Deep Sea Mining:
A civil society perspective

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Deep Sea Conservation Coalition
(Partner: Midas Project and Atlas Projects)

LDAC Working Group 5
24 October 2018

Members include

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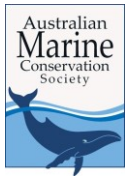

United Nations Convention on the Law of the Sea (UNCLOS)

Part XI – The Area

- The international area of the seabed (the Area): “the common heritage of mankind, the exploration and exploitation of which shall be carried out for the benefit of mankind as a whole”

UNCLOS Part XI: Seabed Mining

Article 145

Protection of the marine environment

- "Necessary measures shall be taken…to ensure effective protection for the marine environment from harmful effects"

- The [International Seabed] Authority shall adopt appropriate rules, regulations and procedures for:
- "the prevention, reduction and control of pollution and other hazards to the marine environment
- "[the prevention of] interference with the ecological balance of the marine environment;
- "the prevention of damage to the flora and fauna of the marine environment"

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ISA Mining Code
Target date: 2020

… inter alia

- Relationship between contractors and ISA – contractual obligations
- Environmental regulations
- Finance, royalty and payments regime
- Mining inspectorate: monitoring and compliance with regulations

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In the meantime…
29 exploration contracts have been issued/signed

Number of Contracts

- Polymetallic sulfides (ridges/vents)

7 contracts:

Indian Ocean: China, Germany, India, Korea.

Atlantic Ocean: France, Poland, Russia

- Cobalt crusts (seamounts)

5 contracts:

Pacific: China (2), Korea, Russia

Atlantic: Brazil

- Polymetallic nodules

17 contracts:

Pacific Ocean: Belgium, China, Cook Islands, France, Germany, Japan, Kiribati, Korea, Nauru, Russia, Singapore, Tonga, UK & IOM - Bulgaria, Cuba, Czech Republic, Poland, Russian Federation and Slovakia.

