Submission by IUCN following the
Second Session of the Preparatory Committee on 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 of Areas beyond National Jurisdiction
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At the invitation of H.E. Mr. Eden Charles, Chair of Preparatory Committee (PrepCom) on the development of an international legally binding instrument (international Instrument) under the United Nations Convention on the Law of the Sea for the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction, IUCN-the International Union for Conservation of Nature- hereby submits supplemental views with respect to the role and value of an implementing agreement at the global and regional levels, the implications of climate change for management of maritime activities in areas beyond national jurisdiction, as well as expanded views on marine genetic resources, capacity building and technology transfer.

IUCN has previously submitted comprehensive comments on area-based management tools and certain cross-cutting issues (institutional arrangements, responsibility & liability, and final clauses) that we hope delegates will also take into consideration.[1] IUCN also fully supports the submission by the High Seas Alliance with respect to area-based management tools, environmental impact assessments and capacity building, and invites governments to give these views their full consideration as well. In addition, we draw delegates' attention to the IUCN Matrix of options for various elements of an implementing agreement, now available online in an interactive format.[2]

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[1] MEASURES SUCH AS AREA-BASED MANAGEMENT TOOLS, INCLUDING MARINE PROTECTED AREAS, Suggested responses to questions on area based management tools (ABMTs), based on the document entitled, "Chair's indicative suggestions of clusters of issues and questions to assist further discussions in the informal working groups at the second session of the Preparatory Committee", http://www.un.org/depts/los/biodiversity/prepcom_files/area_based_management_tools.pdf
CROSS-CUTTING ISSUES Suggested responses to questions regarding three cross-cutting issues based on the document entitled, "Chair's indicative suggestions of clusters of issues and questions to assist further discussions in the informal working groups at the second session of the Preparatory Committee" http://www.un.org/depts/los/biodiversity/prepcom_files/Cross_cutting_issues.pdf

[2] The Matrix is available at: http://www.marinebiodiversitymatrix.org

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Executive Summary

This submission supplements IUCN's previous submissions to the Chair. The information contained herein draws on IUCN's participation in the PrepComs and side events, its review of briefs submitted to the Chair and discussions with various stakeholders, including the Member States, IGOs, NGOs, scientific and academic community. IUCN thanks the many who have contributed to this submission.

This submission highlights the role and value of an implementing agreement to conserve and sustainably use the ocean and its biodiversity beyond national jurisdiction. IUCN suggests that an implementing agreement embrace the principle of *common concern of humankind* to foster a sense of stewardship, collaboration and partnership to confront a global environmental challenge. To advance integrated and coherent management of the ocean and marine biodiversity in areas beyond national jurisdiction (ABNJ), IUCN suggests that robust mechanisms at the global and regional levels will be necessary. After suggesting some components for a functional global framework, IUCN describes some of the many ways a new implementing agreement could be structured to benefit regional fisheries management organizations (RFMOs) as well as regional conservation initiatives, drawing on the experience of the Sargasso Sea Project.

The submission also summarizes recent research regarding the impacts of climate change on marine ecosystems and biodiversity in ABNJ. IUCN suggests that these far-reaching changes underscore the need for scaling up global cooperation in marine scientific research and monitoring and for undertaking directed efforts to bolster ocean health, productivity and resilience. The manifold impacts of climate change including ocean acidification, shifting currents and deoxygenation will moreover need to be considered in the design and implementation of area-based management tools, environmental impact assessments and strategic environmental assessments, and in the management of ongoing activities.

IUCN next provides some suggestions for promoting capacity building and technology transfer within the context of an implementing agreement, with a particular focus on building a platform for capacity building, increasing access to technology as well as financial implications and options.

Finally, IUCN provides some suggestions with respect to marine genetic resources, including benefit sharing and potential definitions to be used in an implementing agreement.

