

Environmental Impact Assessment: Seafloor Minerals Context

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GSR

Global Sea Mineral Resources

EIA: SEAFLOOR MINERALS CONTEXT

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ENVIRONMENTAL OBLIGATIONS SUMMARY

International Conventions & Standards
(e.g. UNCLOS, MARPOL, CBD)

ISA-Specific
(e.g. Mining Code, Regional Environmental Management Plan [REMP], Guidelines, Standards)

► Governing body of marine minerals in the Area:
International Seabed Authority (ISA)



Required for an Exploitation Contract application





Twenty-fifth session

Legal and Technical Commission session, part I
Kingston, 4–15 March 2019
Agenda item 11

**Review of the recommendations for the guidance of
contractors for the assessment of possible environmental
impacts arising from the exploration for marine minerals in
the Area**

**Recommendations for the guidance of contractors for the
assessment of the possible environmental impacts arising
from exploration for marine minerals in the Area**

Issued by the Legal and Technical Commission*

I. Introduction

1. During exploration for marine minerals, the International Seabed Authority is required to, among other things, establish and keep under periodic review environmental rules, regulations and procedures to ensure effective protection for the marine environment from harmful effects which may arise from activities in the Area and, together with sponsoring States, apply a precautionary approach to such activities on the basis of recommendations by the Legal and Technical Commission. In addition, contracts for mineral exploration in the Area require the contractor to gather oceanographic and environmental baseline data and to establish baselines against which to assess the likely effects of its programme of activities under the plan of work for exploration on the marine environment and a programme to monitor and report on such effects. The contractor shall cooperate with the Authority and the sponsoring State or States in the establishment and implementation of such monitoring programmes. The contractor shall report annually on the results of its environmental monitoring programmes. Furthermore, when applying for approval of a plan of work for exploration, each applicant is required to provide, inter alia, a description of a programme for oceanographic and environmental baseline studies in accordance with the relevant regulations and any environmental rules, regulations and procedures established by the Authority that would enable an assessment of the potential environmental impact of the proposed exploration activities, taking into account any recommendations issued by the Legal and Technical Commission, as well as a preliminary assessment of the possible impact of the proposed exploration activities on the marine environment.

* The present document replaces ISBA/19/LTC/8. For further information, please see paragraphs 16 to 19 of ISBA/25/C/19.



ENVIRONMENTAL BASELINE STUDIES AND IMPACT ASSESSMENT

- ▶ ISBA/25/LTC/6 → Baseline Study / EIA Guidance for Contractors
- ▶ 7 Study Areas
 - ▶ Physical Oceanography
 - ▶ Geology
 - ▶ Chemical Oceanography
 - ▶ Sediment Properties
 - ▶ Biological Communities
 - ▶ Bioturbation
 - ▶ Fluxes to Sediment (Sedimentation)



Physical Oceanography

Aim: estimate extent and duration of sediment plumes that may be formed during full-scale operations

Study requirements: study of currents, temperature, and turbidity required. Installation of moorings of current meters, ADCPs, sediment traps, CTDs and other equipment, followed by hydrodynamic (plume) modelling

Geology

Aim: determine heterogeneity of the environment and assist the placement of suitable sampling locations, collect information on the potential for heavy metal and trace element release during full-scale mineral operations

Study requirements: High-resolution bathymetry, box cores, laboratory analysis

Chemical Oceanography

Aim: understand baseline water chemistry conditions in the water column and within sediment pore water, understand the possibility and impact of potential metal release during the extraction process

Study requirements: water column: multiple CTD profiles and water sampling efforts over two years (seasonal studies); pore waters: multi corers, box corers, laboratory analysis

Sediment Properties

Aim: To study baseline sediment conditions and predict the behaviour of mineral extraction on sediment composition. To determine the basic properties of the sediment, including measurements of soil mechanics and composition to adequately characterize the surficial sediment deposits which are the potential source of deep-water plume.

Study requirements: box coring, laboratory analysis

Biological Communities

Aim: evaluate the effects of activities on animals. Studies to include microfauna, meiofauna, macrofauna, megafauna, demersal scavengers, nodule fauna, video/photo surveys, pelagic community assessment (water column and near bottom), baseline tissue metal concentrations, marine animal observations, temporal variation studies, regional distribution/genetic connectivity studies, etc.

Study requirements: Photographic/video transects and animal sampling, use of multi corer, box corer, moored time lapse cameras, plankton nets, ROV and other methods, laboratory analysis

Bioturbation

Aim: gather data on the mixing of sediments by organisms and to predict the impact of extractive activities on biological communities.