Indian Ocean: India

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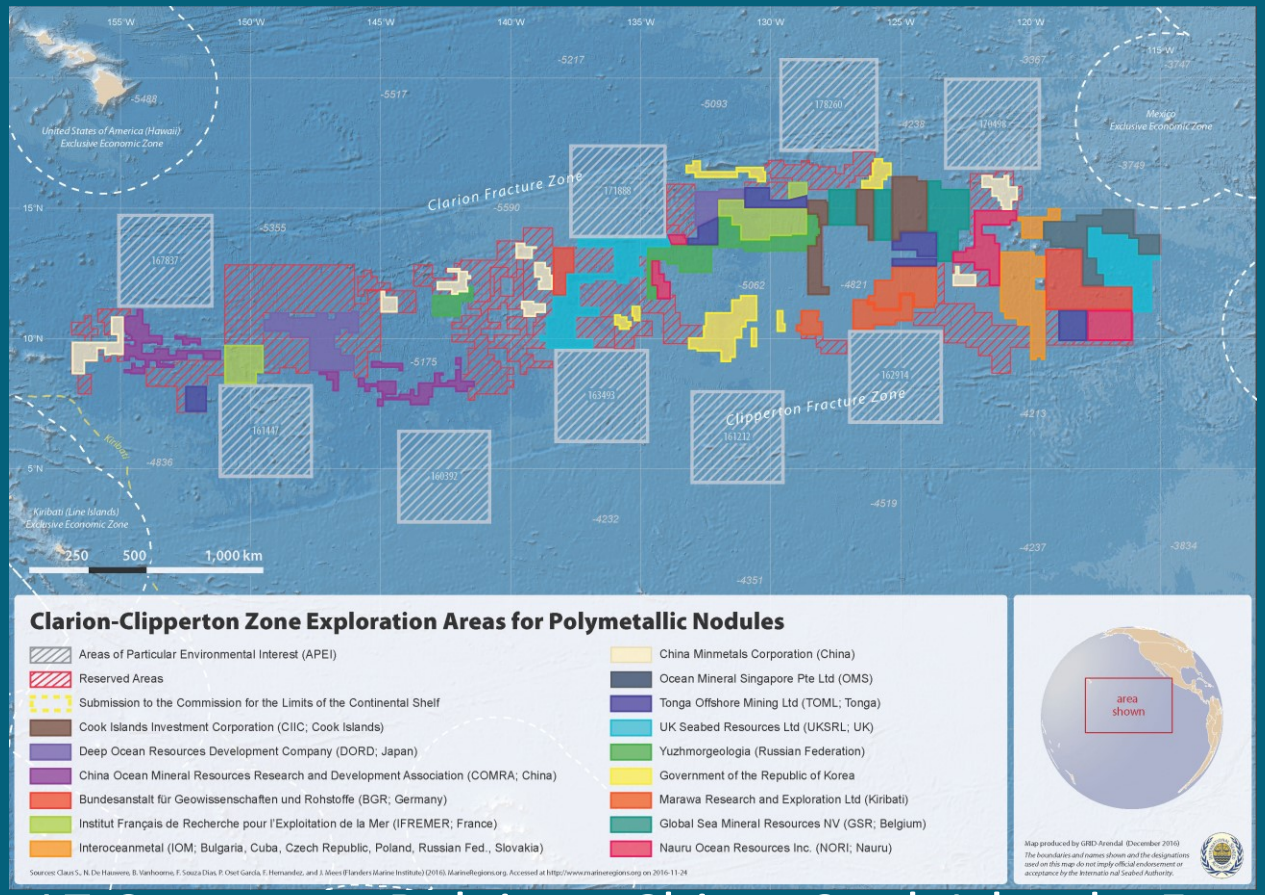
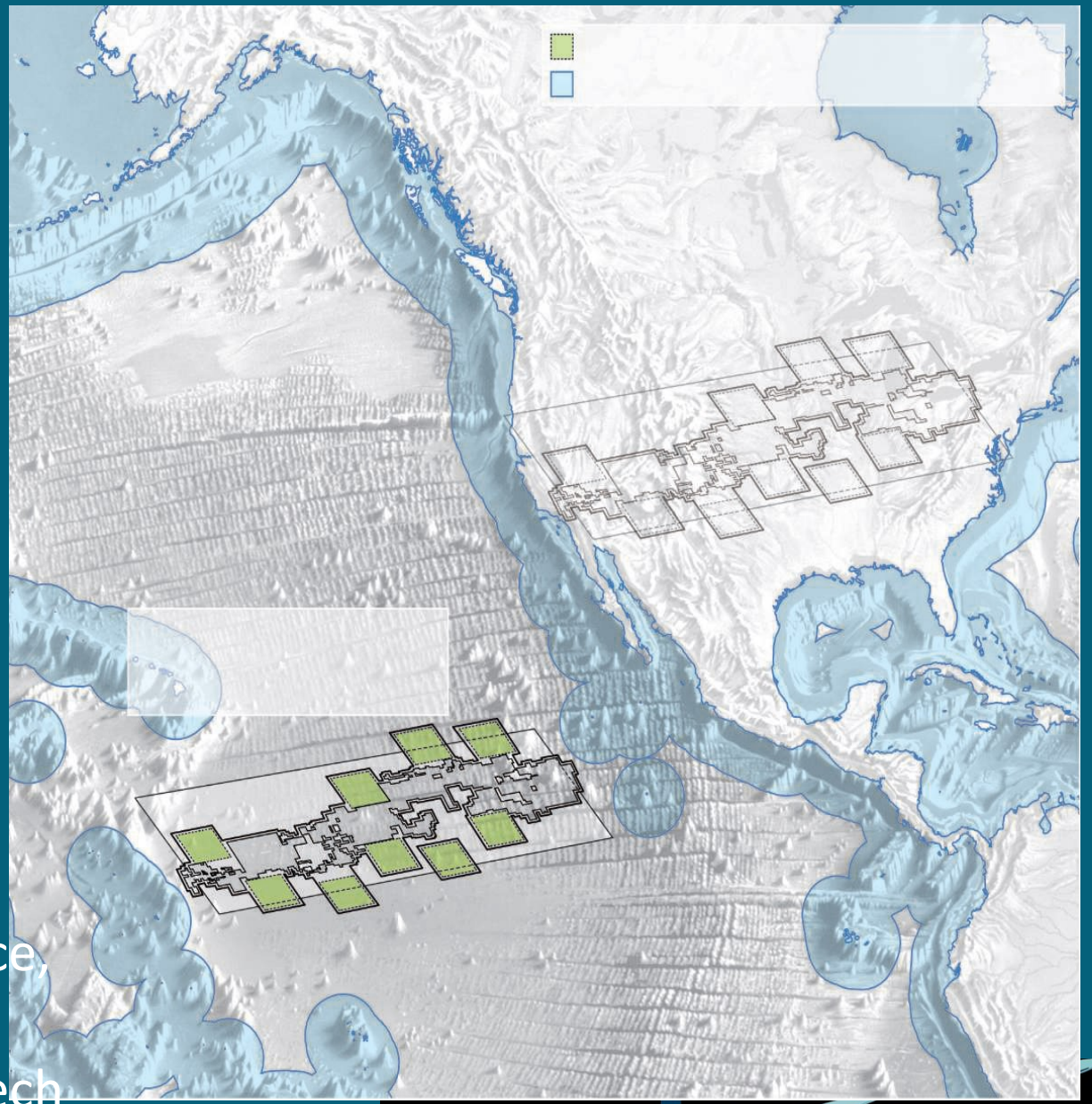
Clarion Clipperton Zone





17 Contracts: Belgium, China, Cook Islands, France, Germany, Japan, Kiribati, Korea, Nauru, Russia, Singapore, Tonga, UK & IOM - Bulgaria, Cuba, Czech Republic, Poland, Russian Federation and Slovakia

