



GSR

Global Sea Mineral Resources

THE CLARION CLIPPERTON ZONE REMP: PART OF THE ENVIRONMENTAL OBLIGATIONS IN THE AREA

Protecting deep seabed ecosystems under the future Agreement on the Conservation and Sustainable Use of BBNJ and by the ISA – Perspectives of Government, Civil Society, Stakeholders, and Law and Science

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Global Sea Mineral Resources NV

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ENVIRONMENTAL OBLIGATIONS

SUMMARY

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

- ▶ Governing body of marine minerals in the Area:
International Seabed Authority (ISA)
- ▶ Mining Code, Regional Environmental Management Plan
[REMP], Guidelines, Standards



Required for an Exploitation Contract application



International Seabed Authority ISBA/25/LTC/6/Rev.1



**Legal and Technical
Commission**

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**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/SC/19](#).

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ENVIRONMENTAL BASELINE STUDIES AND IMPACT ASSESSMENT

- ▶ ISBA/25/LTC/6/Rev.1 → Baseline Study / EIA Guidance for Contractors
- ▶ Study Areas
 - ▶ Physical Oceanography
 - ▶ Geology, including Sediment Properties
 - ▶ Chemical Oceanography
 - ▶ Biological Communities
 - ▶ Bioturbation
 - ▶ Fluxes to Sediment (Sedimentation)



ENVIRONMENTAL BASELINE STUDIES

STUDY AREA

DETAILS

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 [36 months], followed by hydrodynamic (sediment plume) modelling, less than 50 km spacing

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, capturing at least two summer/winter seasons (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 (sampling in 3 different years), 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)

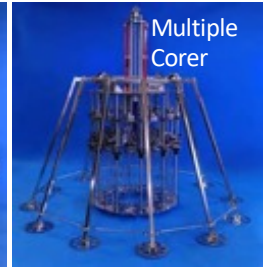
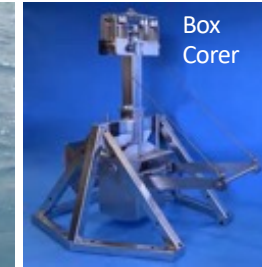
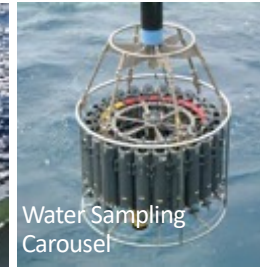
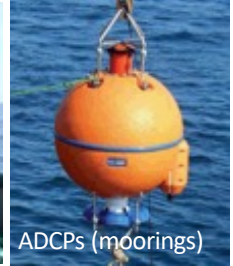
- ▶ **Aim:** To gather time series data on the flux and composition of materials from the upper water column to the deep sea. To understand baseline sedimentation rates and to evaluate the effects of mineral extraction activities (especially plumes) on these rates.
- ▶ **Study requirements:** moored time lapse sediment traps installed for a minimum of 12 months, laboratory analysis

*note list is not exhaustive



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



ENVIRONMENTAL IMPACT STATEMENT (EIS)

- ▶ 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.



ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (EMMP)

Annex VII

Environmental Management and Monitoring Plan

1. The Environmental Management and Monitoring Plan prepared under these regulations and this annex VII shall be:

- (a) Prepared in plain language and in an official language of the Authority, together with, where applicable, an official English-language version; and
- (b) Verified by the report of independent competent persons.