Study requirements: multi cores, e.g. Pb-210 analysis

**Fluxes to Sediment
(Sedimentation)**

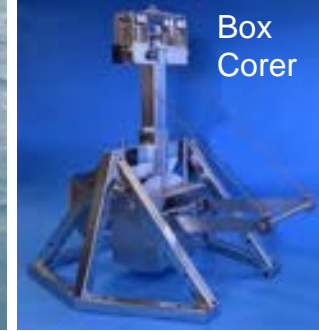
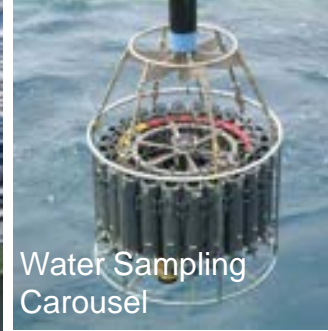
Aim: To gather time series data on the flux and composition of materials from the upper water column to the deep sea. To understand baseline sedimentation rates and to evaluate the effects of mineral extraction activities (especially plumes) on these rates.

Study requirements: moored time lapse sediment traps installed for a minimum of 12 months, laboratory analysis



ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

- ▶ An EIA is a process and an evaluation of the possible positive or negative effects that a proposed project may have on the environment
- ▶ Includes Environmental Risk Assessment, including significance rankings – ensures the EIA and EIS focus on the key issues





- ▶ Tool for decision making
- ▶ Describes the positive and negative environmental effects of a proposed action (EIA results)
- ▶ Presents effects and mitigation
- ▶ Usually also lists one or more alternative actions
- ▶ EIS Template provided in Annex IV of ISA's (draft) Regulations for Exploitation [ISBA/25/C/WP.1]

ISBA/25/C/WP.1

Annex IV

Environmental Impact Statement

1. Preparation of an Environmental Impact Statement

The Environmental Impact Statement prepared under these regulations and the present annex shall:

(a) Be prepared in plain language and in an official language of the Authority together with an official English-language version, where applicable;

(b) Provide information, in accordance with the relevant regulations, Standards and Guidelines, corresponding to the scale and potential magnitude of the activities, to assess the likely Environmental Effects of the proposed activities. Such effects shall be discussed in proportion to their significance. Where an applicant considers an effect to be of no significance, there should be sufficient information to substantiate such conclusion, or a brief discussion as to why further research is not warranted; and

(c) Include a non-technical summary of the main conclusions and information provided to facilitate understanding of the nature of the activity by Stakeholders.

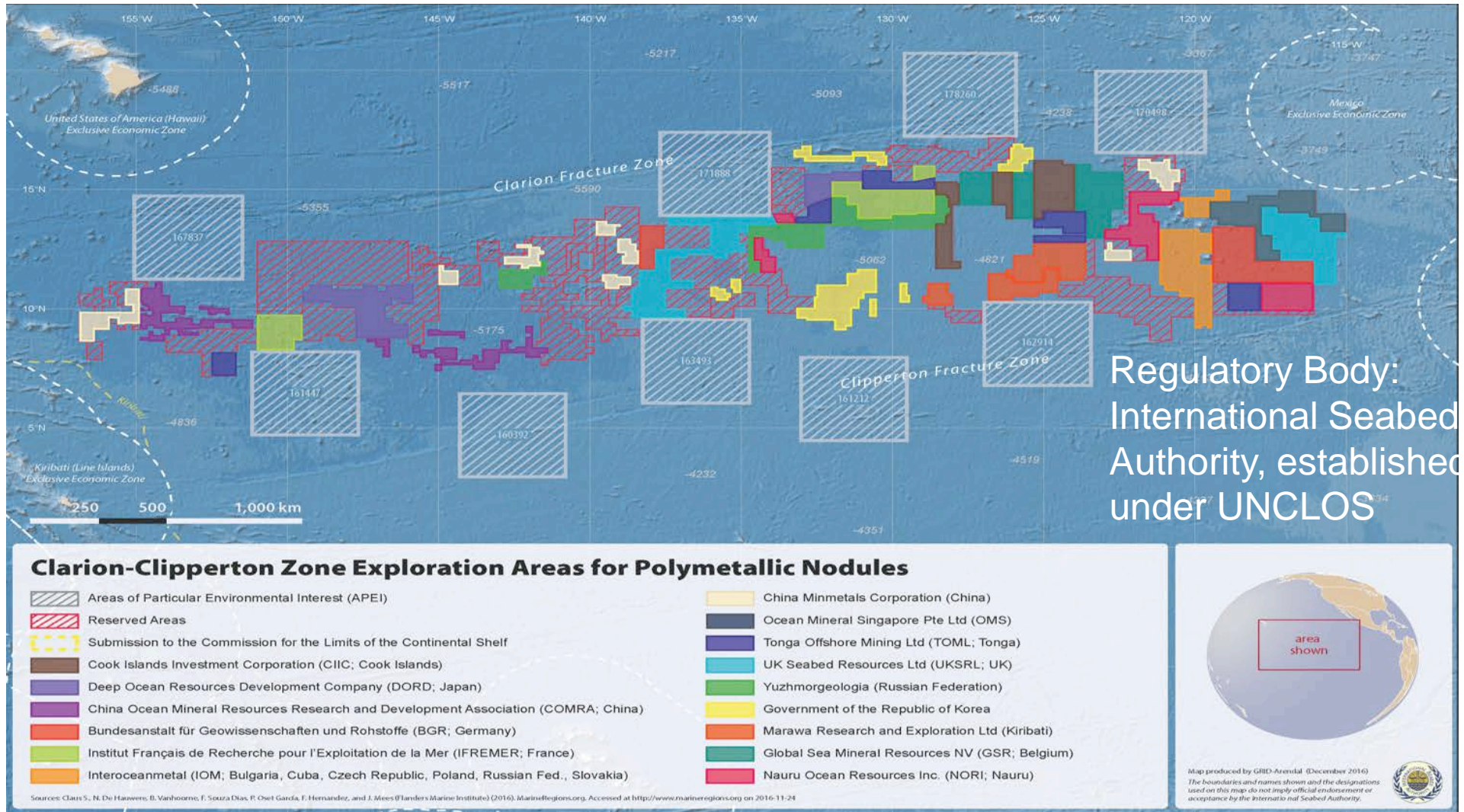
2. Template for Environmental Impact Statement