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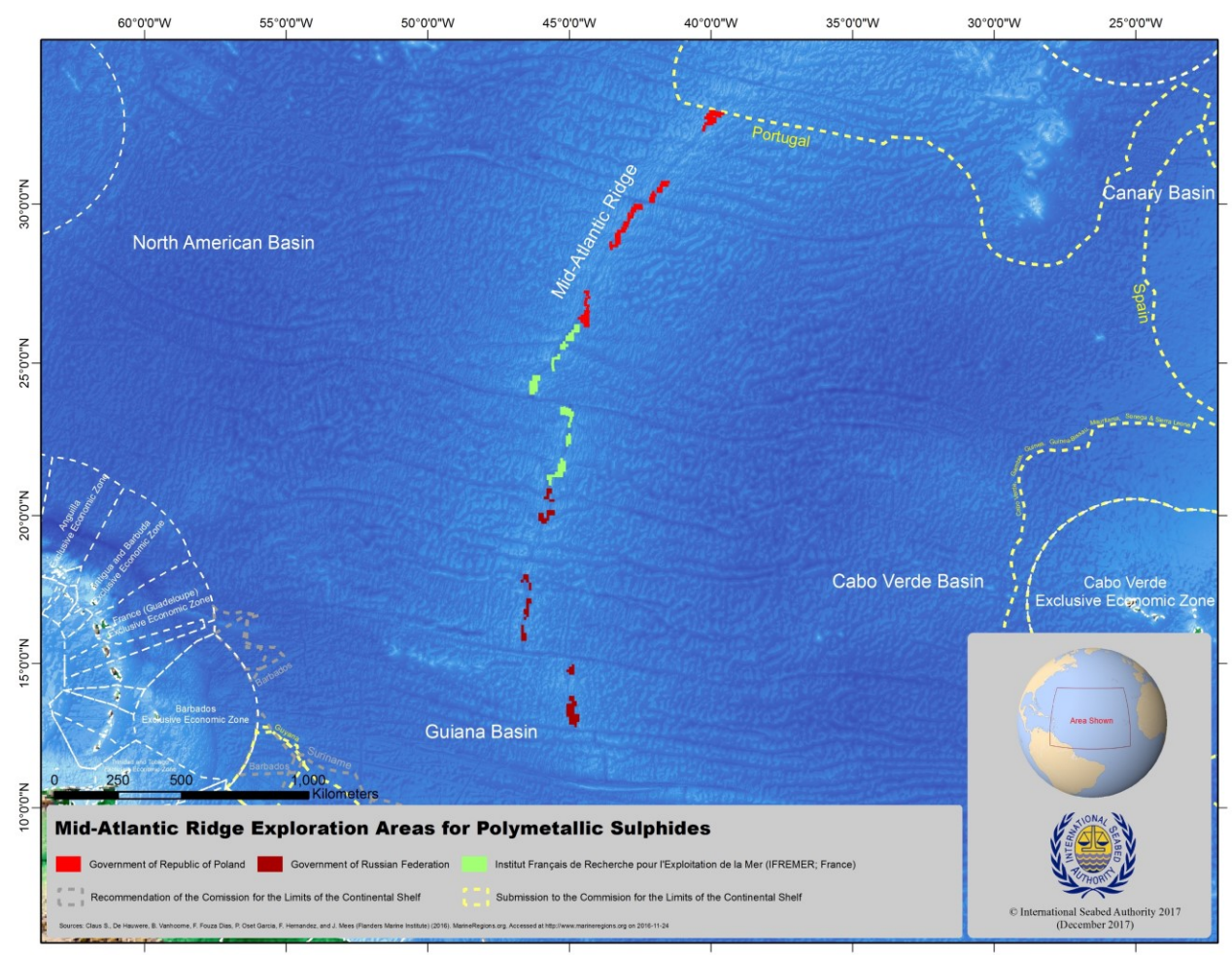
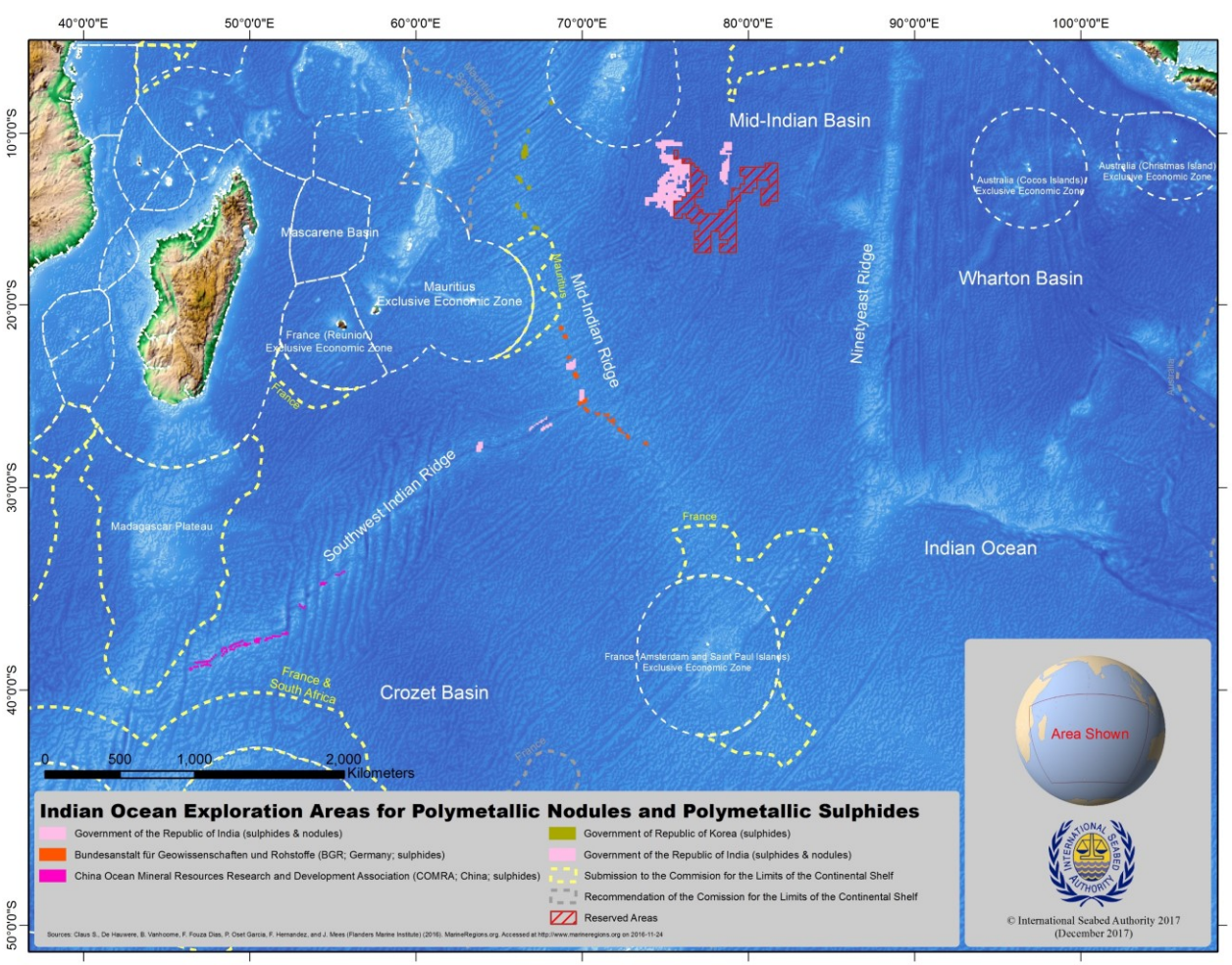
Oceanic ridges – polymetallic (vent) sulfides





