# European Commission stakeholder consultation on seabed mining

## Identification

**Are you answering this questionnaire on behalf of an organisation or as an individual?** *

☒ On behalf of an organisation ☐ As an individual

**Your name (will not be published)** *

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**Contact email (will not be published)** *

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**Where are you based?** *

| | | | | | |
|---|---|---|---|---|---|
| ☐ Austria | ☒ Belgium | ☐ Bulgaria | ☐ Croatia | ☐ Cyprus | ☐ Czech Republic |
| ☐ Denmark | ☐ Estonia | ☐ Finland | ☐ France | ☐ Germany | ☐ Greece |
| ☐ Hungary | ☐ Ireland | ☐ Italy | ☐ Latvia | ☐ Lithuania | ☐ Luxembourg |
| ☐ Malta | ☐ Netherlands | ☐ Poland | ☐ Portugal | ☐ Romania | ☐ Slovakia |
| ☐ Slovenia | ☐ Spain | ☐ Sweden | ☐ United Kingdom | | ☐ OTHER |

**What is your main interest? You may tick more than one box.** *

☒ surveying and prospecting ☐ extraction ☐ processing
☐ equipment manufacture ☐ shipbuilding (vessels and offshore structures)
☐ legal issues ☒ environmental impact
☐ impact on other industries

**Please explain your interest further (optional):**

The European Marine Board (EMB) is a strategic pan-European Forum for seas and oceans research and technology. In 2014 the EMB has 36 Member Organisations (MOs) comprised of National Research Funding Organisations and Research Performing Organisations (including university networks) across Europe. **As an independent, non-governmental advisory body, EMB has no direct commercial interest in seabed mining**. EMB provides a strategic pan-European platform for expressing a collective vision of European marine research priorities to meet future science and societal challenges and opportunities. In 2013, EMB published Navigating the Future IV, a strategic foresight paper on marine science, addressing key themes e.g. climate, food security, energy, and safe and sustainable use of marine space including the deep-sea, in support of a thriving European maritime economy.

With specific reference to deep-sea mining and the growing socio-economic interest in exploitation of marine mineral (and biological) resources, **the European Marine Board has identified a strong need for a new era of high quality, integrated deep-sea research delivered in the context of societal challenges and the need to balance socio-economic gain with sustainable management and governance of the deep sea.** To address this, in January 2014, the EMB launched a **Working Group on Deep Sea research**. This brings together European experts and deep-sea stakeholders from across marine sectors to discuss and present recommendations for future deep-sea research in the context of societal challenges and policy needs. This builds on work conducted by European Marine Board Working Groups on Marine Biodiversity, Networks of Marine Protected Areas, and Valuing Marine Ecosystems. http://www.marineboard.eu/publications

EMB MOs include many of the leading marine academic institutions across Europe and **a specific focus of EMB is scientific excellence and research to further society's knowledge in marine sciences**.

**EMB MOs carry out a wide variety of basic marine research relevant to the blue growth area of seabed mining** spanning the fields of seafloor geology and geochemistry to physical oceanography, deep-sea biodiversity and marine ecosystem studies. Such knowledge is vital to further our understanding of marine environments, provide a baseline for assessing good environmental status and monitor how the marine system responds to both natural and anthropogenic change, providing evidence to underpin decision-making. Scientific research is also vital for identifying Vulnerable Marine Ecosystems (VMEs) and Ecologically or Biologically Significant Areas (EBSAs) which may have unique, rare or endemic species with lower resilience and longer recovery times in the case of human impact (Weaver and Johnson, 2012)[1]. Basic research can also contribute to the longer-term monitoring of such environments and to assessing how these may change into the future.

**Basic research is also the first stage of the value chain for marine economic activities such as seabed mining**, and the demand for such knowledge is likely to increase for informing Environmental Impact Assessments (EIA). EIAs are needed in the precursor stages to the active exploitation phase and to underpin evidence-based decision making and wider ocean governance to support the blue economy and European legislation e.g. MSFD. EMB MOs also conduct innovative research into marine technology and engineering for conducting state-of-the-art scientific exploration and research which not only increases the access to the deep sea but could also help minimize impact through miniaturization, high precision technology and reducing the risks of pollution and disturbance. However, the EMB MOs basic research conducted and commissioned by EMB MOs has no direct commercial interest in seabed mining.