2. An Environmental Management and Monitoring Plan shall contain:

- (a) A non-technical summary of the main conclusions and information provided to facilitate understanding by members of the Authority and Stakeholders;
- (b) A description of the area likely to be affected by the proposed activities;
- (c) The environmental objectives and standards to be met;
- (d) Details of the Environmental Management System and the applicant's environmental policy;
- (e) An assessment of the potential Environmental Effects of the proposed activities on the Marine Environment, and any significant changes likely to result;
- (f) An assessment of the significance of the potential Environmental Effects, and proposed mitigation measures and management control procedures and responses to minimize the harm from Environmental Effects consistent with the environmental impact assessment and the Environmental Impact Statement;
- (g) A description of the planned monitoring programme and the overall approach, standards, protocols, methodologies, procedures and performance assessment of the Environmental Management and Monitoring Plan, including the necessary risk assessment and management techniques, including adaptive management techniques (process, procedure, response), if appropriate, needed to achieve the desired outcomes;
- (h) Details of the proposed monitoring stations across the project area, including the frequency of monitoring and data collection, the spatial and temporal arrangements for such monitoring and the justification for such arrangements;
- (i) The location and planned monitoring and management of preservation reference zones and impact reference zones, or other spatial management planning tools;
- (j) A description of relevant environmental performance Standards and indicators (trigger and threshold points), including decision rules based on the results of the monitoring of these indicators;
- (k) A description of a system for ensuring that the plan shall adhere to Good Industry Practice, Best Available Techniques and Best Available Scientific Evidence, and a description of how such practices are reflected in the proposed Exploitation activities;
- (l) Details of the quality control and management standards, including the frequency of the review of the performance of the Environmental Management and Monitoring Plan;
- (m) A description of the technology to be deployed, in accordance with Good Industry Practice and Best Available Techniques;

- ▶ Tool to proactively manage and confirm that the impacts of exploitation do not exceed those stated in the Contractor's Environmental Impact Statement (EIS) and other relevant environmental commitments or obligations
- ▶ Includes: monitoring programme, location of reference zones, environmental indicators, training programme, waste management, ongoing consultation details



CLOSURE PLAN

ISBA/25/C/WP.1

Annex VIII

Closure Plan

1. The Closure Plan shall be prepared and implemented in accordance with the Guidelines and the relevant regional environmental management plan and shall include the following information:

- (a) A description of the closure objectives and how these relate to the mining activity and its environmental and social setting;
- (b) The period during which the plan will be required, which shall be determined by reference to a specified duration, achievement of a specified event or target indicator or compliance with specified terms agreed with the Authority;
- (c) A plan with coordinates showing the area(s) subject to the closure objectives;
- (d) A summary of the relevant regulatory requirements, including conditions previously documented;
- (e) Details of the closure implementation and timetable, including descriptions of the arrangements for the temporary suspension of mining activities or for permanent closure decommissioning arrangements for vessels, installations, plant and equipment (where applicable);
- (f) Data and information relating to baseline conditions for monitoring measures;
- (g) An updated environmental impact assessment for the activities that will be undertaken during closure, if any, together with details of the identifiable residual Environmental Effects, including any relevant technical documents or reports;
- (h) Details of monitoring to be undertaken during and after closure that specify the sampling design (spatial and temporal sampling), the methods to be used and the duration of the post-closure activities;
- (i) Details of the management measures to Mitigate the residual Environmental Effects;
- (j) Details of any restoration objectives and activities, where applicable;
- (k) Information on reporting and management of data and information post-closure;
- (l) Details of the persons or entity (subcontractor, consultant(s)) that will carry out the monitoring and management measures under the Closure Plan, including their qualification(s) and experience, together with details of the budget, project management plan and the protocols for reporting to the Authority under the Closure Plan;
- (m) Details of the amount of the Environmental Performance Guarantee provided under these regulations;
- (n) Details of any compensatory measures agreed or proposed to achieve the agreed closure objectives; and
- (o) Details of consultations with Stakeholders in respect of the plan.

2. The level of detail in the Closure Plan is expected to differ between cases involving a temporary suspension of mining operations and cases involving final mine closure. The content of the Closure Plan is to be commensurate with the nature, extent and duration of activities associated with the level of closure and maturity of the project.

