



UNIVERSITY OF  
PLYMOUTH

Secretariat,  
International Seabed Authority  
14-20 Port Royal Street  
Kingston, Jamaica  
(submitted via email to [ola@isa.org.jm](mailto:ola@isa.org.jm))

3 July 2021

**RE: Stakeholder Consultation - Draft Guidelines for the Establishment of Baseline Environmental Data**

Dear Sir/Madam,

Please find below our Commentary on the Draft Guidelines for the Establishment of Baseline Environmental Data, as issued in May 2021.

As Group Lead, I submit on behalf of the Marine Conservation Research Group, of the University of Plymouth. The list of contributors is presented at the beginning of the document. Express Consent for sharing is granted.

Sincerely,

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## TEMPLATE FOR COMMENTS

<b><i>Document reviewed</i></b>	
<b>Title of the draft being reviewed:</b>	Draft Guidelines for the Establishment of Baseline Environmental Data
<b><i>Contact information</i></b>	
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<b><i>General Comments</i></b>	
<p>The following experts from the University of Plymouth’s Marine Conservation Research Group contributed to this response:</p> <p>Prof. Kerry Howell            Dr. Sian Rees            Dr. Holly Niner            Dr. Kirsty McQuaid</p> <p>Below we outline general concerns that apply across the document, followed by a list of specific comments.</p>	
<p><b><i>Coherence and complementarity across all Standards and Guidelines</i></b></p> <p>Many of the comments we provide herein likely have bearing on the detail in the other documents under consultation. We advise that these comments are considered across the full portfolio of Standards and Guidelines to ensure cohesion, complementarity and future ease of application.</p>	
<p><b><i>Guidance/Standards for the Collection of Social and Economic Data</i></b></p> <p>There is no guidance for the collection, storage and sharing of social and economic baseline data, including ecosystem services. This should be rectified; otherwise social and economic data cannot be compared or scaled making impact difficult, if not impossible, to determine.</p>	
<p><b><i>Definition of terms</i></b></p> <p>Throughout the text, there are multiple references to “Best available techniques” and “Good Industrial Practice”, with no clarity on where information on these should be sought or what this refers to. There are lessons to be learned from existing practices, including other deep-sea or offshore industries. However, a new industry such as DSM should be seeking to build and expand on this experience with a view to halting trends of environmental degradation that continue to occur under current practices.</p> <p>Further it is not clear who will uphold standards for “Best available techniques” and “good</p>	

industrial practice”.

### ***Minimum standards***

The draft regulations for environmental reference baseline data are extensive and detailed. However, they confer no minimum standards, only recommending that a contractor ‘should’ comply with the guidelines. This unconstrained guidance could lead to the collection of a large amount of data, which exposes potential for mixed methods and no time series, and a Data Rich but Information Poor (DRIP) scenario. In addition, the very long list of measurements gives contractors the option to choose what to measure without any guidance on prioritization.

We recommend that a set of standards and/or obligatory minimum requirements be established, in order to aid comparability of baseline data, which is essential for the success of the REMP. These could in future draw on the Essential Ocean Variables and other standards initiatives being developed under various endorsed UN Ocean Decade Programmes e.g. Marine Life 2030, DOOS, Challenger 150 etc.). Constraining evidence collection would enable question driven research, which provides information on the state of the environment (pre activity) and state change as a result of impact/pressures. These standards should require a format that is robust and scaleable to support local, regional and international processes for sustainable development.

### ***Data sharing***

The provision of data should be an Industry Standard, not a guideline, given ISA commitments to capacity building and data sharing. A standard format should be provided by the ISA to reduce the burden on data centres to transform data.

### ***Defining “sufficient sampling”***

Throughout the text there are many references to “sufficient numbers”, “sufficient replicates”, and similar. Clarification is needed on what these constitute. This seems to be defined as sufficient sampling to detect change against natural variability (e.g. pg 9 line 281-284), but this needs to be made clearer earlier in the document if this is to be interpreted as the definition throughout the text.