**The focus of the EMB response is on Deep sea mining** as EMB have an active Working Group addressing this emerging area. However, EMB MOs carry out basic marine research spanning the three areas of this Consultation. See individual EMB MO responses for further information.

[1] Weaver and Johnson, 2012. Think Big for Marine Conservation. Nature vol: 483, p.399

## Aggregate Extraction

The sea provides a significant proportion of some countries' sand and gravel requirements for construction or beach nourishment.

**Do you wish to answer questions on this?** *

☐ Yes, I would like to answer questions on this issue
☒ No, I will pass to the next section

**Is this a useful way of maintaining an adequate supply of material for construction and beach nourishment** *

☐ we would not manage without it
☐ we believe it is or could be a useful addition to land-based sources
☐ we do not need it

**Please explain (optional):**

**What is your involvement** *

☐ not involved
☐ already involved
☐ expect to be involved in future
☐ would be involved if legislative framework were more favourable

**Please provide more details (optional):**

**What (if anything) is limiting the economic potential of this activity?**

| | Significant | Relevant | Minor | No opinion |
|---|---|---|---|---|
| Limited access to finance* | ☐ | ☐ | ☐ | ☐ |
| Inadequate port facilities* | ☐ | ☐ | ☐ | ☐ |
| Over-stringent licensing conditions * | ☐ | ☐ | ☐ | ☐ |
| Lengthy, unclear or bureaucratic licensing conditions - independent of whether they are too stringent, is their implementation over- | ☐ | ☐ | ☐ | ☐ |

| | | | | |
|---|---|---|---|---|
| bureaucratic? * | | | | |
| Volatility of prices* | ☐ | ☐ | ☐ | ☐ |
| Shortage of skilled labour* | ☐ | ☐ | ☐ | ☐ |
| Shortage of suitable sites* | ☐ | ☐ | ☐ | ☐ |
| Technology shortcomings* | ☐ | ☐ | ☐ | ☐ |
| Local opposition* | ☐ | ☐ | ☐ | ☐ |
| Lack of knowledge of whereabouts of deposits* | ☐ | ☐ | ☐ | ☐ |
| Taxation* | ☐ | ☐ | ☐ | ☐ |
| Competition with other users for resources (e.g. fisheries)* | ☐ | ☐ | ☐ | ☐ |

**Please explain your answer or indicate another factor (optional):**

**The environmental impact of aggregate extraction is –**

| | Better | The same | Worse | No opinion |
|---|---|---|---|---|
| Better or worse than fishing?* | ☐ | ☐ | ☐ | ☐ |
| Better or worse than extraction on land?* | ☐ | ☐ | ☐ | ☐ |
| Better or worse than oil and gas extraction* | ☐ | ☐ | ☐ | ☐ |

**Please explain your answer (optional):**

**What EU action would be helpful?**

| | priority | useful | not useful | no opinion |
|---|---|---|---|---|
| Research on environmental impact* | ☐ | ☐ | ☐ | ☐ |

| | | | | |
|---|---|---|---|---|
| Research on technology* | ☐ | ☐ | ☐ | ☐ |
| Promoting freely accessible seabed maps together with information on geology, ecosystems and habitats * | ☐ | ☐ | ☐ | ☐ |
| Promote exchange of good practice* | ☐ | ☐ | ☐ | ☐ |
| Develop code of corporate responsibility* | ☐ | ☐ | ☐ | ☐ |
| Facilitate mobility of labour* | ☐ | ☐ | ☐ | ☐ |
| Further support to initiatives such as the Extractive Industry Transparency Initiative (includes requirement for disclosure of payments to governments)* | ☐ | ☐ | ☐ | ☐ |
| Strengthen EU environmental legislation such as that on environmental impact and mining waste. These are mostly applicable only for waters of EU countries.* | ☐ | ☐ | ☐ | ☐ |

**Please explain your answer or indicate another area where the EU could act (optional):**

## Shallow water mining of high value commodities

This mostly involves dredging in water depths up to 500 metres. It includes the mining of iron sand, tin, diamonds, gold and phosphate rock.