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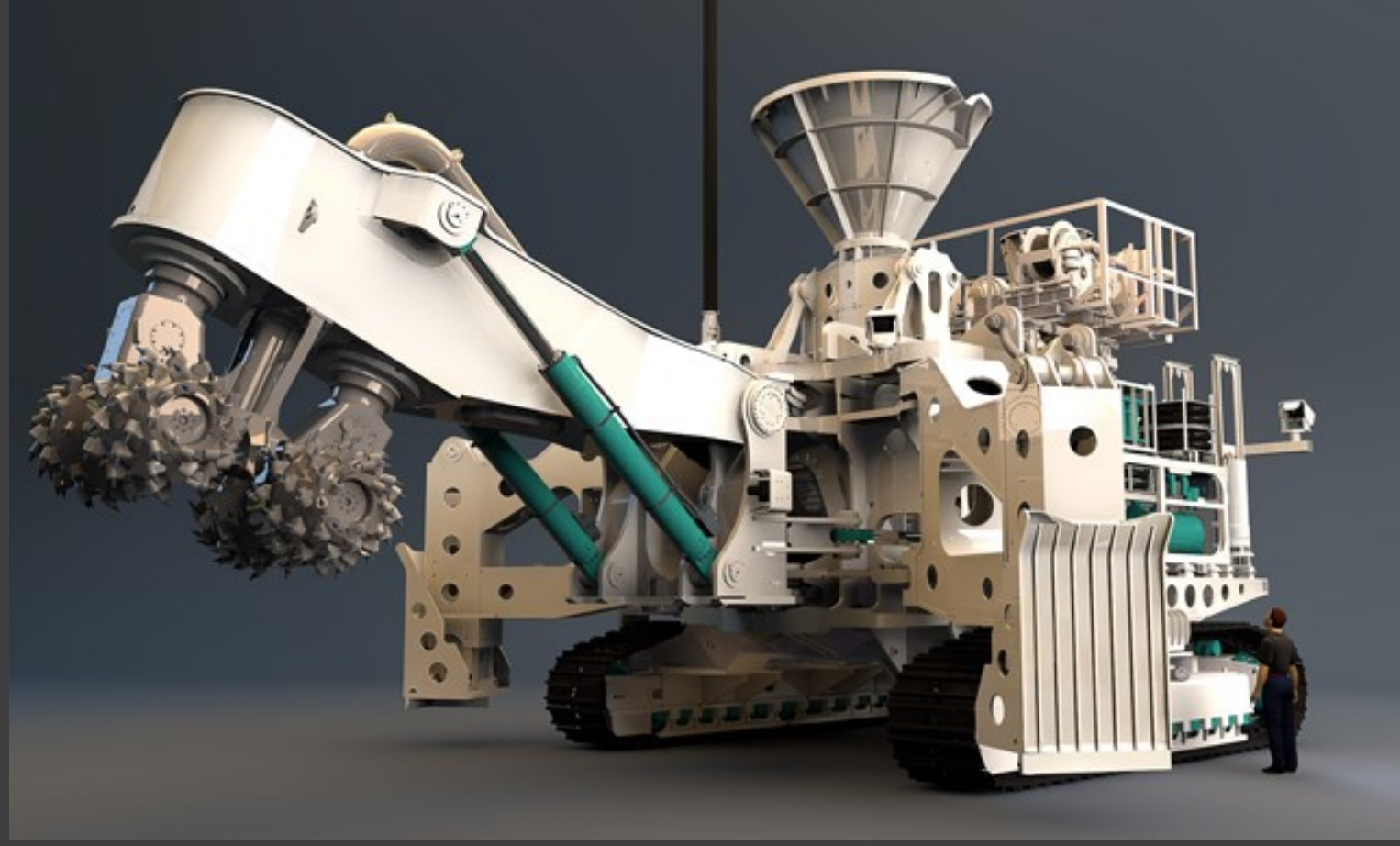