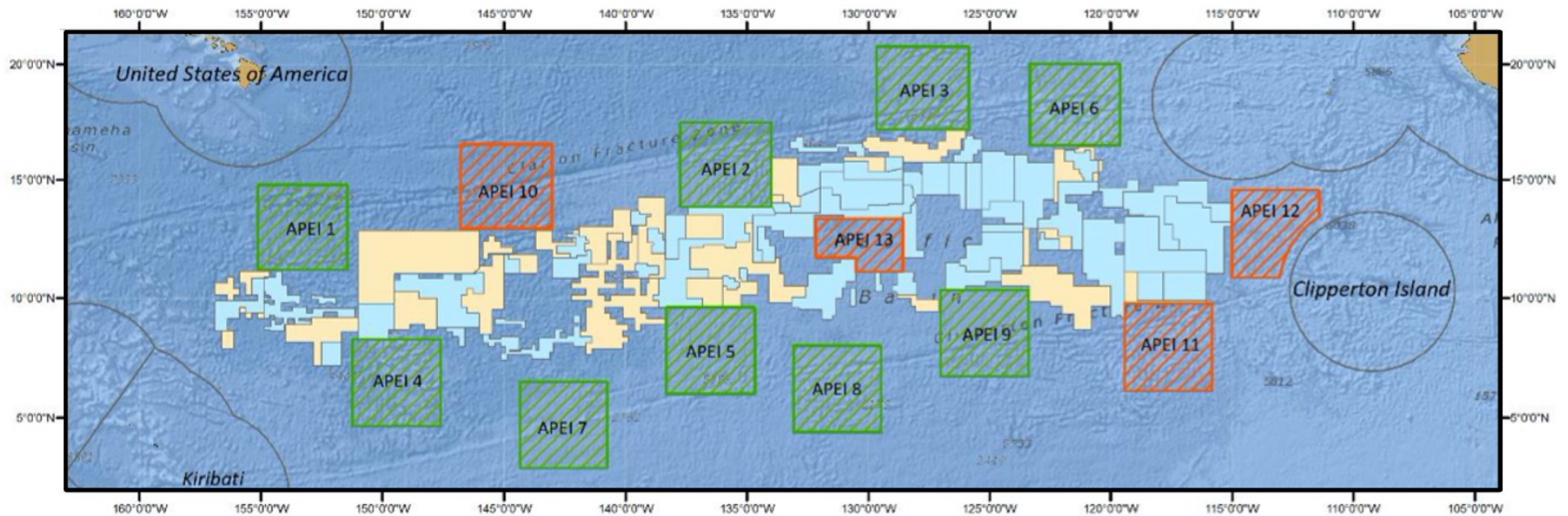
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- ▶ Includes details and selection of mitigative technologies and other specific closure activities
- ▶ Closure objectives
- ▶ Schedule of closure
- ▶ Decommissioning arrangements for vessel, plant and equipment
- ▶ Management measures to mitigate the residual environmental effects
- ▶ Monitoring details



REGIONAL ENVIRONMENTAL MANAGEMENT PLAN (REMP)



- Area under contract or contract approved
- Reserved Areas
- EEZ (VLIZ 2021)
- Areas of Particular Environmental Interest (APEIs)
- Additional APEIs

