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CONSIDERATIONS REGARDING DEEP-SEA MARINE SCIENTIFIC RESEARCH IN AREAS BEYOND NATIONAL JURISDICTION: SUBMISSION

In response to the Chair's overview of the first session of the Preparatory Committee, the Deep Ocean Stewardship Initiative (DOSI)¹ Policy Working Group welcomes this opportunity to provide input to the second Preparatory Committee (PrepCom) meeting for the development of an international legally-binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction (UNGA Resolution 69/292). To help inform continued discussions in informal working groups and in plenary, we wish to provide scientific insight to key topics identified during the first session of the PrepCom, namely, marine genetic resources, including questions on the sharing of benefits; measures such as area-based management tools, including marine protected areas; environmental impact assessments; and capacity-building and the transfer of marine technology.

The content of this submission represents the knowledge and experience of several working groups within the DOSI community, demonstrating the cross-cutting nature of the identified issues. Deep-ocean science relies on access to deep-sea resources and data; conservation of resources for continued ecosystem health and further study of its function; management regimes which allow sustainable industrial activity while minimizing impacts to deep-sea resources; and building scientific and technological capacity (including data-, sample-sharing and standardisation) across regions and career levels to better understand the deep ocean.

The DOSI Policy Working Group thanks the Chair and the members of the Preparatory Committee for their efforts to develop an implementing agreement (Agreement), and remains at your disposal to channel expert advice from the deep-sea scientific community to improve the conservation and sustainable use of marine biodiversity beyond national jurisdiction. DOSI as a whole also stands ready to contribute to your deliberations with its knowledge and expertise on the sustainable use and management of deep-ocean resources for the benefit of all humankind.

¹ The Deep Ocean Stewardship Initiative (DOSI) is a union of experts from across disciplines and sectors formed to develop new ideas for sustainable use and management of deep-ocean resources. DOSI seeks to integrate science, technology, policy, law and economics to advise on ecosystem-based management of resource use in the deep ocean and strategies to maintain the integrity of deep-ocean ecosystems within and beyond national jurisdiction. (<http://dosi-project.org/>)

The DOSI Policy Working Group aims to enhance the linkage between DOSI science and the formulation of policy related to the deep ocean, both within and beyond national jurisdictions, building on the expertise and policy-related activities of the Deep Ocean Stewardship Initiative across Working Groups.

1. Marine genetic resources (MGRs), including questions on the sharing of benefits

How can the Agreement address access and sharing of benefits of MGRs in ABNJ that will encourage, not discourage, R&D of MGRs?

- 1. Enable scientific research to collect samples and data *in situ* from ABNJ.** It is imperative that any new requirements for accessing ABNJ have enough flexibility to enable non-commercial scientific research to proceed, by reflecting, for example, monitoring and reporting requirements based on the current best-practices used for national scientific cruise reporting. Existing examples from areas within national jurisdiction, whereby a researcher can declare there is no commercial intent at the time of collection, could provide some useful models. Environmentally sound access should build upon existing best practice measures and codes of conduct (e.g. InterRidge). Environmental impact assessment (EIA) requirements could apply if the research or experiment has the potential to cause significant adverse impacts on marine biodiversity or the marine environment, based on the type of activity and the ecological characteristics of the area, with more stringent review requirements for those activities with a potential for greater harm. Additional guidelines could be desirable to enhance standardisation and facilitate data, sample sharing and traceability, including tracking the location of archived data (DOSI Deep-Sea Genetic Resources Working Group, 2016, Submission to PrepCom 1).
- 2. Develop feasible options to enable open data.** Open access to data is important to enable the sharing of non-monetary benefits from genetic resources, transfer of marine technology, and make available information on environmental impact assessments (EIAs) and area-based management tools, including marine protected areas. Publication in scientific journals already requires data to be made available. However, there are a number of databases, containing large quantities of data, that could be relevant to the implementation of the Agreement (including biodiversity, genetics, natural products, environmental). Feasible, practical options to facilitate open data, based on existing data management platforms, models and best-practices, should be reviewed including the technical, financial and human resource requirements. A well-publicised and maintained meta-data clearinghouse would be a useful tool to increase transparency and traceability.
- 3. Build on best-practice guidelines and approaches to encourage standardisation in the collection, management, and storage of data.** Guidelines and standards already exist for collection, management and storage of data. Further interoperability between standards could address fragmentation in data systems and avoidance of data silos. Training courses/workshops in data management (e.g. OBIS/INDEEP and the new OBIS deep-sea portal) play an important role in enabling standardization, ensuring minimum meta data requirements which facilitate information collection at the time of sampling, and support capacity development. The Global Ocean Observing System (GOOS) programs, including the Deep Ocean Observing Strategy (DOOS) may also offer global ocean data management options.
- 4. Facilitate sharing of *ex situ* samples.** It is important to avoid creating barriers to sharing samples between researchers—instead, actively encourage sharing of samples. Build on scientific best-practices to require specimens to be archived in a