The recommended format for an Environmental Impact Statement is outlined below. It is intended to provide the International Seabed Authority, its member States and other stakeholders with unambiguous documentation of the potential Environmental Effects on which the Authority can base its assessment, and any subsequent approval that may be granted. Further detail for each section is provided following the overview.

The document is a template only, and is not intended to be prescriptive but rather to guide the format and general content of an Environmental Impact Statement. It does not provide details of methodology or thresholds that may be resource- and site-specific. These methodologies and thresholds may be developed as Standards and Guidelines to support the regulations.



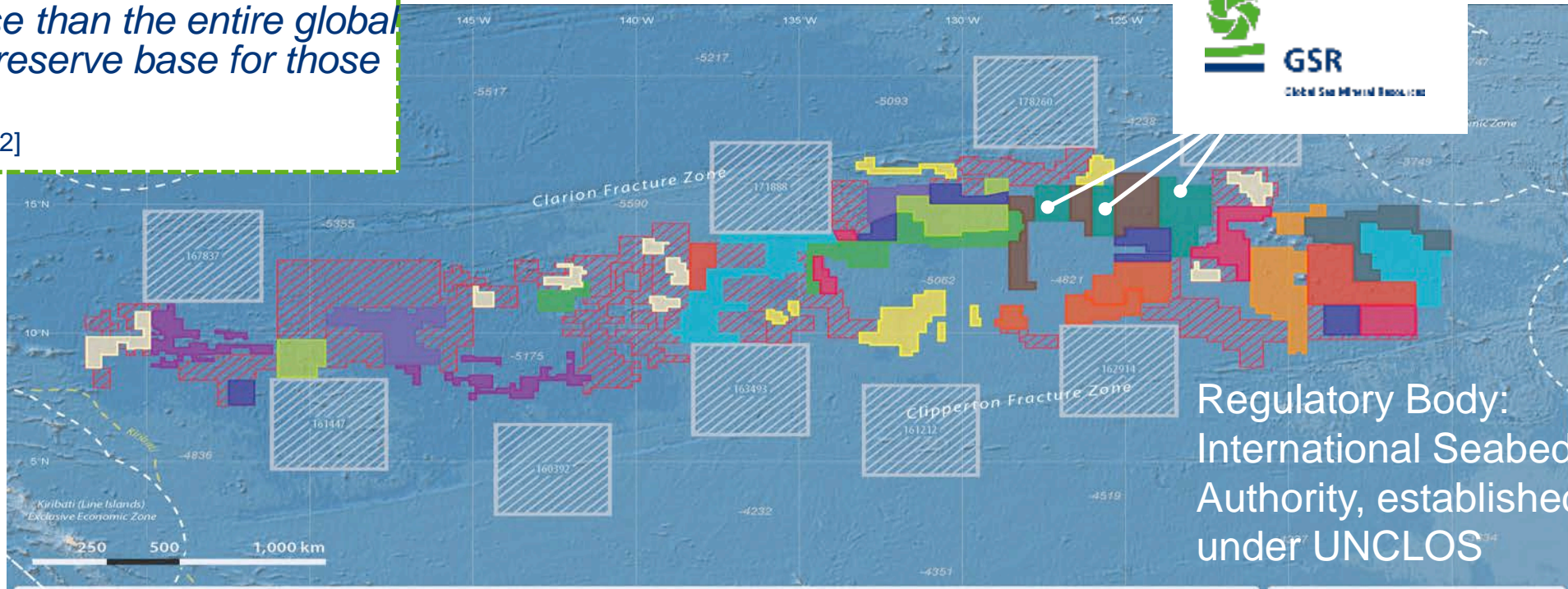
REGIONAL ENVIRONMENTAL MANAGEMENT PLAN (REMP)