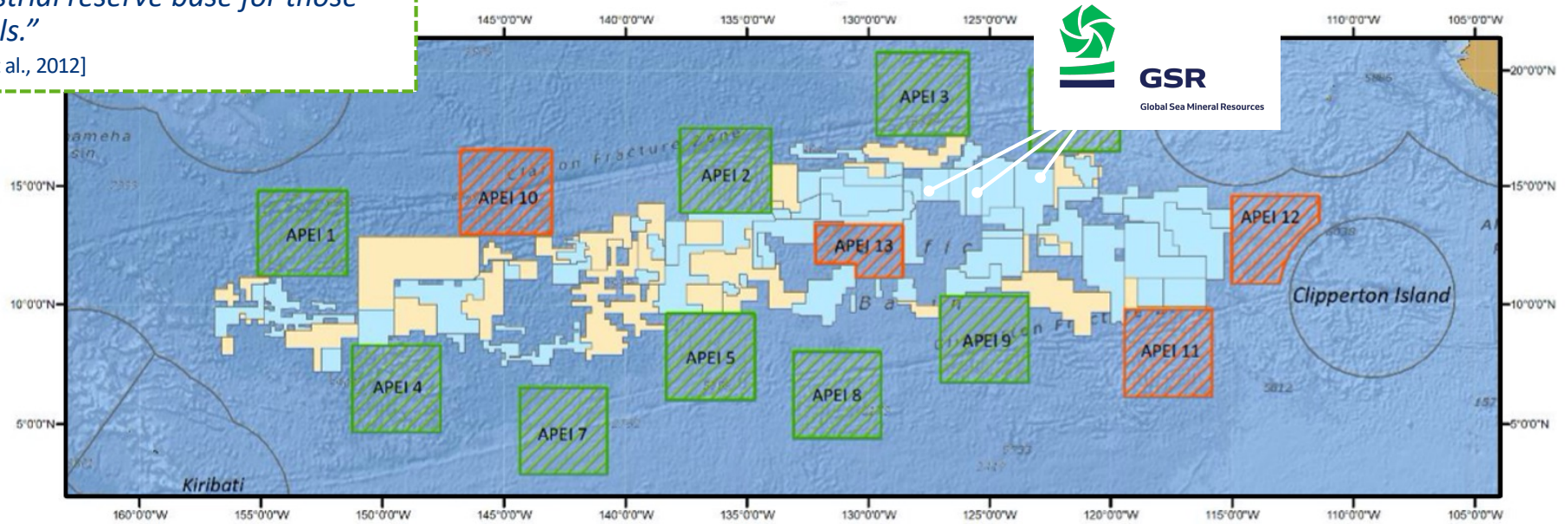
- ▶ ISBA/26/C/58
- ▶ 2,000,000km²



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.”

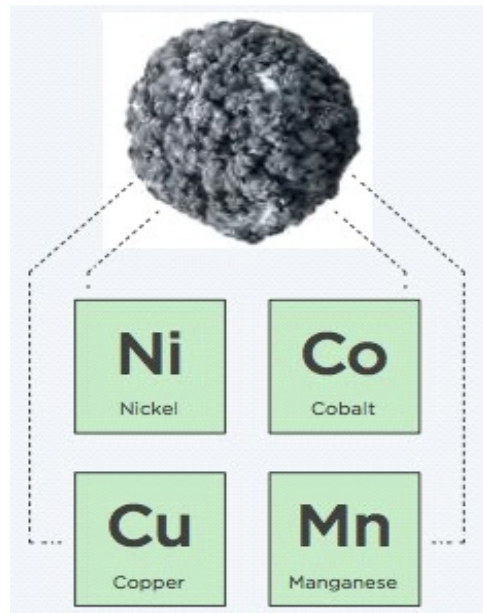
[Hein et al., 2012]