facility, such as a museum or other collection, which is able to facilitate sharing. Ensure appropriate resourcing for museums and collections to undertake this work.

5. **Avoid creating financial burdens on researchers.** Deep-sea research is already a high-cost activity. Avoid imposing additional costs on researchers that could prevent research being undertaken at all. Ideally, the costs of data management and sharing will be integrated throughout the research and development process, however, it will require cooperation among funding agencies, researchers, and users for such integration to happen.
6. **Encourage training and education in marine scientific research to advance scientific knowledge and increase sample sharing and support capacity development.** Capacity development training programmes, early career researcher exchanges, scholarships, sponsored PhD and MS programs as well as post-doctoral fellowships are all effective ways to enhance capacity. A technology transfer clearinghouse mechanism and enhanced connections through existing international scientist networks (e.g. INDEEP) can be utilized for enhanced capacity building.
7. **Encourage international cooperation in scientific research to advance knowledge of marine biodiversity in ABNJ and share costs of research, develop new mechanisms to fund marine biodiversity research.** Enable developing countries to benefit from the outcomes of marine scientific research in ABNJ, provide access to research vessels and underwater vehicles and the imagery and data they generate. Also provide training opportunities/research exchanges to build capacity in using the shared data.
8. **Ensure appropriate resources for the long-term proofing, storage and management of databases, as well as access to online databases.** Sources for sufficient funding should be secured so that long-term maintenance, management and access to online databases can be achieved.
9. **Where appropriate, encourage participation of regional organisations.** The regional management and scientific organisations can play an active role in promoting capacity building and technology transfer by supporting the work of other organizations at the regional level.
10. **The definition of MGR should be sufficiently broad so that the Agreement does not unintentionally leave out vast amount of genetic resources in areas beyond national jurisdiction.** The life cycles of many deep-sea organisms do not honor legal geographical boundaries and can be mobile, thus, they can inhabit the sea-floor, water column or both throughout their life cycle.
11. **Look to existing collaborations for best practices which:**
 - **increase international cooperation in the conduct of deep-sea research.** The deep-sea scientific community is growing rapidly and international cooperation and communication is critical to maximise research outputs and incorporation of the results into global deep-sea management efforts. During the Census of Marine Life decade (2000-2010) great momentum was generated in terms of collaboration among the deep-sea community. This created a template for an international network for scientific investigations of deep-sea ecosystems (INDEEP) and the deep-ocean stewardship initiative

(DOSI) which continue to grow and foster the power of community in advancing deep-sea science. Key synthesis papers have been generated via these collaborations which are driving deep-sea science objectives forward (see Baker *et al.* 2010, Menot *et al.* 2010, Ramirez-Llodra *et al.* 2011, Mora *et al.* 2013, Thurber *et al.* 2013, Vanreusel *et al.* 2015, Hilario *et al.* 2015, Baco *et al.* 2016, Levin *et al.* 2016, Woolley *et al.* 2016). The INDEEP and DOSI networks are well-placed to promote standardised research protocols and the sharing of samples. In addition, technological advances in ship-board tele-presence provide the opportunity to assist scientific activities and exchanges, not only for science communication, but also for expert advice from shore and sample sharing.

- **enhance sample sharing.** In addition to resources to enable museums to store specimens in collection, resources are also needed to make a catalogue of existing material and place the catalogue in an online database, searchable to external scientists looking for particular samples.
- **enhance open access to data.** Increasingly, deep-sea researchers are opting for publications in open-access journals. Open access to data and technology should be explored. Scientists are already engaged in open-access activities, through various initiatives, such as Biological Innovation for Open Society, Biobricks, and the Open Source Drug Discovery.
- **increase capacity development opportunities (e.g. training, mentoring, early career research exchanges) for developing country scientists.** Internships and research exchanges are well-promoted by the International Seabed Authority, the International Oceanographic Commission, INDEEP, DOSI and other bodies. However, there remains the need for a mechanism whereby trained researchers are granted the resources/capacity to continue to engage in deep-sea research upon returning to their country. Scientists from developing countries should be able to engage in research and development activities in their own country.

