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CONSULTATION RESPONSE – IMPACT ASSESSMENT FOR MINERAL ACTIVITIES ON THE NORWEGIAN CONTINENTAL SHELF AND DRAFT DECISION ON OPENING THE AREA.

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The Institute of Marine Research's consultation response to the impact assessment for mineral activities on the Norwegian Continental Shelf and the draft decision on opening the area

Summary of the Institute of Marine Research's consultation response

- Knowledge base: The background reports for the present Impact Assessment (hereafter IA) document large gaps in our knowledge about the nature conditions and bottom currents in the assessment area. The IA gives little importance to these gaps and shows no understanding of the fact that this lack of knowledge makes it impossible to objectively assess the impacts of mineral extraction. This contrasts exactly what the aim of the investigation phase should be: to shed light on the identified impacts of exploration, extraction, and the cessation of mining activities.
- Rate of knowledge acquisition: Under the Norwegian Seabed Minerals Act, the government may demand knowledge about nature conditions to be acquired for an IA in conjunction with a plan for extraction being submitted for approval of permit by the license holder. This means that even though an almost complete absence of knowledge about the nature conditions already has been documented, the Ministry does not appear to take the necessary steps to immediately start the time-consuming work of filling scientific gaps so that future IAs associated with extraction licences can be founded on an adequate knowledge base.
- Description of procedures: The present IA should establish a clearer plan for how existing scientific gaps shall be filled, for example by opening areas for mineral activities in small stages while we build up our knowledge in parallel, and by imposing strict requirements for knowledge-based IAs for individual licences. The knowledge obtained would then facilitate, at an early stage, the tailoring of 1) standardised and independent licence-specific IAs, 2) systems for assessing impacts and risks, and 3) new standards for monitoring this kind of industrial activity.
- Reputation: The Institute of Marine Research cannot see that the present IA satisfies what one would expect of Norway as an ocean and coastal state which emphasises the importance of knowledge-based, sustainable management practices. If mining were to be allowed in the assessment area as set out in the IA, it would impair Norway's reputation as a fishing nation and reliable partner for the ocean.

Elaborating comments from the Institute of Marine Research

The present IA reveals important gaps in our knowledge about the nature conditions without making a good plan for establishing the necessary knowledge in the time to come

Our most important comment on the IA is that it **neither takes into account the consequences of our lack of knowledge about nature conditions in the assessment area, nor sets out a good plan for filling those knowledge gaps**. The background reports on which the impact assessment is based, document very large knowledge gaps with respect to hydrodynamics, occurrence of species, habitats, and ecosystems in the dark part of the water column (the aphotic zone) throughout the entire assessment area. When it is essentially unknown both what lives in the area and how different species and ecosystems are interconnected, it is impossible to establish with sufficient certainty the



impacts of exploring or extracting deep-sea minerals, or to determine the best approach for ceasing the extraction of minerals when the resources in an area have been depleted.

The IA concludes that “impacts will mainly occur in the specific geographic area where the extraction takes place”, even though the background reports point out that we do not know about either of the bottom currents or the dispersion of return. The claim is based on an assumption that similar biological resources exist intact in the surrounding areas – but **currently we lack the knowledge to say whether unique natural environments may be lost in conjunction with mineral extraction, or whether genetically identical organisms exist across a wider area.** The current gaps in our knowledge mean that **the IA should have set out more clearly how a knowledge base will be established** (field surveys, numerical modelling, exposure studies, analyses). Ideally, this knowledge acquisition should occur ahead of, or at the very least in parallel with, a stepwise opening of parts of the assessment area, with the rate of further opening reflecting the complexity of the nature conditions in the area and the amount of work involved in mapping it. Stepwise opening could have started with areas of a size that makes it realistic, within 5-10 years, to build up sufficient knowledge about nature conditions and hydrodynamics to provide a foundation for future licence-specific IAs which takes care of the environment in a good manner..

A good IA requires **knowledge about both local and regional biodiversity – in order to ascertain whether local nature conditions are unique**, which takes long time to establish. Since only fragments of the area in question have been mapped (visually and/or by taking physical samples), previous experience tells us that you will find a large number of unknown species (up to 90%, Bribiesca-Contreras et al., 2022), and that it can take 10-20 years from the collection of biological material to the formal description of a new species (Olsen et al., 2022, page 10 in Annex 3, Amon 2022). Speeding up this process requires a systematic effort to collect field data and a large number of dedicated taxonomists to perform analyses.