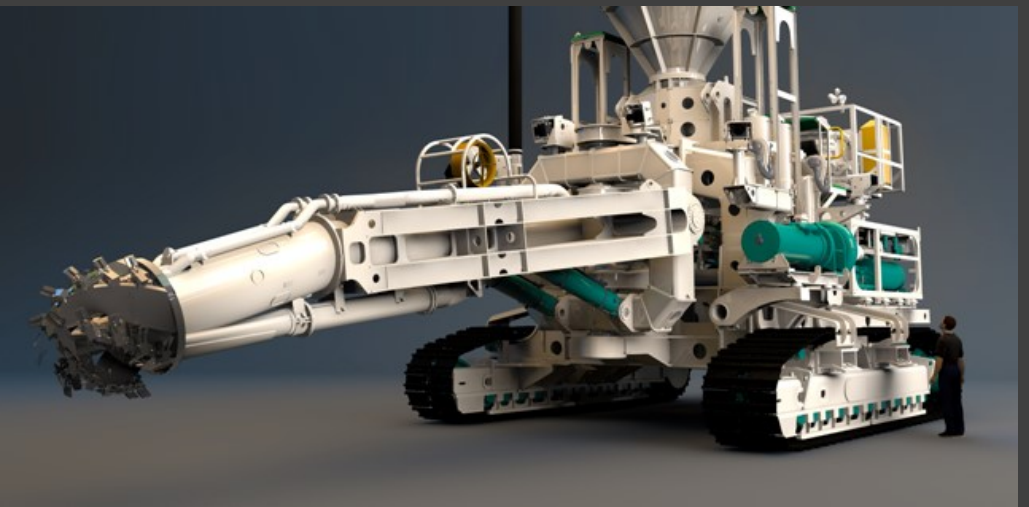

Nautilus Minerals polymetallic sulfide mining machinery

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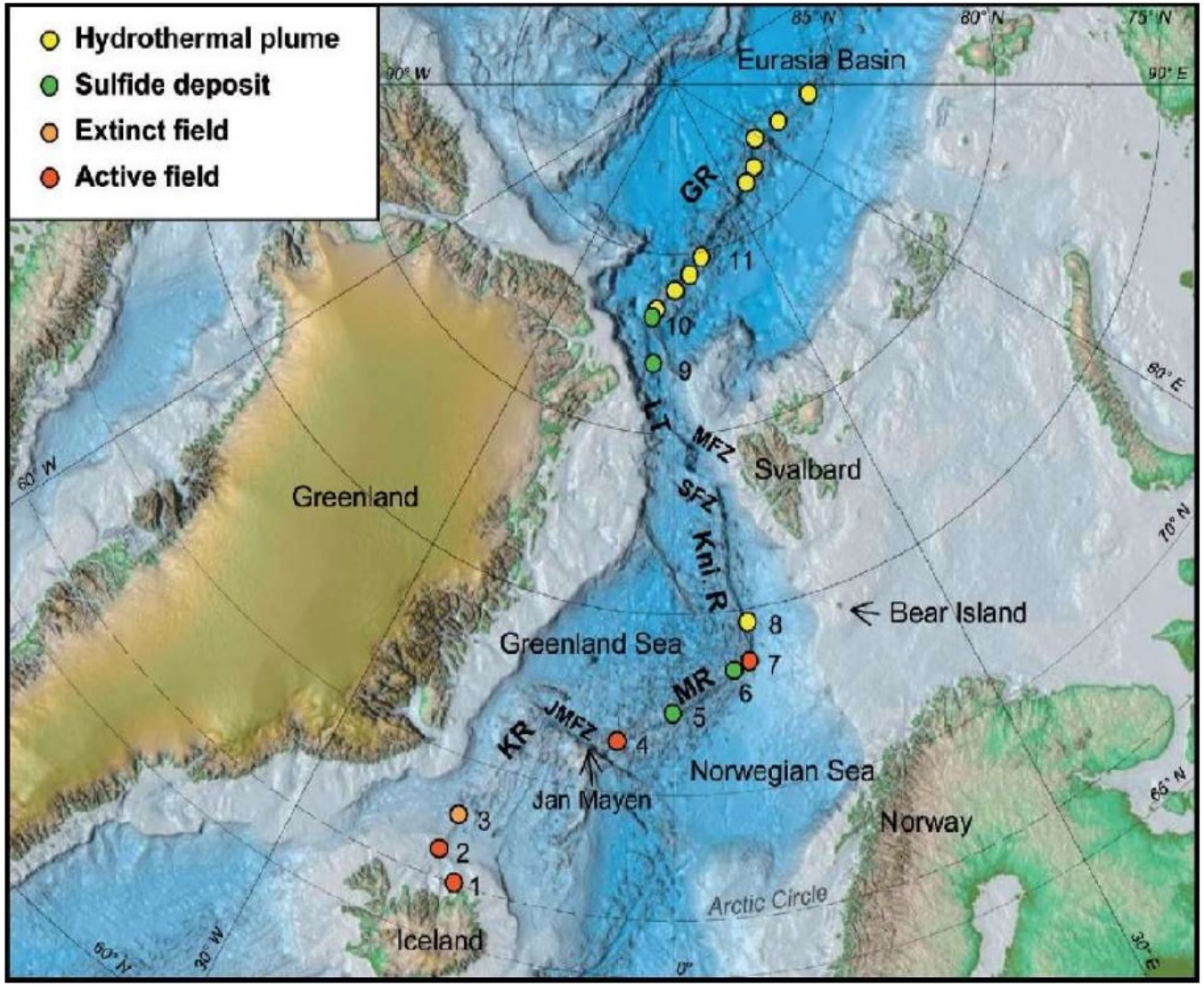
Norway: AMOR Mohns Ridge

Mapping deposits
- Gold, copper, silver, zinc

Norwegian Research Council, Norwegian University of Science and Technology, Nordic Mining ASA (applied for exploration license)
Statoil/Equinor



Ridges: MR is Mohns Ridge; and Kni. R is Knipovich Ridge.
Vent fields: (4) Jan Mayen, Soria Moria, and Troll Wall; (5) Copper Hill sulfide mineralized breccia; (6) Mohn's Treasure sulfide deposit; (7) Loki's Castle; and (8) hydrothermal plume.

Figure 2-7 – Active and extinct vent fields along the Arctic Mid-Ocean Ridge (AMOR) (Pedersen, et al., 2013).

Biodiversity loss from deep-sea mining

Nature Geoscience June 2017

correspondence

Biodiversity loss from deep-sea mining

To the Editor — The emerging deep-sea mining industry is seen by some to be an engine for economic development in the maritime sector[1]. The International Seabed Authority — the body that regulates mining activities on the seabed beyond national jurisdiction — must also protect the marine environment from harmful effects that arise from mining[2]. The International Seabed Authority is currently drafting a regulatory framework for deep-sea mining that includes measures for environmental protection. Responsible mining increasingly strives to work with no net loss of biodiversity[3]. Financial and regulatory frameworks commonly require extractive industries to use a four-tier mitigation hierarchy to prevent biodiversity loss in order of priority, biodiversity loss is to be avoided, minimized, remediated and — as a last resort — offset[4,5]. We argue here that mining with no net loss of biodiversity using this mitigation hierarchy in the deep sea is an unattainable goal.