2. Measures such as area-based management measures (ABMTs), including marine protected areas (MPAs)

How can the Agreement enable identification, designation, and effective management of a global network of MPAs?

1. **Adopt science-based criteria and guidelines** for marine protected areas (MPAs) and MPA networks. These criteria and guidelines could build on the work of the Convention of Biological Diversity and similar agreements to develop ecological and biological criteria for MPAs, and the design of ecologically representative and well-connected networks of MPAs.
2. **Consider and encourage ALL kinds of effective area-based conservation measures** as part of a global network if they provide for the long-term conservation of biodiversity and contribute to the goals of representativity and connectivity and replication.

3. **Enable a systematic approach to conservation planning** that encourages the use of decision-support tools to enable the integration of various ecological criteria and socio-economic considerations to ensure the network satisfies the objectives of an MPA network.
4. **Establish or designate a scientific advisory body** to assist with the review, and as necessary the development, of MPA and other area-based management proposals.
5. **Consult with indigenous cultures** who may rely on deep sea resources for sustenance or cultural importance; their knowledge and traditions can inform MPA designation process as well as management strategies.
6. **Incorporate climate change** (warming, deoxygenation, acidification) via existing maps and projections including time of emergence (beyond natural variation) into evaluation of vulnerability, need for protections, and resilience.
7. **Recognize climate change impacts in designating MPAs and MPA networks.** Climate change can function as a physiological stressor that increases vulnerability to physical disturbance and reduces resilience; alters habitat suitability and representativeness; redistributes species and modify biodiversity; and impacts the ecosystem services provided by the deep sea, including the availability of fish stocks in ABNJ and coastal waters.

What are the effective ABMTs that can be applied to marine biodiversity in ABNJ?

1. **ABMTs designated/implemented by international agencies** include ISA Areas of Particular Environmental Interest, Preservation Reference Zones-, UNEP Regional Seas MPAs-, RFMO spatial and temporal closures, IMO PSSAs and Special Areas-, UNESCO World Heritage-related, have a number of common criteria, cross-cutting those of the EBSAs. This would all be in addition to an effective system of MPAs.
2. **Consideration should also be given to regional, ecosystem-based, marine spatial planning processes**, where a variety of management tools can be applied by competent authorities in addition to MPAs.

How can the Agreement balance ABMTs, including MPAs, for conservation and sustainable development?

1. **Area-based management tools may serve a variety of purposes that benefit both conservation and sustainable use.** A goal for the agreement could be that all activities are conducted on a sustainable basis. The definition for MPAs adopted by the agreement should clarify that MPAs should focus on the long-term conservation of biodiversity and preserving associated ecosystems functions, processes and services. Hence MPA management measures should give priority to conservation objectives.
2. **The Agreement should support ongoing regional processes that are already pursuing and implementing biodiversity strategies.** In the North-East Atlantic, OSPAR and NEAFC, through a collective arrangement, set up a network of ABMTs

in continuity between the EEZ and ABNJ. In the Pacific, the 'Framework for a Pacific Oceanscape' provides another example for regional strategy.

What should be the level of protection accorded to MPAs?

1. **MPAs should focus on the long-term conservation of biodiversity and preserving associated ecosystems functions, processes and services.** Hence MPAs should receive the level of protection necessary to achieve this minimum objective as well as other objectives that may be set forth in the agreement (e.g., climate resilience, maintenance of ecosystem services; protection of long-term scientific monitoring sites).
2. **The level of protection accorded to MPAs** should ensure a comprehensive approach that includes:
 - All vertical realms (seabed, seabed and near-bottom waters, seabed and midwater, seabed and entire water column, surface waters).
 - protection from different forms of activity:
 - base protections from direct bottom physical disturbance (extraction of non-living resources, living resources),
 - indirect - food web alterations (fishing), chemical contamination, sound, light

3. Environmental impact assessments (EIAs)

What are the best practices that the Agreement can draw upon to require implementation of EIAs?