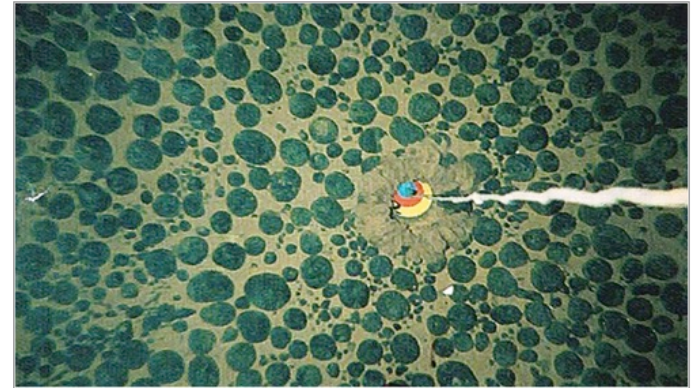
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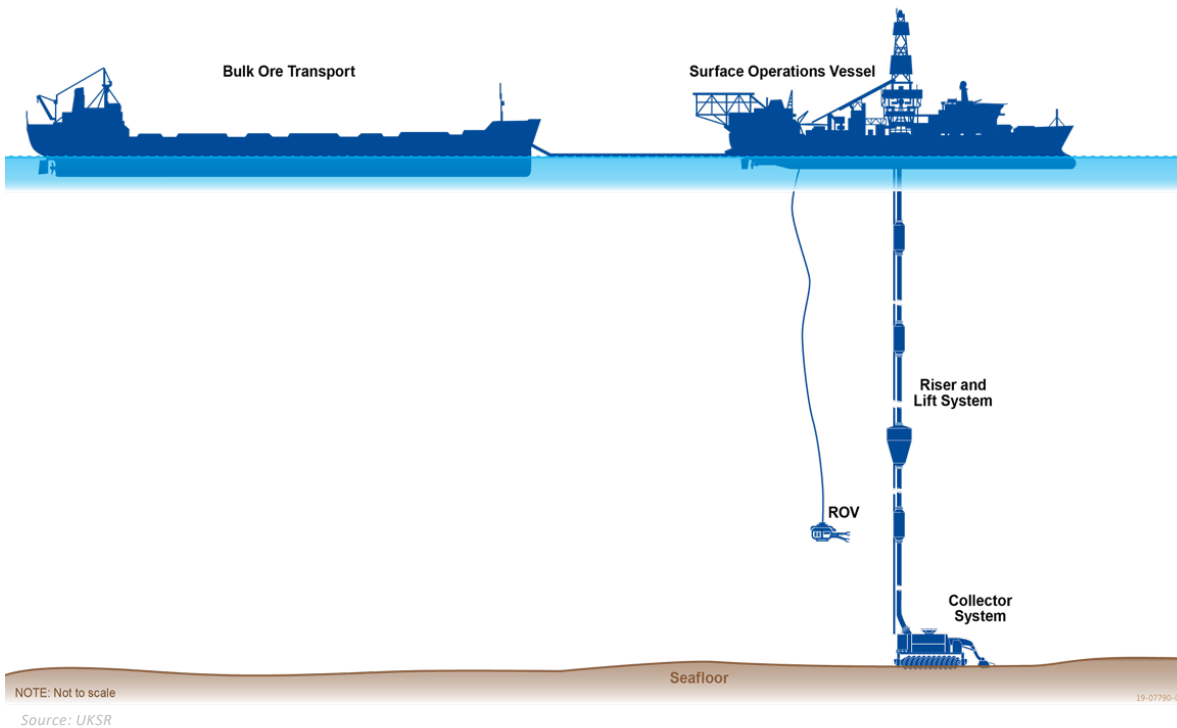
- ▶ Rich in manganese, nickel, copper and cobalt
- ▶ Rare earths also present
- ▶ Potato-sized, hard surface
- ▶ Exist on the surface – not attached
- ▶ Cover extensive areas of the ocean's abyssal plains



POLYMETALLIC NODULES



PRODUCTION SYSTEM KEY COMPONENTS



► Key Activities within the Area:

► Mining System

Collectors

Lift System

Surface Vessel

► Materials Handling

Dewatering

Ship-to-ship transfer

► Transshipment





▶ ISBA/25/LTC/6/Rev.1 , Apr. 2020

Water Column (Physico-chemical)

- › Underwater noise
- › CTD
- › Trace metals
- › pH, Alkalinity, Dissolved Oxygen, nutrients
- › Organic carbon
- › Turbidity, light attenuation
- › Currents – direction, speed, seasonality
- › Sedimentation – baseline flux, seasonality
- › Plankton/Nekton
- › Fish (shallow and deep water)
- › Baseline metal concentrations (fish, etc.)
- › Toxicology studies (potential for...)
- › Marine animal and seabird studies

(non exhaustive list)

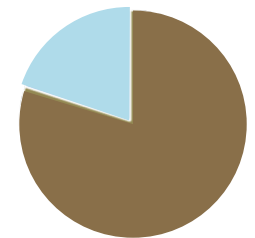
Seabed

- › Sediment Properties,
- › Geological Properties
- › Trace metals, redox,
- › Nutrients, TOC, etc.
- › Communities (what's there?)
- › Activity (what are they doing?) : Bioturbation, respiration & biogeochemical flux
- › Foodweb structure & genetic connectivity
- › Metals in tissue and ecotoxicology