The first tier of the mitigation hierarchy is avoidance. Potentially useful mitigation strategies in the deep sea include patchwork extraction, whereby some minerals with associated fauna are left undisturbed, or other means to limit the direct mining footprint. Even so, loss of biodiversity will be unavoidable because mining directly destroys habitat and indirectly degrades large volumes of the water column and areas of the seabed due to the generation of sediment plumes that are enriched in bioavailable metals.

Although biodiversity loss within mines is inevitable, innovative engineering design could reduce or minimize some risks to near- and far-field biodiversity. For example, shrouds fitted to cutting equipment might reduce the dispersion of sediment plumes and the footprint of plume impacts such as the burial of organisms. Similarly, vehicle design might limit compaction of seabed sediments. Of course, the efficacy of such efforts in mitigating biodiversity loss would need to be tested.

Remediation addresses the residual loss of biodiversity at and around a mine site after avoidance and minimization interventions. In the deep sea, native species are often slow to recruit and recolonize disturbed habitats. Slow recovery on the scale of decades to centuries, enormous spatial scales of mines for certain mineral resources (a single 30-year operation license to mine metal-rich nodules will involve an area about the size of Austria[6]) and the high cost of working in the deep sea may mean that remediation is unrealistic[7]. Further, the science of deep-sea benthic remediation is a nascent field[8]. It is far from established that remediation of industrial mine sites in the deep sea is feasible for any mineral resource, and we know of no remediation actions that can be applied to the water column.

The last resort in the mitigation hierarchy is in-kind or like-for-like offsets within a biogeographical region. When offsets cannot be located where the affected biodiversity is found, and where the affected biodiversity is important for geographically restricted functions such as connectivity (as is the case for the deep sea), in-kind offsets are not an appropriate mitigation strategy[9]. Out-of-kind offsets[10], such as restoring coral reefs in exchange for loss of deep-sea biodiversity, have been proposed, but this practice assumes that loss of largely unknown deep-sea species and ecosystems is acceptable. We question this assumption on scientific grounds. The relationship between any gain in biological diversity in an out-of-kind setting and loss of biological diversity in the deep sea is so ambiguous as to be scientifically meaningless. Further, compensating biodiversity loss in international waters with biodiversity gains in national waters could constitute a transfer of wealth that runs counter to the Law of the Sea, where benefits from deep seabed mining must accrue to the international community at large, as part of the common heritage of humankind. Given the paucity of other industrial activities in the deep sea (except perhaps fisheries), it is difficult to imagine a scenario where averted risk offsets[10] could apply; that is, where a mining operation could avert biodiversity losses from other activities.

The four-tier mitigation hierarchy used so often to minimize biodiversity loss in terrestrial mining and offshore oil and gas operations thus fails when applied to the deep ocean. Residual biodiversity loss cannot be mitigated through remediation or offsets and the goal of no net loss of biodiversity is not achievable for deep-seabed mining. Focus therefore must be on avoiding and minimizing harm. Most mining-induced loss of biodiversity in the deep sea is likely to last forever on human timescales, given the very slow natural rates of recovery in affected ecosystems. It is incumbent on the International Seabed Authority to communicate to the public the potentially serious implications of this loss of biodiversity and ask for a response. ❐

KARINA ADRON, IN SITU SCIENCE ILLUSTRATION

The Tu'i Malila vent field in the Lau Basin, southwest Pacific. Lau Basin foundation species (*Alviniconcha* spp. snails, *Ifremeria nautilei* snails, and *Bathymodiolus septemdierum* mussels) live in diffuse flow on the surfaces of metal-rich sulfide deposits.

References

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2. Levin, L. A. *et al. Mar. Policy* **74**, 245–259 (2016).
3. Rattan, H. *et al. Oryx* **49**, 232–238 (2015).
4. Ekstrom, J., Bennun, L. & Mitchell, R. *A Cross-sector Guide for Implementing the Mitigation Hierarchy* (Cross Sector Biodiversity Initiative, 2015).
5. *Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources* (International Finance Corporation, 2012).
6. Smith, C. R., Levin, L. A., Koslow, A., Tyler, P. A. & Glover, A. G. in *Aquatic Ecosystems: Trends and Global Prospects* (ed. Polunin, N.) 334–360 (Cambridge Univ. Press, 2008).
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8. Stenberg, S. M., Landahl, T. & Gooses, T. J. *J. Exp. Mar. Bio. Ecol.* **395**, 153–161 (2010).
9. Pilgrim, J. D. *et al. Conserv. Lett.* **6**, 376–384 (2013).
10. *Guidance Notes to the Standard on Biodiversity Offsets* (Business and Biodiversity Offsets Program, 2012).

Press release:

"Biodiversity losses from deep-sea mining are unavoidable and possibly irrevocable… "

"The International Seabed Authority … must recognize this risk… to inform discussions about whether deep-seabed mining should proceed, and if so, what standards and safeguards need to be put into place to minimize biodiversity loss..."