**Do you wish to answer questions on this?***

☐ Yes, I would like to answer questions on this ☒ No, I will skip this and move to the next section

**Could this contribute towards a sustainable and economical supply of raw material for EU industry and agriculture?***

☐ Yes, otherwise we risk shortages
☐ It is a useful addition to land-based sources
☐ We do not need it

**Please explain (optional):**

**What is your involvement?**

☐ We are already involved
☐ We can see ourselves being involved in next 10 years
☐ We are still assessing the opportunities
☐ We do not believe that we will be involved
☐ We would assess environmental impact

**Please explain (optional):**

**What (if anything) is driving economic interest?**

| | Significant | Relevant | Not important | No opinion |
|---|---|---|---|---|
| Advances in technology* | ☐ | ☐ | ☐ | ☐ |
| Limited access to raw materials from terrestrial sources* | ☐ | ☐ | ☐ | ☐ |

**Please explain (optional):**

**Where is your primary interest? (at most 3 choice(s))**

☐ Waters of EU countries on European continent
☐ Waters of overseas territories of EU countries
☐ Waters of non-EU countries

**Which shallow water deposits do you think will become economically interesting in the next 10 years (optional question)? (at most 7 choice(s))**

☐ tin ☐ phosphates ☐ diamonds ☐ gold ☐ rare earths
☐ iron sands ☐ other

**Please specify*:**

**Please explain (optional):**

**What (if anything) is limiting the economic potential of this activity?**

| | Significant | Relevant | Minor | No opinion |
|---|---|---|---|---|
| Limited access to finance* | ☐ | ☐ | ☐ | ☐ |
| Inadequate port facilities* | ☐ | ☐ | ☐ | ☐ |
| Over-stringent licensing conditions * | ☐ | ☐ | ☐ | ☐ |
| Lengthy, unclear or bureaucratic licensing conditions - independent of whether they are too stringent, is their implementation over-bureaucratic?* | ☐ | ☐ | ☐ | ☐ |
| Volatility of prices* | ☐ | ☐ | ☐ | ☐ |
| Shortage of skilled labour* | ☐ | ☐ | ☐ | ☐ |
| Shortage of suitable sites* | ☐ | ☐ | ☐ | ☐ |
| Technology shortcomings* | ☐ | ☐ | ☐ | ☐ |
| Local opposition* | ☐ | ☐ | ☐ | ☐ |
| Lack of knowledge of whereabouts of deposits* | ☐ | ☐ | ☐ | ☐ |
| Taxation* | ☐ | ☐ | ☐ | ☐ |
| Competition with other users for resources (e.g. fisheries)* | ☐ | ☐ | ☐ | ☐ |

**Please explain your answers or indicate another factor (optional):**

**The environmental impact of shallow water mining is:**

| | Better | Worse | About the same | No opinion |
|---|---|---|---|---|
| Better or worse than fishing* | ☐ | ☐ | ☐ | ☐ |
| Better or worse than mining on land* | ☐ | ☐ | ☐ | ☐ |
| Better or worse than oil and gas extraction* | ☐ | ☐ | ☐ | ☐ |

**Please explain your answers (optional):**

**What EU action would be helpful?**

| | Priority | Useful | Not useful | No opinion |
|---|---|---|---|---|
| Research on environmental impact* | ☐ | ☐ | ☐ | ☐ |
| Research on technology* | ☐ | ☐ | ☐ | ☐ |
| Promoting freely accessible seabed maps together with information on geology, ecosystems and habitats * | ☐ | ☐ | ☐ | ☐ |
| Promote exchange of good practice* | ☐ | ☐ | ☐ | ☐ |
| Develop code of corporate responsibility* | ☐ | ☐ | ☐ | ☐ |
| Facilitate mobility of labour* | ☐ | ☐ | ☐ | ☐ |
| Further support to initiatives such as the Extractive Industry Transparency Initiative (includes requirement for disclosure of payments to governments)* | ☐ | ☐ | ☐ | ☐ |

| | | | | |
|---|---|---|---|---|
| Strengthen EU environmental legislation such as that on environmental impact and mining waste. These are mostly applicable only for waters of EU countries.* | ☐ | ☐ | ☐ | ☐ |

**Please explain your choice or suggest another action that EU could take (optional)**

## Deep sea mining

Deep-sea mining involves mining activities that take place at large depths. Mining can take place both within national jurisdictions and in areas beyond national jurisdiction (ABNJ or international waters). Deep-sea mining is aimed at mining higher value commodities, such as copper, cobalt, nickel and rare earth elements. Do you wish to answer questions on this? *