The present IA states that there is a limited financial downside for commercial entities who are allocated licences and fail to find viable resources, which in our view indicates that necessary knowledge about nature conditions will not be acquired during this phase either. This seems consistent with the surveying done by the Norwegian Offshore Directorate since 2018, where knowledge about nature conditions apparently is neglected. Given the time it takes to build up a good understanding of nature conditions and the need for a regional context to understand local conditions, it is very unfortunate that knowledge acquisition keeps being deferred. **In our view, the IA does not appear to take the scope of the necessary knowledge base, or the time it will take to build it up, seriously.** The present IA assumes that commercial entities can be required to acquire new knowledge about biodiversity during the extraction process, but it is not clear whether this always will be set as a condition, even though knowledge about nature conditions is nearly non-existent. If a requirement of this kind is set, the data obtained about biodiversity and hydrodynamics for a licence-specific IA will still be limited only to the area covered by the licence, and will thus not provide knowledge about the regional context of this area. We therefore recommend that the resource mapping (both as currently carried out by the state and as carried out in the future by commercial entities) includes an initial biodiversity survey (including the presence of large structure-building species) performed by entities with documented qualifications. In addition, the state should significantly increase its efforts to map the overall biodiversity in the assessment area to ensure an acceptable progress in knowledge acquisition, bearing in the mind the time it can be expected to take. The Norwegian Offshore Directorate has already financed research in the vicinity of a few hydrothermal vents along the Atlantic Mid-Ocean Ridge (AMOR, Annex 3), but similar research into other common habitats (such as seamounts, inactive sulphide deposits, and abyssal plains) should be prioritised in the near future. In addition, the state should finance more large-scale seabed mapping in the assessment area, of similar kind done through the MAREANO programme, which since its inception in 2006 has perfected the value chain from field survey with complementary tools



via analyses to building knowledge and communicating it as map layers. Using multi-beam echo sounders, MAREANO has already mapped depth and reflectance of a significant part of the assessment area, but we lack visual information and physical seabed samples from the same area. Additional large-scale mapping of the assessment area would give the relevant management authorities in Norway the necessary information to evaluate whether local surveys disclose unique, particularly important, or vulnerable populations of species and/or ecosystems, whether there is a potential for rapid recolonisation from surrounding populations after the cessation of mineral extraction, or if we can expect permanent changes to biodiversity.

The draft decision to open large parts of the assessment area may result in commercial entities applying for extraction licences in areas where – after knowledge has been acquired about the nature conditions – deep-sea mining cannot be permitted after all, because it would contravene national and international agreements on the protection of valuable, vulnerable, and threatened nature (Eriksen et al., 2021, OSPAR 2009, Convention on Biological Diversity (CBD), COP15: <https://www.regjeringen.no/no/aktuelt/verdens-land-samlet-om-en-naturavtale/id2952178/>). If the Ministry of Petroleum and Energy initiates parallel surveying of both the resources and nature conditions, the probability for such incidences to occur may be significantly reduced – as also the potential downside for the commercial entities.

We would like to point out that, in waters outside national jurisdiction, clear guidelines have been established for regional management plans which will ensure that networks of areas containing 30% of all landscape types will not be opened for mineral extraction, and which will also provide complete protection to areas that are designated important (Dunn et al., 2018). The government has a clearly stated intention of strengthening its efforts to protect and preserve the environment, to meet the requirement of 100% sustainable management and 30% conservation of the ocean by 2030 (negotiated in Montreal in December 2022 through the CBD, to which Norway is a signatory). **It is hard to see how that can be fulfilled at the same time as deciding to open vast areas of the ocean for a new commercial activity with virtually no knowledge about the nature conditions or bottom currents**, and it suggests that Norway does not take its obligations under the Convention on Biological Diversity seriously.