C. L. Van Dover, J. A. Ardron, E. Escobar, M. Gianni, K. M. Gjerde, A. Jaeckel, D. O. B. Jones, L. A. Levin, H. J. Niner, L. Pendleton, C. R. Smith, T. Thiele, P. J. Turner, L. Watling and P. P. E. Weaver https://t.co/2guvyvGfmC

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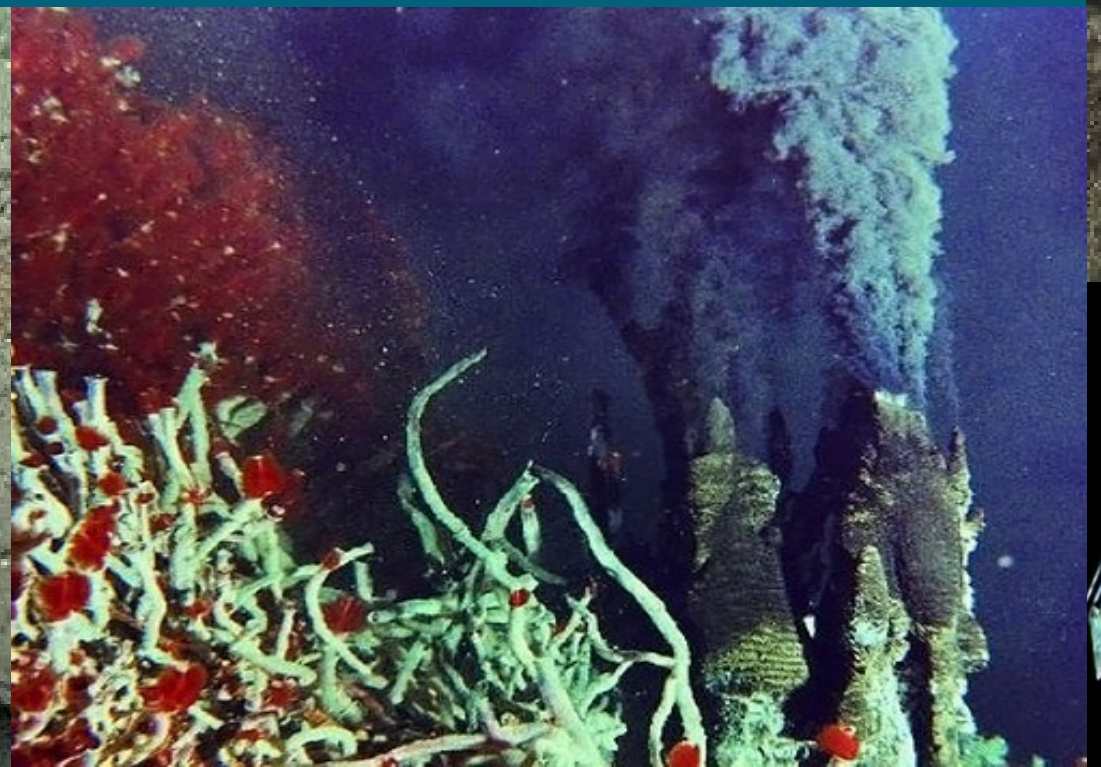
Deep-Sea Mining With No Net Loss of Biodiversity—An Impossible Aim (Niner et al, Frontiers in Marine Science, March 2018)

Scientific rationale and international obligations for protection of active hydrothermal vent ecosystems from deep-sea mining (Van Dover et al, Marine Policy, April 2018)



UN 1st World Ocean Assessment 2016

"This truly vast deep-sea realm constitutes the largest source of species and ecosystem diversity on Earth…evidence that the richness and diversity of organisms in the deep sea exceeds all other known biomes… and supports the diverse ecosystem processes and functions necessary for the Earth's natural systems to function" (mesopelagic carbon pump bathypelagic, seabed)

4,947 meters on canyon slope leading to Sirena Deep in Mariana trench / NOAA

Deep sea already under stress:

- Climate change related impacts: deoxygenation, acidification, temperature/food changes (POC flux) (Sweetman et al 2017; Levin et al 2016)
- Pollution: plastics, POPs in DS fish (Jamieson et al 2017)
- Fisheries impacts 200-2000m+ (1st WOA; ICES, others)

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ISA regulations: if biodiversity loss inevitable then…

- How much biodiversity loss will states through the ISA regulations allow or permit? Over what time frame will the loss be permitted given that in many/most cases the loss will be irreversible on human timescales?

- Can meaningful limits be placed and enforced over time to be sure that a ‘permissible' loss is not exceeded?

- What about cumulative impacts and stressors on deep ocean ecosystems already occurring or foreseen to occur?

- What about impacts on fisheries (plumes, light, sound, benthos, waste discharge)?

- How will the states justify the biodiversity loss, loss of ecosystem services, impacts on fisheries or other activities – e.g. what is the benefit to humankind as a whole (the common heritage of mankind) that would justify the loss of biodiversity in the Area?

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UNCLOS negotiated in 1970's

2030 Sustainable Development Goals

SDG 12

"By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse & achieve the sustainable management and efficient use of natural resources"

SDG 14.2

"By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans"