☒ Yes, I would like to answer questions on this
☐ No, I would like to skip this and move to the next section

Could this contribute towards a sustainable and economical supply of raw material for EU industry and agriculture? *

☐ Yes, otherwise we risk shortages
☒ It is a useful addition to land-based sources
☐ We do not need it

**Please explain your answers (optional):**

**The European Marine Board recognizes the economic opportunity for seabed mining and the need for Europe to be involved in such activities** (European Marine Board (2013) Navigating the Future IV ) , particularly in light of the increasing demand which outweighs the current supply from terrestrial environments, and the need to secure European sources for higher value commodities e.g. rare earth metals and other strategic metals. Such extraction can be seen as an opportunity, not only in terms of the economic value of mineral extraction and associated products, but in terms of the jobs it creates and by driving innovation through technological developments, including in the areas of Artificial Intelligence (A.I.) and marine robotics.

With *in situ* deep-sea mining still in its infancy (although imminent, *in situ* operations are yet to begin), **the European Marine Board sees this as a timely opportunity for establishing Europe as a front-runner in matching economic opportunities with the best science and governance regarding the emerging exploitation of mineral (and biological) resources from the deep ocean**. Specifically related to deep-sea blue growth activities, the European Marine Board Working Group on Deep Sea research is addressing the need for a strategic vision for how deep-sea research can support and inform deep-sea mining and the full range of existing and emerging deep-sea economic activities e.g. fishing, offshore oil and gas, aquaculture (e.g. un-tethered submerged cages), renewables (e.g. ocean thermal energy conversion) and even tourism.

The EMB Working Group on Deep Seas promotes an interdisciplinary and cross-sectoral approach, taking into account expertise in the natural and social sciences, and legal and policy domains, together with industry interaction, to determine how marine scientific research can help tackle environmental, technical and legal challenges of deep-sea mining and wider activities. Ensuring research is carried out in tandem with economic activities is particularly pertinent in the deep sea where only 0.0001% of the deep-sea has been sampled biologically. We currently have very little information on the functioning of deep-sea ecosystems, how these systems evolved, or their resilience to human threats and natural pressures (European Marine Board (2013) Navigating the Future IV, chapter 8). **Key areas under discussion are the need for scientific knowledge to underpin a more transparent regulation of the deep-sea, including an independent Environmental Impact Assessment procedure, and for it to inform developments in the regulation of the deep-sea, including responsibility and liability for environmental damage.** This could also include a more iterative process for making scientific research available and timely for ocean stewardship and governance e.g. informing policy decisions with new evidence on Vulnerable Marine Ecosystems (VMEs) etc.

In the longer-term, **raw material from the deep-sea are still a finite resource** and although currently economically attractive, this may not be the case into the future. **Scientific research could therefore also be targeted to develop alternatives to deep-sea mining such as technology and applications for recycling of rare earth metals and other related raw materials**.

**What is your involvement?*** **(Involvement could include prospecting, extraction, processing, providing equipment)**

- [x] We are already involved
- [ ] We could see ourselves being involved in next 10 years
- [ ] We are still looking at the opportunities
- [ ] We do not believe that we will be involved
- [x] We would monitor environmental impact

**Which deposits are of primary interest for you? * (at most 4 choice(s))**

☒ Polymetallic nodules
☒ Polymetallic sulphides
☒ Cobalt-rich crusts
☒ Rare earth element-rich deep-sea sediments
☐ No opinion

**Where do you believe that most mining activity will take place? ***

☐ In jurisdictional waters
☒ In international waters
☐ No opinion

**What (if anything) is driving economic interest?**

| | Significant | Relevant | Not important | No opinion |
|---|---|---|---|---|
| Advances in technology* | ☒ | ☐ | ☐ | ☐ |
| Limited access to raw materials from terrestrial sources* | ☐ | ☒ | ☐ | ☐ |

**Please explain your answers (optional):**

**see next page**

EMB, through its 36 MOs, conducts basic research in the areas of deep-sea marine science and technology. The main focus is producing knowledge to underpin our understanding of the deep-sea environment. **Potential areas of EMB MO involvement related to seabed mining include environmental impact assessments and monitoring**. Interest in deep-sea deposits, e.g. seafloor massive sulphides, is for research purposes only with no direct interest in commercial application.