### ***Support for pre-cruise design***

In many places in the text, it is recommended that the level of sampling required should be determined through power analyses and species accumulation curves. Whilst these are excellent methods, these analyses are only undertaken after data collection and already require a certain baseline. This may cause confusion. A section should be created that highlights this and recommends which preliminary data are needed to inform sampling strategies. This could be, for example, a guideline or standard to support pre-cruise survey design through recommendations on minimum sampling requirements. Only based on these, should the next step of power-analyses be taken.

### ***Revisiting definitions of “sufficient sampling”***

Following from this, further consideration is needed on what amounts to “sufficient” sampling. In the CCZ, there are a few common megafauna morphotypes, and many very rare morphotypes (Amon et al., 2016; Simon-Lledó et al., 2019, 2020). In their summary of environmental requirements for deep-sea mining, Bräger et al. note that “special emphasis should be put on

rare species as they may be the first to be lost” (Bräger et al. 2018, p. 7), and many rare species have become a priority for conservation efforts in other ecosystems (Gaston & Fuller, 2007). This is reflected in the criteria for identifying Vulnerable Marine Ecosystems (FAO, 2009) and Ecologically or Biologically Significant Marine Areas (CBD, 2009). While biodiversity is widely accepted to support ecosystem function, the impact of loss of rare species on ecosystem functioning is not well understood (Jain et al., 2014; Lyons et al., 2005). If rare species that are lost perform functions that directly or indirectly affect ecosystem functioning, this could be important (e.g. Danovaro et al., 2008; Lyons & Schwartz, 2001), particularly for ecosystem resistance and/or resilience to change. While there is debate around the contribution of rare species to ecosystem function a precautionary approach to environmental management may involve sampling a high proportion of the faunal community, perhaps higher than is required to detect change.

### ***Need for consistency***

There is inconsistency in the level of detail provided for sampling methods of different environmental components and faunal size classes. Where possible, estimates of minimum sampling requirements should be provided to support pre-cruise survey design (see previous comment), and these must be supported by references (which are not provided in all cases).

### ***Clarity on review processes***

There is no indication of how power analyses and other statistics used to justify sampling design (e.g. number of replicates) will be reviewed or how quality will be assured, by either the contractor, ISA or independent reviewer (other than a recommendation that data and findings should be published in peer-reviewed journals, pg 10 line 311-314). This is a crucial step to ensure that any analyses and conclusions drawn are reliable.

Additionally we would welcome transparency around how the standards and guidelines have and will be developed in the future.

### ***Strategic Environmental Assessment/Regional Environmental Assessment***

We welcome the recommendation for cooperation and exchange of data among contractors and between contractors and scientists. However, this needs to be stronger. In order for contractor results to be comparable, and allow for meta-analyses on the scale required to fully support regional environmental management, there needs to be a high degree of collaboration amongst contractors. There is a role for Regional Environmental Assessment, to design and implement a large-scale, coordinated, strategic environmental assessment (SEA) of areas of interest (e.g. the CCZ). This would ensure sampling by individual contractors is strategically coordinated, avoids duplication of efforts, and allows better understanding of the region as a whole to provide a regional context for project-specific EIAs.

SEA has been employed by other industry sectors (e.g. in UK oil and gas industry (Bett, 2001), aggregate dredging (BMAPA, 2019; Wallingford, 2010), and offshore energy development (Gill et al., 2005; UK Gov, 2019; Nedwell et al., 2007)) however many decisions are deferred to the point of EIA which does not provide the strategic viewpoint necessary to understand the cumulative impacts of a sector and therefore its acceptability and also falls short of providing assurances for contractors.

### ***Climate change***

The recommendations only briefly touch on the need to assess possible climate change impacts of seabed mining. Explicit guidelines and/or standards are needed on the components and parameters to be measured, as well as the timescales over which they should be assessed.

### **Baseline sampling of APEIs**

Whilst we are aware that this baseline document covers baseline environmental data for the contract areas, we note that it is very important to develop documents on responsibilities and guidelines/standards for the establishment of baseline environmental data in APEIs. To our knowledge, there is, to date, no document on how APEIs should be sampled. APEIs were established to capture the full range of habitats and communities present in the CCZ (ISA, 2011), but it is currently unclear if they support similar biological communities to areas under exploration, and environmental conditions in APEIs are different (McQuaid et al., 2020; Washburn et al., 2021). Recommendations for a strategy to sample APEIs would be welcome, including one that links to the need for Regional Environmental Assessment.