“Nodules in the Pacific Ocean contain more nickel, cobalt and manganese than the entire global terrestrial reserve base for those metals.”

[Hein et al., 2012]

REGIONAL ENVIRONMENTAL MANAGEMENT PLAN (REMP)



Regulatory Body:
International Seabed
Authority, established
under UNCLOS

Clarion-Clipperton Zone Exploration Areas for Polymetallic Nodules

- | | |
|---|--|
| Areas of Particular Environmental Interest (APEI) | China Minmetals Corporation (China) |
| Reserved Areas | Ocean Mineral Singapore Pte Ltd (OMS) |
| Submission to the Commission for the Limits of the Continental Shelf | Tonga Offshore Mining Ltd (TOML; Tonga) |
| Cook Islands Investment Corporation (CIIC; Cook Islands) | UK Seabed Resources Ltd (UKSRL; UK) |
| Deep Ocean Resources Development Company (DORD; Japan) | Yuzhmorgeologia (Russian Federation) |
| China Ocean Mineral Resources Research and Development Association (COMRA; China) | Government of the Republic of Korea |
| Bundesanstalt für Geowissenschaften und Rohstoffe (BGR; Germany) | Marawa Research and Exploration Ltd (Kiribati) |
| Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER; France) | Global Sea Mineral Resources NV (GSR; Belgium) |
| Interoceanmetal (IOM; Bulgaria, Cuba, Czech Republic, Poland, Russian Fed., Slovakia) | Nauru Ocean Resources Inc. (NORI; Nauru) |



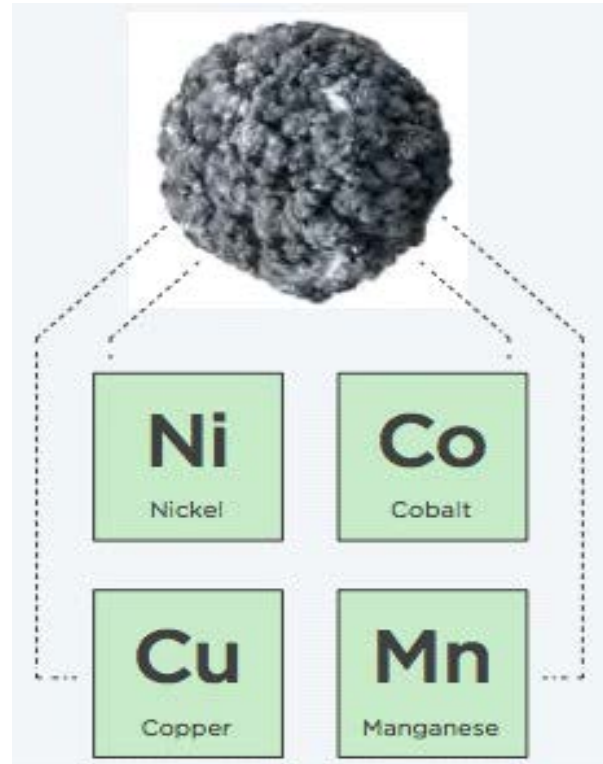
Map produced by GRID-Arendal (December 2016)
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the International Seabed Authority.