Demand for raw materials is expected to increase and outweigh economically viable terrestrial deposits, driving interest to exploit the deep-sea. In turn, **the demand for scientific knowledge in the deep sea is expected to increase to meet stakeholder requirements**. While EMB believes most mining will take place in international waters, it is noted that *in situ* deep-sea mining activities are already planned imminently in jurisdictional waters, starting with the territorial waters of Papua New Guinea, led by Nautilus Minerals Inc.

In addition to national efforts, some EMB MOs are also engaged in European projects related to deep-sea mining. These range from Managing Impacts of Deep Sea Resource Exploitation (MIDAS) http://eu-midas.net/ to conducting research developing scientific and technological solutions for deep sea activities e.g. Blue Mining http://www.bluemining.eu/

Another significant aspect driving the current interest in deep-sea mining is that **technological advances are revolutionizing access to the deep sea**, driving commercial opportunities to exploit the deep-sea (Navigating the Future IV (2013), European Marine Board, chapter 8). EMB MOs are also engaged in marine engineering and technology developments e.g. AUVs, ROVs for deep-sea research and are currently engaged in the drive for miniaturization and higher precision instrumentation and sensors. This should also be seen as an opportunity to develop technology that increases efficiency (reduces costs) and minimizes the environmental impact of deep-sea mining (potentially extending the extraction period), and minimizing polluting discharges. This is perhaps particularly pertinent in the deep-sea where not only so little is known about the functioning and resilience of biological ecosystems but also the growth and recovery rates are likely to be much longer than for shallow-water fauna. In addition to technological advances, it is also necessary to maintain current research vessels and equipment in good shape in order to conduct experiments and deploy these instruments.

In addition, state-of-the-art technological advances are developing from fields such as Artificial Intelligence and Information Communication Technology (ICT) across domains such as Space and Agriculture. **A cross-disciplinary approach should be encouraged to capture innovations across scientific fields and apply these to provide solutions for marine activities** in areas such as system design, autonomous manipulation, image recognition, autonomy and sustained learning.

Such technological developments require **skilled personnel e.g. engineers in both the public and private sectors, creating jobs and further expanding the blue economy**. Knowledge Alliances between higher education and the private sector will also be important to further develop and increase opportunities for multi-sector collaboration e.g. increasing access to platforms and test-beds.

### What (if anything) is limiting the economic potential of this activity?

| | significant | relevant | minor | no opinion |
|---|---|---|---|---|
| Limited access to finance* | ☐ | ☒ | ☐ | ☐ |
| Inadequate port facilities* | ☐ | ☐ | ☐ | ☒ |
| Over-stringent licensing conditions * | ☐ | ☐ | ☒ | ☐ |
| Lengthy, unclear or bureaucratic licensing conditions - independent of whether they are too stringent, is their implementation over-bureaucratic?* | ☐ | ☐ | ☐ | ☒ |
| Volatility of prices* | ☐ | ☒ | ☐ | ☐ |
| Shortage of skilled labour* | ☒ | ☐ | ☐ | ☐ |
| Shortage of suitable sites* | ☒ | ☐ | ☐ | ☐ |
| Technology shortcomings* | ☒ | ☐ | ☐ | ☐ |
| Local opposition* | ☐ | ☒ | ☐ | ☐ |
| Lack of knowledge of whereabouts of deposits* | ☒ | ☐ | ☐ | ☐ |
| Taxation* | ☐ | ☐ | ☐ | ☒ |
| Competition with other users for resources (eg fisheries)* | ☐ | ☐ | ☒ | ☐ |

### Please provide more details or indicate other factors that might limit the activity (optional)

There are many potential limiting factors for economic development in deep-sea mining. However, **a major limiting factor in both economic and governance terms is the lack of knowledge about the deep-sea**. In the deep-sea this gap in knowledge is particularly pertinent where only 0.0001% of the deep-sea has been sampled biologically. The international Census of Marine Life project found that every second specimen collected from waters deeper than 3,000m belongs to a species new to science (Heip, C. and McDonough, N., 2012.Marine Biodiversity: A Science Roadmap for Europe. European Marine Board Future Science Brief 1). Currently we still have major and important gaps in our knowledge of the natural histories, life cycles, ecosystem interactions, and ecological functions of marine species and ecosystems. Still less is known about their resilience to human threats and natural pressures (European Marine Board (2013) Navigating the Future IV).