### **Specific Comments**

<b>Page</b>	<b>Line</b>	<b>Comment</b>
4	62	“...should be based on the environmental reference baseline data.” This baseline data should also take into account any potential for a shifted baseline. For example, if an area has previously been trawled or dredged by fishing gear it will already be in an impacted state.
4	87-89	It is not clear who will uphold standards for best Available Techniques and Good Industrial Practice.
5	106	“Baseline data should be multidisciplinary...”. The Impact Assessment processes also requires the integration of socio-economic data with reference to ecosystem services. The scope and standards for baseline data collection should also extend to any social and economic data that is required to assess impact and long term monitoring programmes.
5	107	Please add “of the environment through sampling” after “Appropriate representation”.
5	114-119	There is no indication of how many replicates over space and time. The guidelines should include a minimum, e.g. drawing from the literature and/or best practice in other industries for how many temporal replicates and how many spatial replicates. Of course these will be different depending on the component being measured, as stated, but a non-exhaustive list of guidelines should be provided as guidance.
5	127-128	No examples of appropriate benthic biogeographies are given. We suggest the text at line 28 is modified and expanded upon as follows “e.g. Longhurst (1998) for the epipelagic, Sutton et al. (2017) for the mesopelagic, and Watling et al., (2013) for the benthic. New biogeographies are currently the focus of research efforts as well as bioregionalisations, also called broad-scale habitat maps, which may provide a more practical

		<i>tool in support of spatial management approaches (Howell, 2010; McQuaid et al., 2020)."</i>
6	144	It is not clear how 'controls' for future monitoring are incorporated into the sampling design proposed.
8	225	Who will carry out " <i>Independent feedback</i> ", and how will this be reported? A process for this should be described.
9	245-250	We would like to see a stronger emphasis on Regional Environmental Assessment, as observed in other industries (e.g. oil and gas, aggregate dredging). See general comment above.
9	264	This section is confusing and needs clarification. There needs to be an Industry Standard for quality rather a defined " <i>minimum quality control</i> ". Why drive down standards?
10	296-297	There needs to be an Industry Standard for quality rather a defined minimum.
10	305	" <i>Raw and derived data <u>must</u> (inserted instead of should) be submitted <u>in an agreed format</u> to established and long-term sustained Global Data Assembly Centres that provide open access</i> ". The provision of data should be an Industry Standard, not a guideline, given ISA commitments to capacity building and data sharing. In 'an agreed format' will reduce the burden on data centres to transform data.
10	317	Add "time and date" to para. 45
35	1379	If " <i>diverse methodological approaches</i> " are recommended, how can it be ensured that derived data can be scaled across space and time? We recommend a common approach or an Industry Standard that best serves the purpose of the acquisition of data and can be used to answer questions not only about the impact of an activity at a particular site, but across multiple sites and scales.
38	1495	This would be better as a comprehensive list of the various components that should be measured.
40	1570-1575	This section should be moved to the macrofaunal sampling section, as it does not apply to benthic sampling in general.
40	1576-1579	Physiographic units should conform to a standard habitat classification system, in order to standardize approaches between contractors.
43	1677	Please elaborate on what is meant by " <i>broad scales of relevance to mining operations</i> ", or add an estimate.
43	1697	Please add an estimate of the area that the five replicates should cover, and a reference for this recommendation.
57	2277	Please expand on how standardization should be carried out, e.g. repeated observation of a portion of the data set by multiple observers?
58	2331	" <i>25 nodules</i> " over what area (i.e. spatial scale)?