Sources: ClauS, N. De Haan, B. Vanhoore, F. Souza Dias, P. Osei Garcia, F. Hernandez, and J. Mees (Hamburg Marine Institute) (2016). MarineRegions.org. Accessed at <http://www.marinerregions.org> on 2016-11-24

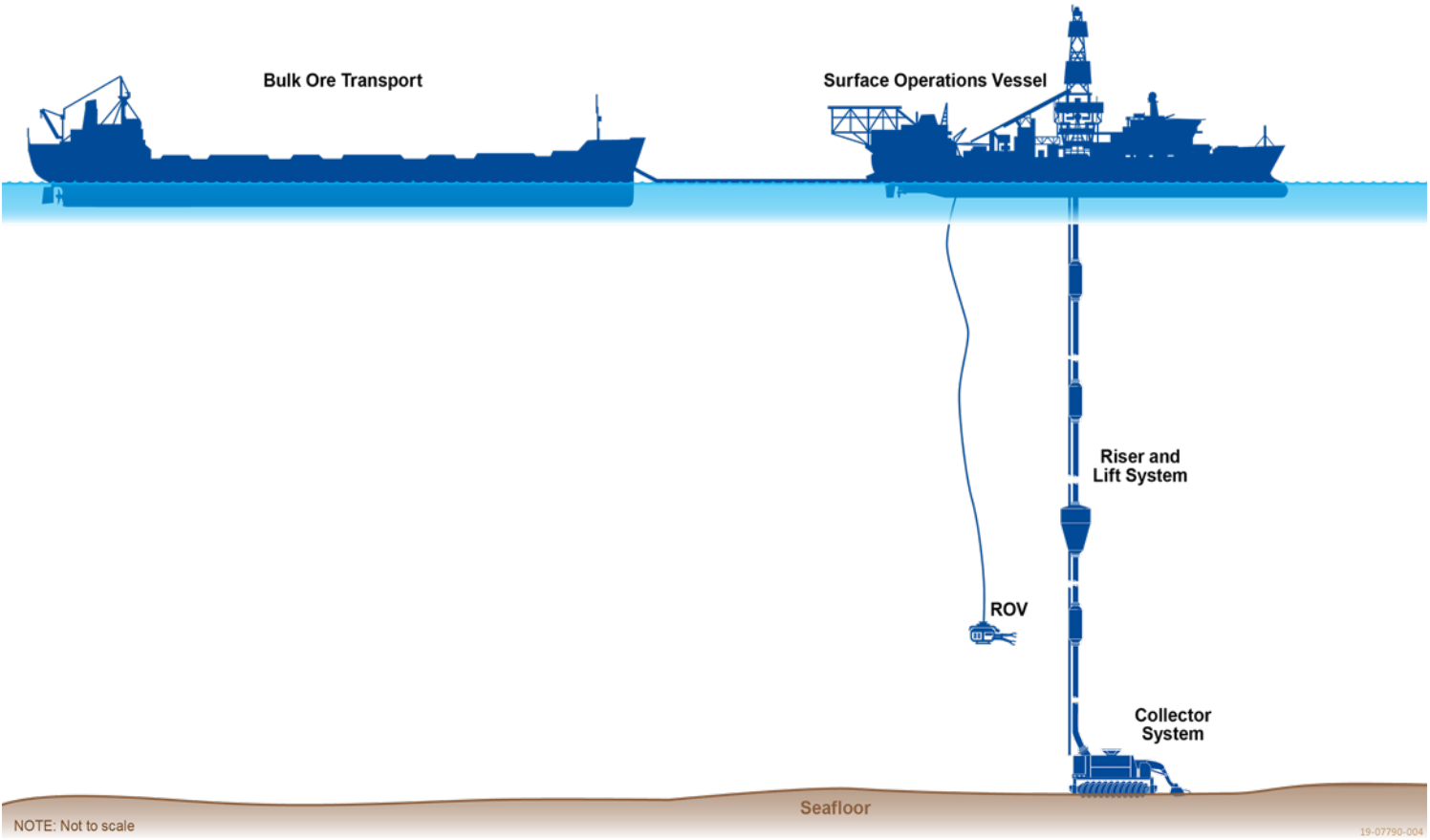


POLYMETALLIC NODULES

- ▶ Rich in manganese, nickel, copper and cobalt
- ▶ Rare earths also present
- ▶ Potato-sized, hard surface
- ▶ Exist on the surface – not attached
- ▶ Cover extensive areas of the ocean's abyssal plains



PRODUCTION SYSTEM KEY COMPONENTS



- ▶ Key Activities within the Area:
 - ▶ Harvesting
 - Collectors
 - Lift System
 - Surface Vessel
 - ▶ Materials Handling
 - Dewatering
 - Ship-to-ship transfer
 - ▶ Transshipment