From an economic perspective, this **lack of knowledge about deep-sea environments could limit blue growth** through lack of information on new reserves/deposits and where extraction would be most cost-efficient. Gaps in knowledge will also limit the effectiveness of ocean governance since it is difficult to assess the potential impact of seabed mining in the deep-sea for sustainable development. This could hinder both the licensing stage of seabed mining, e.g. through lack of knowledge for environmental impact assessments, and the long-term prospects for seabed mining if the impact on marine ecosystems is not better understood.

A European flagship project which will contribute to this process is the production of **a European seabed map by 2020**. It is likely that the EMB MOs research community will contribute to this through **innovative application of science** (e.g. habitat mapping of deep-sea ecosystems) and developing **state-of-the-art technology** for data collection and management (see EMB response to Marine Knowledge 2020 Consultation, December 2012). This will support management of industrial activities through better resolution bathymetry and mapping of resources e.g. raw material reserves/deposit. It will also provide new information on spatial and temporal distributions of marine ecosystems and the potential impacts of extraction to inform ocean governance.

### The environmental impact of deep-sea mining is:

| | Probably worse | Probably better | It depends how it is done and where it is done | No opinion |
|---|---|---|---|---|
| Better or worse than fishing?* | ☐ | ☐ | ☒ | ☐ |
| Better or worse than mining on land?* | ☐ | ☐ | ☒ | ☐ |
| Better or worse than offshore oil and gas extraction* | ☐ | ☐ | ☒ | ☐ |

### Please provide more details or indicate other factors that might limit the activity (optional)

**The environmental impact of deep-sea mining, and indeed any other human activity in the deep-sea, e.g. fishing, offshore oil and gas, is highly dependent on the scale, methodology and precise location of each activity.** Scientific projects such as HERMES, HERMIONE and MIDAS have investigated the potential impacts through interdisciplinary research. However, there remain many gaps in knowledge from this extreme environment with only 0.0001% of the deep-sea having been sampled biologically (see earlier sections). In addition, **the known deep-sea environments and associated ecosystems are highly diverse**, ranging from highly endemic hotspots including chemosynthetic environments and deep-sea corals, that may require careful governance and conservation to expanses of abyssal plain and deep-sea fauna which may display more resilience to seabed mining in the context of a precautionary, ecosystem approach. Due to the importance of benthic-pelagic coupling and that industries will have wide ranging effects, it is also critical to pay attention to the area above the seafloor, including the water column and ocean surface, e.g. particle discharge, noise, and infrastructure. It is therefore vital that specialists from the marine scientific community are engaged in providing **transparent, independent knowledge to help inform regulatory and licensing decisions**.

One key potential way to contribute is through **revisions to the Environmental Impact Assessment (EIA) in the deep-sea**. A standardized and more iterative approach is suggested for providing scientific input and advice to EIA and monitoring, taking into account the obligation for due diligence and the precautionary principle for any actor doing work at sea. Any revisions to regulations and licensing should take into account the highly diverse stakeholder community that would like to access the deep-sea, ranging from academic researchers conducting basic research to industry.

### What EU action would be helpful?

| | Priority | Useful | Not useful | No opinion |
|---|---|---|---|---|
| Research on environmental impact* | ☒ | ☐ | ☐ | ☐ |
| Research on technology* | ☒ | ☐ | ☐ | ☐ |
| Promoting freely accessible seabed maps together with information on geology, ecosystems and habitats * | ☒ | ☐ | ☐ | ☐ |
| Promote exchange of good practice* | ☒ | ☐ | ☐ | ☐ |
| Develop code of corporate responsibility* | ☒ | ☐ | ☐ | ☐ |
| Facilitate mobility of labour* | ☐ | ☐ | ☐ | ☒ |
| Further support to initiatives such as the Extractive Industry Transparency Initiative (includes requirement for disclosure of payments to governments)* | ☐ | ☒ | ☐ | ☐ |

| | | | | |
|---|---|---|---|---|
| Strengthen EU environmental legislation such as that on environmental impact and mining waste. These are mostly applicable only for waters of EU countries.* | ☐ | ☒ | ☐ | ☐ |
| Support a pilot project to test technology under realistic conditions* | ☒ | ☐ | ☐ | ☐ |
| Actively support network of marine protected areas in areas beyond national jurisdiction* | ☒ | ☐ | ☐ | ☐ |

