered for human lifetimes even if no further disturbance occurs. This makes the debate over “rehabilitation” qualitatively different from restoration in more productive systems: in the deep ocean, recovery may be extremely limited on human timescales. Proponents sometimes point to protected zones as partial safeguards, but protected areas do not regenerate removed substrate, and they may not prevent plume drift or cumulative regional effects.

Scientific uncertainty is therefore not a rhetorical device; it is a practical constraint on decision-making. Baseline surveys must document biodiversity, ecosystem function, and natural variability across huge areas, yet deep-ocean sampling is expensive, logistically difficult, and spatially sparse. Even where species lists can be assembled, functional roles and interaction networks are often poorly understood. This matters because regulation requires thresholds: the ISA must judge what counts as unacceptable damage. Yet defining “serious harm” without long-term datasets is contested, and impact assessments can become battleground documents. Companies may present limited snapshots as sufficient evidence of manageability, while scientists and NGOs argue that uncertainty should be treated as a reason to delay rather than to proceed. Under a precautionary principle, ignorance increases the burden of proof; under an adaptive-management logic, ignorance is treated as a condition to be navigated while operations begin.

Equity arguments complicate the picture further. Under the “common heritage” principle, benefits from mining in the Area are intended to be shared, including with states that lack the capital or technology to mine. Designing such benefit-sharing is politically difficult: questions arise about distribution formulas, how to account for environmental costs, and whether revenues should support development, conservation, or both. Liability for damage



is also legally and practically challenging. Deep-sea impacts may be cumulative, delayed, or diffuse, and enforcement in international waters is structurally weak. This makes accountability difficult to operationalise: even if rules exist, proving causation and securing compensation may be far harder than in terrestrial contexts where boundaries and jurisdiction are clearer.

Industry frequently argues that deep-sea mining could reduce pressure on land-based mining, which has well-documented social harms, including displacement, toxic pollution, and labour abuses. Critics counter that this substitution is not guaranteed: demand may rise with electrification, and terrestrial extraction may continue regardless. They also point to alternative pathways—material efficiency, recycling, substitution, and changes in *battery design*—that could reduce demand for new extraction without opening a new ecological frontier. The policy question thus becomes one of plausible futures: whether societies will treat mineral demand as fixed and inevitable, or as a variable shaped by innovation, regulation, and consumption patterns. In this frame, deep-sea mining is not a technical inevitability but a choice about which constraints are politically acceptable.

Regulation remains in flux, and that incompleteness is part of the quagmire. Draft exploitation rules include environmental management plans, monitoring requirements, and proposals for protected zones, but critics question whether the ISA has sufficient capacity, independence, and enforcement tools to police compliance—especially when member states hold conflicting interests as sponsors, beneficiaries, and regulators. Some governments and firms urge proceeding under adaptive management, updating rules as evidence accumulates; others insist that beginning exploitation before robust baselines exist is an inversion of scientific logic. Ultimately, deep-sea mining forces governance of a global commons under uncertainty: it requires deciding how much risk is acceptable, who benefits, and how to value ecosystems that are largely unseen yet potentially irreplaceable.

Questions 27–31

Select the correct answer.

27 Why does the passage describe deep-sea mining as a “quagmire”?

- A** Most countries have already agreed on a complete set of mining regulations.
- B** The environmental impacts are already fully understood and easy to manage.
- C** Governance is complex, scientific knowledge is limited, and economic stakes are high.
- D** The main deposits are located inside coastal states’ national waters.

28 What does the passage indicate about the International Seabed Authority (ISA)?



- A** Its role is limited to issuing exploration contracts, not environmental oversight.
- B** It is expected to protect the environment while also facilitating resource development.
- C** It enforces national mining laws for all coastal states.
- D** It has already approved large-scale commercial exploitation in the Area.

29 Why is the “two-year rule” controversial, according to the passage?

- A** It may pressure regulators to allow exploitation before baseline science is adequate.
- B** It prevents the ISA from updating rules once mining begins.
- C** It forces companies to share all raw data publicly before applying.
- D** It requires mining to begin within two years of the first exploration cruise.

30 Which impact is described as potentially extending beyond the immediate mining zone?

- A** The removal of nodules that destroys habitat at the extraction site itself.
- B** The disruption caused by noise and light affecting species near vehicles.
- C** Chemical release that may disturb species adapted to stable darkness.
- D** Sediment plumes that could spread and smother filter feeders.

31 What does the passage suggest about ecological recovery in the deep sea?

- A** Recovery is likely to be rapid once mining stops.
- B** Recovery is assured if protected zones are created nearby.
- C** Recovery may be extremely limited on human timescales.
- D** Recovery is not a concern because deep-sea habitats reform quickly.

Questions 32–36

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

32 The passage suggests that many deep-sea organisms may recover slowly because they grow and reproduce at low rates.

33 The passage indicates that collecting adequate baseline data is difficult partly because deep-ocean sampling is costly and coverage is limited.

34 The passage states that “serious harm” can be clearly defined even without long-term environmental data.

35 The passage suggests that a fair system for sharing revenues from mining in the Area would be politically difficult to design.



36 The passage states that draft exploitation rules already specify exactly how large protected zones must be in every mining region.

Questions 37–40

Complete the table below. Choose **ONE WORD ONLY** from the text for each answer.

Deep-sea mining: key disputes

Dimension	Issue / Approach	Effect / Comment
Support for mining	Supply of nickel, cobalt, manganese and copper	Metals could be used for batteries and renewable-energy 37
Governance	ISA's dual mandate	Dual mandate described as a recipe for 38
	"Two-year rule"	May accelerate approval before adequate baseline science is available
Environmental impacts	Sediment plumes drifting beyond the mining area	Can smother filter 39 and clog feeding structures
	Slow growth and reproduction of abyssal organisms	Ecological recovery may be extremely limited on human timescales
Alternative pathways	Material efficiency, recycling and substitution	Changes in battery 40 could reduce demand for new extraction

Answer Key

27. C

28. B

29. A

30. D

31. C

32. TRUE

33. TRUE



34. FALSE

35. TRUE

36. NOT GIVEN

37. infrastructure

38. conflict

39. feeders

40. design