Source: UKSR



2017



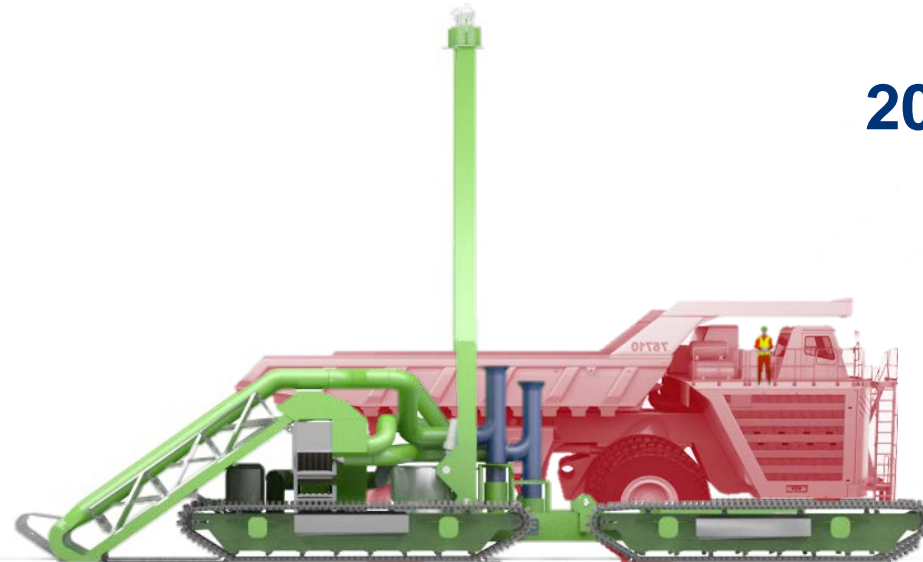
**Tracked Soil
Testing Device**

2020



**Pre – Prototype
Nodule Collector**

2023



**Prototype
Commercial Nodule Collector**

TRANSPARENT APPROACH TO ENVIRONMENTAL MANAGEMENT

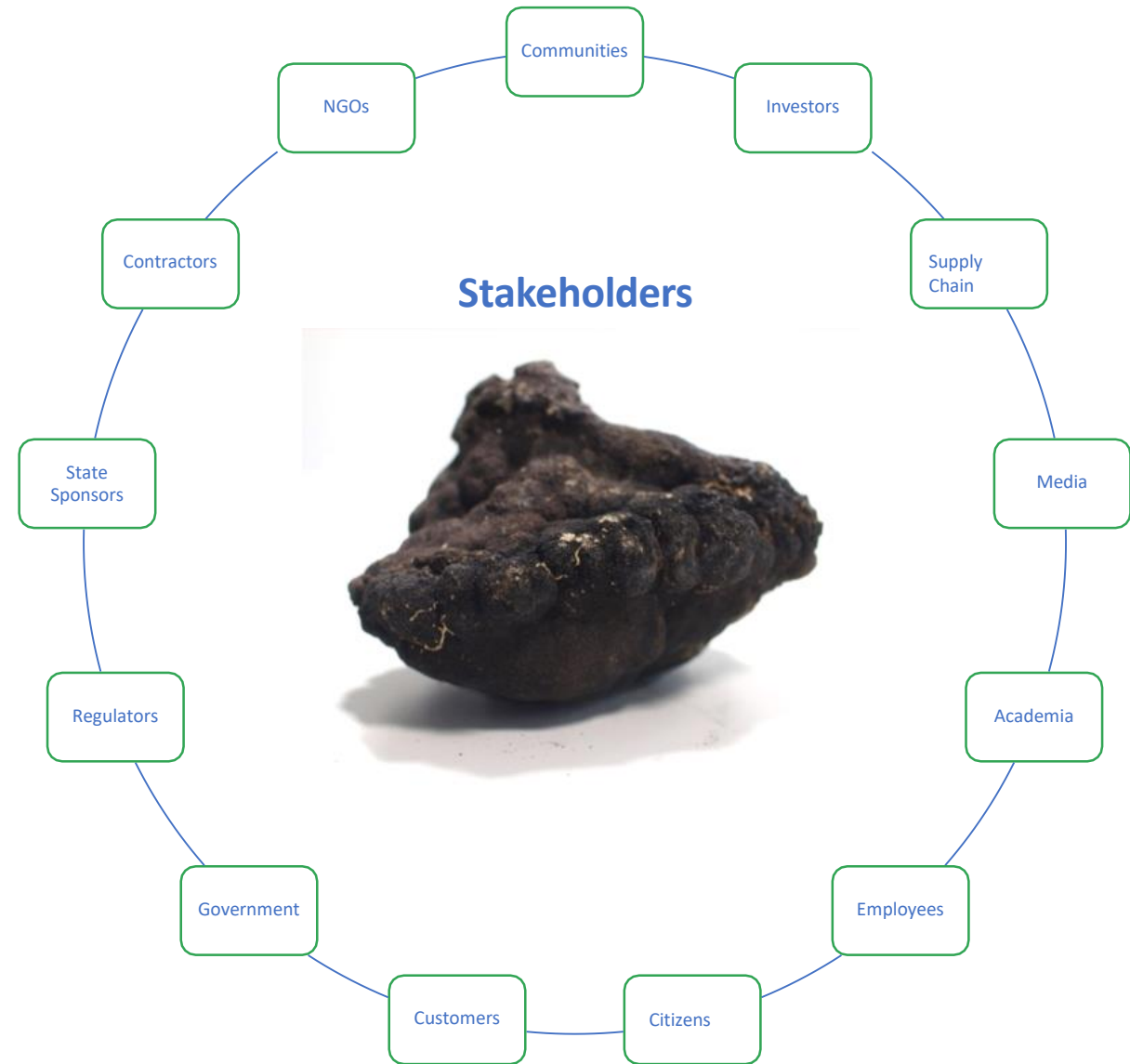
► Multi-Stakeholder engagement

- Ongoing, transparent and inclusive
- Multi-stakeholder approach to develop plans and programs

► Engage world leading scientists with an open mind and full transparency in collaborative research

► Freedom to publish

► Committed to high standards in science, engineering and transparent communication





PARTNERSHIPS FOR THE GOALS

ProCat Project

In situ trials, in the operational environment of the CCZ, in order to:

- Confirm trafficability and maneuverability of soil specific- and purpose-built caterpillar tracks, decreasing energy consumption and direct seabed disturbance
- Optimize the in-situ operations of a hydraulic collector head to increasing pick-up efficiency and decrease energy consumption
- Validate nodule-sediment separation process of primary flow and subsequent nodule transport by secondary flow
- Verify reliability and the robustness of the technology to increase the state-of-the-art



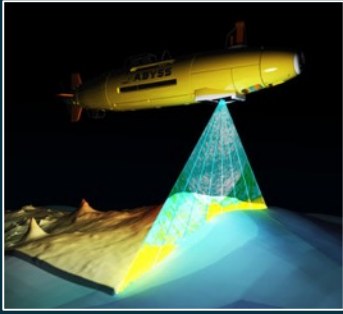
JPI-O MiningImpact 2 project – Assessing environmental effects

Independent scientific evaluation of the environmental impacts of the ProCat trials, in order to:

- Reduce existing knowledge gaps and uncertainties about environmental impacts
- Gather data about operational impacts
- Design of fit-for-purpose environmental monitoring programs
- Make recommendations of a precautionary approach for ISA's exploitation mining code



Boxcore



AUV