58	2345	Add time and date, or just date
<p><b>References</b></p> <p>Amon, D. J., Ziegler, A. F., Dahlgren, T. G., Glover, A. G., Goineau, A., Gooday, A. J., Wiklund, H. &amp; Smith, C. R. (2016) 'Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone'. <i>Scientific Reports</i>, 6 pp. 30492.</p> <p>Bett, B. J. (2001) 'UK Atlantic Margin Environmental Survey: Introduction and overview of bathyal benthic ecology'. <i>Continental Shelf Research</i>, 21 (8), pp. 917-956.</p> <p>BMAPA (2019) 'Regional Assessment'. <i>British Marine Aggregate Producers Association</i>. [Online]. Available at: <a href="https://bmapa.org/regulation_and_management/regional_assessment.php">https://bmapa.org/regulation_and_management/regional_assessment.php</a> (Accessed: 26 July 2019).</p> <p>Bräger, S., Romero Rodriguez, G. Q. &amp; Mulsow, S. (2018) 'The current status of environmental requirements for deep seabed mining issued by the International Seabed Authority'. <i>Marine Policy</i> 114: 103258.</p> <p>Convention on Biological Diversity [CBD] (2009). Report of the Expert Workshop on Scientific and Technical Guidance on the Use of Biogeographic Classification Systems and Identification of Marine Areas Beyond National Jurisdiction in Need of Protection. Ottawa, ON: CBD.</p> <p>Danovaro, R., Gambi, C., Dell'Anno, A., Corinaldesi, C., Fraschetti, S., Vanreusel, A., Vincx, M. &amp; Gooday, A. J. (2008) 'Exponential decline of deep-sea ecosystem functioning linked to benthic biodiversity loss'. <i>Current Biology</i>, 18 (1), pp. 1-8.</p> <p>Food and Agriculture Organization of the United Nations [FAO] (2009). International Guidelines for the Management of Deep-sea Fisheries in the High Seas. Rome: FAO.</p> <p>Gaston, K. J. &amp; Fuller, R. A. (2007) 'Biodiversity and extinction: Losing the common and the widespread'. <i>Progress in Physical Geography: Earth and Environment</i>, 31 (2), pp. 213-225.</p> <p>Gill, A., Gloyne-Philips, I., Neal, K. &amp; Kimber, J. (2005) <i>COWRIE 1.5 The Potential Effects of Electromagnetic Fields Generated by Sub-Sea Power Cables Associated with Offshore Wind Farm Developments on Electrically and Magnetically Sensitive Marine Organisms - A Review</i>. Centre for Marine and Coastal Studies Ltd (CMACS) and Cranfield University. Available at: <a href="https://tethys.pnnl.gov/sites/default/files/publications/The_Potential_Effects_of_Electromagnetic_Fields_Generated_by_Sub_Sea_Power_Cables.pdf">https://tethys.pnnl.gov/sites/default/files/publications/The_Potential_Effects_of_Electromagnetic_Fields_Generated_by_Sub_Sea_Power_Cables.pdf</a> (Accessed: 29 July 2018).</p> <p>Howell, K.L. (2010). A benthic classification system to aid in the implementation of marine protected area networks in the deep/high seas of the NE Atlantic. <i>Biological Conservation</i>, 143(5), pp.1041-1056.</p> <p>Jain, M., Flynn, D. F., Prager, C. M., Hart, G. M., Devan, C. M., Ahrestani, F. S., Palmer, M. I., Bunker, D. E., Knops, J. M., Jouseau, C. F. &amp; Naeem, S. (2014) 'The importance of rare species: A trait-based assessment of rare species contributions to functional diversity and possible ecosystem function in tall-grass prairies'. <i>Ecology and evolution</i>, 4 (1), pp. 104-112.</p> <p>Lyons, K. G., Bringham, C. A., Traut, B. H. &amp; Schwartz, M. W. (2005) 'Rare species and ecosystem functioning'. <i>Conservation Biology</i>, 19 (4), pp. 1019-1024.</p> <p>Lyons, K. G. &amp; Schwartz, M. W. (2001) 'Rare species loss alters ecosystem function – invasion resistance'. <i>Ecology Letters</i>, 4 (4), pp. 358-365.</p> <p>McQuaid, K. A., Attrill, M. J., Clark, M. R., Copley, A., Glover, A. 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