BASELINE STUDIES
3D SPATIAL REQUIREMENTS

→ ++ Vertical / temporal structure
fewer effects expected

Vessel-time

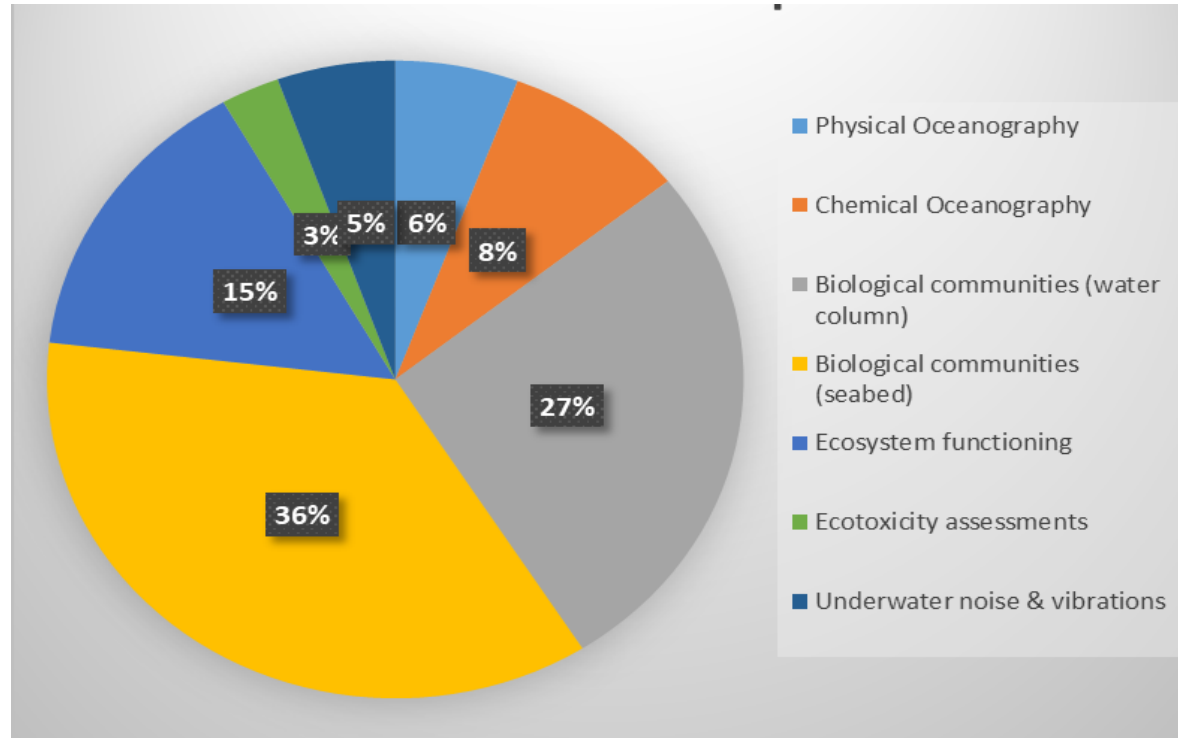


■ Seabed ■ Water column

Less temporal variability?
→ ++ samples & Replicates
++ environmental effects expected