**Please explain your choices or suggest alternative courses of action (optional)**

European deep sea mining has been defined by the EC as a Blue Growth sector of high potential for sustainable jobs and growth (e.g. COM(2014) 254/2 (13/05/2014). There is also the **opportunity for Europe to become a world leader in matching socio-economic activity with ocean governance through establishing guidelines and regulations for deep-sea mining**. This requires a more defined European policy for deep-sea mining.

In terms of **further knowledge requirements**, research on the environmental impact of deep-sea mining is crucial. This should go hand-in-hand with basic research which provides essential knowledge of the marine environment and ecosystems to underpin EIAs and wider ocean governance. Research on technology is also crucial to both improve access to the deep-sea, but also to find innovative ways to minimize the impact, e.g. through miniaturization, higher prevision and artificial intelligence (see also earlier sections). Access to *in situ* ocean platforms for performing research and for testing technology is already increasing through European projects such as EMSO, FixO3, and JERICO.

**Sharing best practice** is crucial and industry should be encouraged to adopt best practice methodology and use to work towards sustainable development. A code of corporate responsibility, taking into account the obligation for due diligence and the precautionary principle, is necessary for any actor doing work at sea (see section above).

Assessing the current and future needs for regulation in the deep-sea, including responsibility and liability for environmental damage, is particularly important to inform future ocean stewardship and governance. **Any move to strengthen EU environmental legislation, such as that on environmental impact and mining waste, should take into account the high diversity of stakeholders accessing the deep sea** (e.g. from basic research to commercial activities) with very different goals, methods and potential impacts. Since deep-sea mining is likely to move further offshore, any **EU legislation should also link with legislation for waters beyond EU National jurisdiction e.g. through the International Seabed Authority.**

**Networks of Marine Protected Areas (MPAs)** contributing to ecosystem-based marine spatial management are perceived as an optimal way to safeguard biodiversity assets (Olsen *et al.* 2013. Achieving Ecologically Coherent Networks of MPAs in Europe: Science needs and priorities. European Marine Board Position Paper 18). The vision for an MPA network across Europe is gaining momentum e.g. through EU directives such as Natura 2000, MSFD and regional initiatives e.g. Regional Sea Conventions. However, there are currently only a few examples of MPAs being developed in Areas Beyond National Jurisdiction (ABNJ) e.g. OSPAR. Taking into account the drive for deep-sea mining to move further offshore into deeper, more extreme environments, **the European Marine Board therefore supports an EU action to support a network of marine protected areas in areas beyond national jurisdiction**. Setting conservation objectives and evaluating candidate areas for marine protection requires an assessment of ecological criteria and a sound understanding of marine species, ecosystems, and habitats, and their susceptibility to environmental change and human impact.

## Anything else

### Are there any other points you would like to bring up?

**Ecosystem-Based Marine Spatial Management (EB-MSM)** is gaining momentum as a planning tool to make informed and coordinated decisions about how to use marine resources in a sustainable manner. There is a need to develop mechanisms for achieving Marine Spatial Planning (MSP) in Areas Beyond National Jurisdiction (ABNJ) since there are no specific rules for MSP in the deep sea. This is particularly timely as economic interests move further off-shore and into the deep-sea.

**Better dialogue is required between science-policy-industry and wider stakeholders** to communicate the need, and value, to balance economic activities with ocean governance. For example, conservation is often perceived as lost opportunity but in fact could in the longer-term improve yields.

There is a growing need for **basic scientific research** to support economic activities in the deep sea. One way to maximize future investments by member states is through **Joint Programming**.

In addition, **assessing the current and future needs for regulation in the deep-sea**, including responsibility and liability for environmental damage, is particularly important to inform future ocean stewardship and governance. Legislation and regulation should also **take into account new emerging areas of deep-sea economic activities** such as deep ocean thermal energy conversion, aquaculture through autonomous, un-tethered submerged culture/ranching cages, and tourism.

### You may upload a file with further information here.