ROV



SyPRID

Deep sea Moorings



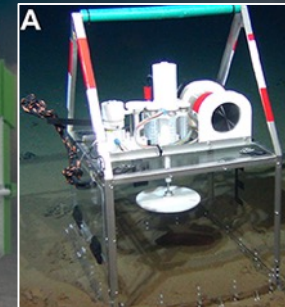
Water samplers



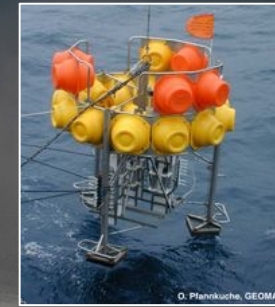
Pushcores



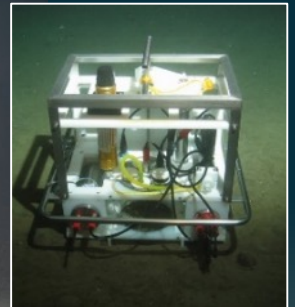
Multicore



CUBE



Landers



Benthic chamber





Environmental Impact Statement

1. Introduction
2. Policy, legal and administrative context
3. Project description
4. Description of the existing environment
5. Assessment of impacts and proposed mitigation
6. Accidental events and natural hazards
7. Environmental management, monitoring and reporting
8. Abbreviations
9. Study team
10. Expert review
11. References

Ref: Following ISBA/23/LTC/CRP.3*

Download:

<https://www.deme-group.com/gsr/news/gsr-publishes-its-prior-environmental-impact-statement-relating-2019-patania-ii-disturbance>





SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

17 PARTNERSHIPS FOR THE GOALS


SUSTAINABLE DEVELOPMENT GOALS



SEAFLOOR MINERALS CAN CONTRIBUTE TO SUSTAINABLE DEVELOPMENT GOALS



6 CLEAN WATER AND SANITATION
Metals for clean water distribution systems. Use of desalinization as primary water source. Not competing with local water users



7 AFFORDABLE AND CLEAN ENERGY
Clean, competitively priced metals need for clean energy solutions



8 DECENT WORK AND ECONOMIC GROWTH
Access to development opportunities for States otherwise resource-poor



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
Enabling industry advancements in innovative technology and infrastructure solutions



11 SUSTAINABLE CITIES AND COMMUNITIES
Reduce land-use conflicts. Metals for housing and basic services



12 RESPONSIBLE CONSUMPTION AND PRODUCTION
Focus on high grade resources, minimizing waste. Minimize use of water, land, chemicals, etc.