We should also point out that the Offshore Directorate “take note” of several of the Institute of Marine Research’s comments in our previous consultation response to the program plan for the IA. This includes among others inadequate knowledge base. Nevertheless, the present IA does not give any specifics on the process for building up a knowledge base about the nature conditions before approving start-up of activities. **It is therefore impossible to see how a sufficient knowledge base will be acquired to the extent that makes it possible to “highlight which effects a potential opening could have for the environment,” in accordance with the Norwegian Seabed Minerals Act.**

The IA concludes that the impacts are small based on a highly inadequate knowledge base

The present IA states that: “*knowledge about the fauna and nature conditions is limited*” -“*approved plan for extraction ... demands an impact assessment to be carried out ... including that local conditions must be assessed and taken into account.*” -“*The present impact assessment ... highlights ... impacts related to exploration, extraction, and the cessation of the activity.*” – “*In general, the activity has been found to have small environmental impacts.*” – “*For most of the impacts, current knowledge suggests that in practical management it will be possible to implement mitigations*”. Here the Institute of Marine Research wishes to point out that only a few hydrothermal vents have been studied by a camera on a ROV in an area covering “592,500 square kilometres at depths of 100-4,000 metres”. With **so few point observations, we wonder how far the present IA manages to extrapolate the environmental impacts of deep-sea mining across large areas**, in a way that, in our view, be on the border of trivialization. For example, the IA points out that the negative impacts of



mineral extraction on the seabed will be very limited – “*The exposed area with supposedly harmful deposits is expected to extend approximately 1 km around an underwater unit*” – without mentioning that the entire area covered by a licence may be affected depending on how coherent a population in the licence area is. Below we will highlight two examples where **we consider that the environmental impacts of mineral extraction and the effectiveness of mitigations have been incorrectly assessed.**

On page 11, the IA states that the underlying bedrock will enable fauna to re-establish after removal of the manganese crust, with some uncertainty about the time frame for this. The IMR believes that this statement reveals how the IA has made insufficient use of the available knowledge to assess the impacts of mining activities. A review of the life history traits for some of the species dominating the benthic communities on Schultzbanken (the most thoroughly studied seamount in the assessment area) clearly shows that it is not likely that a stable benthic community, of the same kind as the original one, will be re-established in the foreseeable future. In the case of the sea strawberry coral *Gersemia rubiformis* and the horny sponge *Stylocordya borealis*, fertilisation and the development of the eggs and larvae occur inside the bodies of adult individuals (Henry et al., 2003; Sarà et al., 2002). The offspring settle to bottom, eventually, within a few metres’ radius of the “mother coral”. Recolonising an area of 20 km², the proposed size of the extraction licence for the manganese crust, at a speed of 1 m per generation would take 5,000 generations, or around 50,000 years. It is hard to see how this can be mitigated. We also wish to point out that internal fertilisation and development of larvae appears to be the rule, rather than the exception, for Arctic benthic fauna/sponges (Sarà et al., 2002). The calculations of recolonisation time are supported by the results of the SponGES project (www.deepseasponges.org), which estimated that the re-establishment of a healthy benthic community in a 3-m-wide corridor exposed to an experimental beam trawl haul on Schultzbanken would take from 10 to 100s of years (Morris et al. 2020).

Many species migrate between the mesopelagic zone and near the surface of the water column either daily (such as mesopelagic species) or seasonally (such as the zooplankton *C. finmarchicus*, which overwinters in the Norwegian Sea at depths of 500-1,500 m). These species link the deep and shallow parts of the ocean and are eaten by animals higher up the food chain (Kutti et al., 2021, Annex 4). For example, commercially important plankton-eating fish stocks such as herring and mackerel, feed on the older life stages of *C. finmarchicus*. Zooplankton, including *C. finmarchicus*, have also been found to eat mineral particles (Paffenhöfer 1972; Anderson, E.P. & Mackas 1986; Farkas et al. 2017). In our view, it is hard to understand how the IA has concluded that there is low potential for this to affect food safety, despite the great uncertainty related to exposure of metals in deep-sea environments, for example through return water produced when extracting deep-sea minerals. Accumulation up the food chain will depend on metal and particle content of the return water from mining, the location where it is released, and how it spreads in relation to the habitats of species that migrate between deep and shallow waters and re included in the food chain of fish for human consumption. Fish species distribution is dynamic, exemplified by mackerel which have moved north and west within the waters in question.