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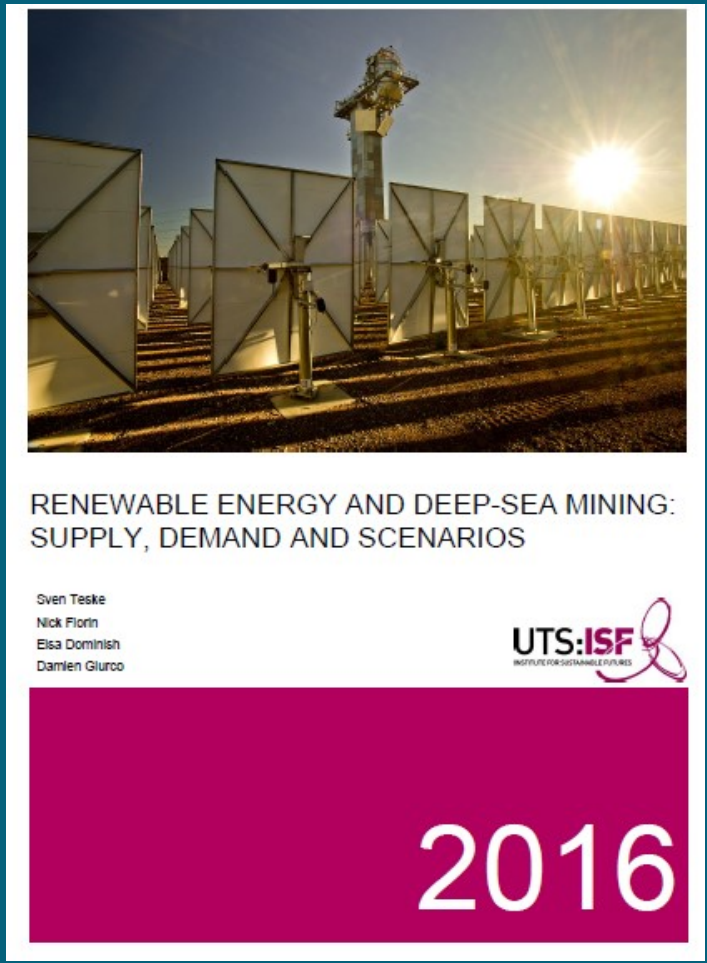
Metal demands for renewable energy



- Transition to 100% renewable energy economy by 2050 can be done without sourcing supplies from deep-sea

- Copper
- Cobalt
- Nickel
- Lithium
- Silver
- Specialty metals (Tellurium)
- Rare Earths (Neodymium, Dysprosium)

Teske, S., Florin, N., Dominish, E. & Giurco, D. 2016, Renewable Energy and Deep Sea Mining: Supply, Demand and Scenarios. University of Technology Sydney https://opus.lib.uts.edu.au/handle/10453/67336

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Intergovernmental Conference to negotiate new UNCLOS Implementing Agreement conservation and sustainable use of marine biodiversity in ABNJ

Questions:

- States through IGC negotiating UNCLOS implementing agreement to conserve and sustainably use biodiversity in ABNJ
- States through ISA negotiating instrument ("exploitation regulations") under UNCLOS that is likely to lead to biodiversity loss in deep-sea ecosystems systems already under stress
- How will governments reconcile these two processes?
- Is there political and/or institutional capacity to constrain development of industry if economic drivers are strong? (MIT research – CCZ mining likely to be profitable)

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Coherent coordinated approach to ABNJ
UN General Assembly resolutions 59/25 (2004), 61/105 (2006)… 71/123 (2016) – deep-sea fisheries & biodiversity in ABNJ

- UN debate - biodiversity, equity, sustainability, governance, international law; ecosystem approach; precautionary approach (UNCLOS & UN FSA)
- Core agreement: Prevent significant adverse impacts on Vulnerable Marine Ecosystems VMEs (seamounts, cold-water corals, deep-sea sponges etc)
- Require EIAs for deep-sea fisheries; VME area closures, sustainable catch, minimize impact on non-target species, cumulative impact assessments
- call on States/relevant international organizations to 'consider taking action' to address potential impacts on VMEs from other activities (e.g. oil & gas, seabed mining) and climate change impacts (71/123 paragraphs 185 & 184)

SHOULD DEEP-SEA MINING BE HELD TO A LESSER STANDARD?

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Policy developments since the Pleistocene

Code of Hammuabi, Magna Carta, etc…

The precautionary approach:

"The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures"

(UN Fish Stocks Agreement Art 6.2/Rio Principle 15)

In other words, ignorance is no longer an excuse under international law

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European Parliament Resolution 16 January 2018

- 22. Stresses that **ensuring transparency**, including public access to information, stakeholder involvement, public participation in decision-making and access to justice in environmental matters as required under the Aarhus Convention… is a matter of priority in addressing existing governance shortcomings; **calls on the Member States and the Commission to work through the ISA in order to ensure transparency** in its working methods and its effective capacity to assess environmental impacts, as well as ensuring **the effective protection of the marine environment from harmful effects and the protection and preservation of the marine environment,** as required under Parts XI and XII of the UN Convention of the Law of the Sea;
- **42. Moratorium until risks are fully understood**

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ISA Reform : Transparency

- “Non-confidential information, such as that relating to the protection and preservation of the marine environment, should be shared widely and be readily accessible” (ISA decision 2017)

SO… Recommendations:

- EIAs and other environmental information should be made public, involve stakeholder consultations, input and review
- ISA Contracts should be made public
- ISA Legal and Technical Commision (LTC) meetings should be open, deliberations made public, decisions debated and justified
- ISA Scientific Committee should be established for effective and transparent expertise, debate and review
- Sponsoring States should be open and transparent

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Some Conclusions

- ISA – Transparency and ensure “effective” protection of marine environment
- A debate should be held over whether seabed mining in ABNJ is really necessary (SDG 12, 14, others) - NGO Statement 2018
- Consumption of mineral resources should be one of sustainability, reuse, improved product design, recycling of materials rather than exploring for new sources of minerals in the deep sea.
- Provisions on deep-sea mining in EP resolution should be acted on
- Deep-sea mining should not occur unless risks fully understood (including to fisheries); clear/demonstrable benefit to society (mankind) as a whole (not just companies and states) without environmental, social or economic costs to other industries/society

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Gracias, Merci, Obrigado!

Members include

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And thanks to Synchronicity Earth, Kaplan Fund, Oceans 5, DSCC member organizations and the many scientists, NGOs and others working on deep-sea biology, ecology and conservation

www.savethehighseas.org

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