13 CLIMATE ACTION
Clean metals supporting clean energy solutions



14 LIFE BELOW WATER
Environmental responsibility leaders through transparency, engineering design, scientific knowledge, data sharing, collaboration



15 LIFE ON LAND
Reduce pressures on land as unique source of critical metals



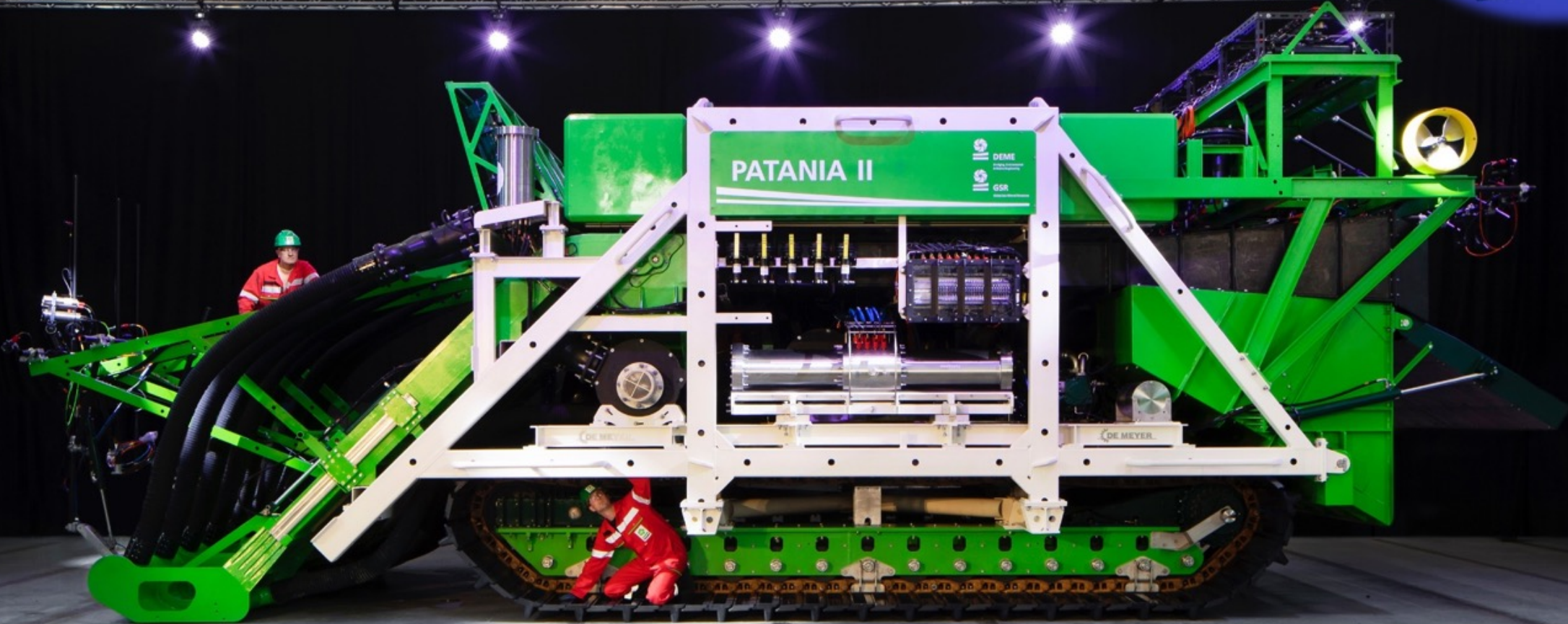
17 PARTNERSHIPS FOR THE GOALS
Collaboration and transparent inclusion of science, industries, governments, etc.



- ▶ **Effective regulations**, implementing the Law of the Sea (UNCLOS), which provides the legal framework for the conservation and sustainable use of the oceans and their resources
- ▶ **Responsible and transparent** impact assessment and management
- ▶ Increased economic access to and benefits from the sustainable use of marine resources for developing states
- ▶ **Science-based management plans**, including strategies to minimize the extent and duration of impacts
- ▶ Increased **scientific knowledge, training and research capacity**
- ▶ **Multinational scientific cooperation**



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