Absence of a plan for establishing licence-specific IAs and monitoring

The Norwegian Seabed Mineral Act states that opening areas for mineral extraction requires an IA that sheds light on the various interests involved, including environmental impacts. However, the quality of the present IA inevitably reflects the inadequate knowledge about the nature conditions. At a much later stage of the process, the licensee of a permit must submit an extraction plan for approval, including an IA that “includes environmental factors” for the area in question. We do not see that this adequately meets the strict requirements for acquiring knowledge about the local nature conditions that would be necessary to carry out a satisfactory IA as a part of an extraction



plan. **The IA lacks information about the Norwegian Offshore Directorate's plan for how (or whether) to set requirements for the quality of the licence-specific IA, risk analyses or the need for an independent review of the IA before extraction can begin.** These are basic elements that would prevent pressure from shareholders for a return on commercial entities' investments from affecting the outcome of risk analyses and environmental impact assessments. Licence-specific IAs should be carried out independently of the company seeking approval for mineral extraction, and in line with the general recommendations that arose as a result of the government's own evaluation of impact assessments for major onshore projects (<https://www.regjeringen.no/no/dokumenter/evaluering-av-konsekvensutredninger-etter-kapittel-5-i-forskrift-om-konsekvensutredninger/id2835812/>). In its negotiations with the International Seabed Authority (ISA), Norway is arguing that the rules governing the extraction of minerals in international waters should be based on robust environmental standards in which good, independent impact assessments and mechanisms to ensure compliance play a key role. Norway's approach to international management activities should provide a model for introducing equivalent processes in our own waters.

Monitoring potential environmental impacts should be a key aspect of licence-specific IAs. The current standard for environmental monitoring requires sediment samples to be collected, and the observed species composition and knowledge about the various species' sensitivities to human activities are then used to estimate a number of condition indexes. In areas where you can expect that a majority of the organisms you will find does not belong to any known species, and we therefore have no knowledge about those organisms' sensitivities to human activities, this kind of standardised environmental monitoring will be of no value. This demonstrates clearly how important it is to initiate processes for mapping the assessment area as quickly as possible. To monitor the potential impacts of mineral extraction on organisms living attached to hard-bottom substrate, it is also necessary to develop completely new standards for environmental monitoring. These standards should aim to monitor sub-lethal (non-lethal) parameters that are indicators of stress. This is because many of the organism groups commonly found on hard bottoms and areas with strong currents have an extremely long life cycle (they can live up to 100-1,000 years). It is therefore inappropriate to look at the community structure, because when it is changed, it will take a long time for mitigating measures to bring about re-establishment.

The opening process in an international perspective

In negotiations at the International Seabed Authority (ISA), Norway has argued that it is necessary to establish rules that ensure the independence and quality of IAs in international waters. Norway played a key role in negotiating the international Convention on Biological Diversity in Montreal in December 2022, which commits Norway (along with other countries) to 100% sustainable management and 30% conservation of the land and ocean by 2030. It is therefore hard to understand why the process for opening areas of the Norwegian Continental Shelf for mineral extraction pay so little attention to the gaps in the knowledge base, and deferring data collection to increase our knowledge and the establishment of processes for standardising impact assessments and regional conservation plans. The need for conservation, sustainable management, and co-existence are elements that should have formed a natural part of the present IA.

Within international ocean governance, the key priorities of the European Commission are to (EC 2022): ... *"prohibit deep-sea mining until scientific gaps are properly filled, no harmful effects arise from mining and the marine environment is effectively protected"*

The same communication from the European Commission stated that *"On deep seabed mining, there is a broad consensus in the scientific community and among States that knowledge related to deep-sea environment and the impacts of mining are not comprehensive enough to enable evidence-based decision-making to allow for proceeding safely with exploitation. The EU will continue to*



advocate for prohibiting deep-sea mining until these scientific gaps are properly filled, that it can be demonstrated that no harmful effects arise from mining and, as required under the UNCLOS, the necessary provisions in the exploitation regulations for the effective protection of the marine environment are in place.”

The World Economic Forum, as well as numerous companies, financial institutions, countries, and NGOs have also expressed similar opinions and consequently support for a ban on deep-sea mining until further notice. The Institute of Marine Research cannot see that the IA meets the standards and expectations to which Norway should expect to be held as a ocean and coastal state which emphasises the importance of knowledge-based, sustainable management practices. **Norway’s reputation as a fishing nation and reliable partner for ocean issues may come under serious strain if the planned process of granting exploration licences followed by extraction licences is implemented on the basis of inadequate scientific knowledge, such as the present IA, and against advices of both the Institute of Marine Research and other national and international expert communities.**



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