BASELINE STUDIES COST BREAKDOWN

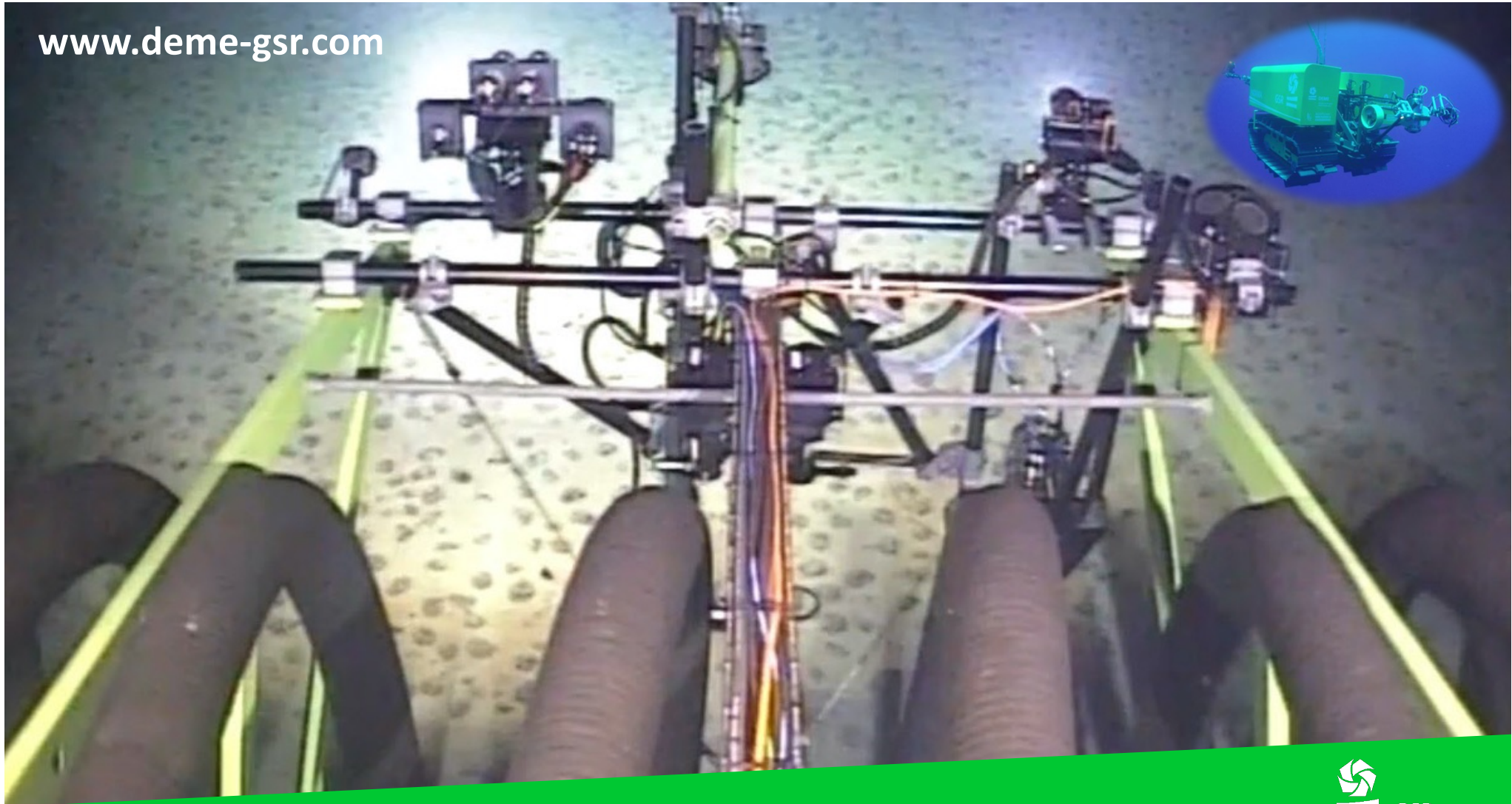


TAKEAWAYS/THOUGHTS

- ▶ YES PLEASE to agreed **conservation goals** (established through collaboration) and let's keep in mind there may be more than one way to reach them
- ▶ **3D+ view/studies** are needed – and are required by the ISA and are being undertaken by contractors and the scientific community
- ▶ **Connections/Connectivity** is important – and studies required by the ISA... *Do we need to preserve all connections (or some of all?), or do we need to prioritise? (we need a conservation goal)*
- ▶ The exploration phase helps to achieve the scientific information we need to make **informed decisions** (exploration = research → data → information → knowledge)
- ▶ Keep an **open mind** until the data is in: Sediment plumes might not be toxic (nodules), and systems can be designed to avoid impacts to midwater
- ▶ **Baseline studies are just one part**, also important is the 'mine plan' and mitigation strategies to understand what the actual impacts/effects might be
- ▶ **Not all resource types are equal** = different environments and habitats, different mining techniques, different environmental effects & management strategies (does this mean there is the potential for different goals?)
- ▶ Key environmental management strategy for nodules: **set aside areas. Contractor reference areas/PRZs could compliment networks of set aside areas established through REMPs or other means**
- ▶ ISA's DEEPDATA database is now an OBIS node - should we think further about pooling (and how do we pool) all ocean data? (**Global Data Sharing**)
- ▶ Climate change and the biodiversity crisis are planetary issues –**planetary thinking is needed** to solve them. Here, we are discussing oceans only, let's not forget about the land part of our planet. (**Holistic approach** needed)



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