1. **EIAs should be associated with environmental permits necessary for the implementation of certain projects and to the development of related legislation.**
2. **Include consultation with indigenous cultures:** ensure industrial activities are compatible with community needs and traditions.
3. **Include climate stressors in baseline analysis, and in assessment of single and cumulative impacts.**
4. **Environmental Impact Assessment should recognize that climate change may be a source of cumulative impacts:** Climate change may vary biodiversity independent of other stressors. Disturbance-induced change in climate variables (e.g., plume-induced rise in oxygen demand) should be identified.

What should be the scope of EIAs?

1. **Diagnostic of key environmental components and means of maintaining or enhancing environmental quality.**
2. **EIAs should include assessment of vulnerability to climate stressors.**

3. **EIAs should include assessment of Ecosystem Services provided by the area of interest, and potential impacts to these services** (see Le *et al.* in press).
4. **Valuation of Ecosystem Services in ABNJ should adhere to two critical IPBES recommendations:** (1) Acknowledge the broad range of world views on value of nature and its services and (2) Recognize that all steps of assessment and decisions are value-laden (see IPBES/4/INF/13 Preliminary guide regarding diverse conceptualization of multiple values of nature and its benefits, including biodiversity and ecosystem functions and services (deliverable 3 (d))).

What should be the triggering conditions/thresholds for carrying out EIAs?

1. **‘Significant adverse change’ which can serve as a trigger should be identified:** Activities likely to have significant adverse impacts or significant adverse effects are the most commonly used thresholds. Determination of a potentially significant impact should especially consider cumulative environmental impacts based on ecosystem and precautionary perspectives. A more sensitive threshold for activities likely to adversely affect marine protected areas should also be established.

How could the Agreement best facilitate transboundary EIAs (TEIAs) and strategic environmental assessments (SEAs)?

1. **Provide the necessary framework, boundaries and links between interested parties.**
2. **Include consultation with indigenous cultures to ensure industrial activities are compatible with community needs and traditions,** which can be transboundary in nature.

What should be the scope of TEIAs/SEAs?

1. **Define proper uses and management practices in different areas.**
2. **TEIAs, as with other EIAs, should include assessment of Ecosystem Services provided by the area of interest, and potential impacts to these services:** These should include ecosystem services that derive from multiple life stages, migrations, water or chemical movements, and other transboundary processes, and the cumulative impacts to these services.

What should be the triggering conditions/thresholds for carrying out EIAs/SEAs?

1. **Projects as well as programmes, policies or new technologies/activities likely to have significant adverse effects alone or in combination with other activities and anthropogenic impacts.**
2. **SEAs are an important tool that could be applied to existing activities where there is a potential for significant adverse impacts alone or in combination with other activities and anthropogenic impacts.** SEAs could be progressively carried out by the relevant competent organization in consultation with other organizations

based on the best available scientific information. Plans for SEAs on a regional basis for seabed mining have been proposed by the International Seabed Authority.

3. **Plans, projects and activities that pose the potential for serious harm should be subject to additional scrutiny and conditions.** In the context of seabed mining, “serious harm” is a term used in UNCLOS and ISA exploration regulations as a threshold that must be prevented or the project (or mining in a vulnerable area) is not to be allowed to proceed. Though “serious harm” has yet to be defined, parameters such as the potential of an activity to have long lasting and potentially irreversible impacts on deep ocean ecosystems, as well as the unique characteristics of deep-sea species, should be considered when determining what constitutes “serious harm” (see Levin *et al.*, submitted to Marine Policy).

4. Capacity-building and the transfer of marine technology

How could the Agreement facilitate meaningful capacity-building and technology transfer to achieve conservation and sustainable use of the ocean/marine biodiversity?

1. **Build capacity to measure climate change impacts and include monitoring and/or mitigating them in management tools:** New observations and observational tools are needed in remote and deep areas to record climate change and its impacts. Policy should protect those ecosystem services of deep-sea/high-seas commons altered by climate change. Biodiversity initiatives should be integrated with climate policy and climate banking to develop the necessary funding to support related activities.
2. **Stimulate interdisciplinary and multinational research programs,** with special focus in common challenges and means of implementation. It should also consider incentives for technology application in least developed countries.
3. **Encourage development of undergraduate and graduate level studies in marine genomics/marine genetic resources.**
4. **There should be a close interconnection between States from the same region,** something that only regional organizations can allow. Therefore, each regional and relevant organization should be asked to set up a specific DSMR working group that would facilitate the transfer of information not only North-South but also South-South.

Citations

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