1. The role of an implementing agreement to conserve and sustainably use the ocean and its biodiversity beyond national jurisdiction

1.1. Conserving marine biodiversity in ABNJ as a common concern of the global community

An implementing agreement is needed to provide an overarching framework and unifying global vision, objectives, principles and approaches to drive progress in pursuit of long term conservation and sustainable use of marine biodiversity in the face of escalating challenges to ocean health and productivity.

The Paris Agreement has raised global awareness of the accelerating impacts of climate change, and the need for global cooperation and action at all levels to confront a global problem. Marine ecosystems and biodiversity are being undermined not only by the multiple impacts of climate change but also from the cumulative impacts of ongoing activities such as overfishing, habitat destruction, pollution and species introductions.[3] These interactive and often synergistic impacts make conservation a global challenge that can only be addressed through global cooperation and collaboration. This will entail, among other measures, mitigation and adaptation to increase resilience of the ocean and marine biodiversity in areas beyond national jurisdiction (ABNJ).

IUCN suggests that an implementing agreement should reaffirm that the conservation of marine biodiversity in marine ABNJ is a *common concern of humankind*. The principle that the conservation of biological diversity is a common concern of humankind was affirmed in the Convention on Biodiversity (CBD). This is a principle applicable not to a specific territory or ocean space, but a concept of stewardship, collaboration and partnership to confront a global environmental challenge.[4]

Based on its application in other conventions, the *common concern of humankind* principle reflects and can incorporate the concepts of inter and intra-generational equity, international solidarity, shared decision making, accountability and fair and equitable benefit and burden sharing through cooperation.[5] Implicit in the principle is that use of the ocean and its biodiversity would be for peaceful purposes, which is consistent with UNCLOS' mandate in Article 88 that "high seas shall be reserved for peaceful purposes." Thus, the principle reflects the key concepts in UNCLOS and could be a central pillar for the effective and long-term conservation and sustainable use of the ocean and marine biodiversity in ABNJ.

There is a sense of urgency and common cause that we believe the concept of common concern of humankind can incorporate into the new agreement, as it has done in the CBD and in the Paris Agreement. The true test however will come in how this principle is operationalized. IUCN believes that an implementing agreement is the vehicle whereby the global community of nations can join forces to address the increasing need for integrated ecosystem-based management, international science

[3] Crespo, G.O. & Dunn, D.C. (2016), "A review of the impacts of fisheries on open-ocean ecosystems" Nippon Foundation Nereus Program Policy Brief, available at: http://www.nereusprogram.org/briefs.

[4] Dinah Shelton, Common Concern of Humanity, Environmental Law and Policy 39/2 (2009), 83.

[5] See C. Bowling, E. Pierson and S. Ratté,(2016). The Common Concern of Humankind: A Potential Framework for a New International Legally Binding Instrument on the Conservation and Sustainable Use of Marine Biological Diversity in the High Seas, available at: http://www.un.org/depts/los/biodiversity/prepcom_files/BowlingPiersonandRatte_Common_Concern.pdf

cooperation, capacity building, technology transfer as well as better use of and development of conservation tools to sustain, protect and restore marine biodiversity in ABNJ across the 21st century.

1.2. Institutional mechanisms to enable integrated and coherent management

In the First Global Integrated Marine Assessment (First World Ocean Assessment) published by the United Nations following a 14 year effort, scientists from around the world emphasized the need for integrated and coherent action to cope with increasing ocean degradation, including from climate change. The various actors need to take into account the effects on ecosystems of each of the many pressures, what is being done in other sectors and the way they interact.[6] Another recent study has highlighted the need for strong enabling mechanisms for cooperation if the conditions for effective interplay with respect to marine biodiversity beyond national jurisdiction are to be achieved. [7] The conditions for effective interplay include non-hierarchical organizations operating in sync based on a common purpose and set of principles. [8]

To enable effective integration, cooperation, collaboration and coherent action, a global institutional framework, including a regular meeting of the parties, is needed to, *inter alia*, provide a global level perspective on priorities for biodiversity conservation. This would include functions such as the designation of a network of MPAs, facilitation and review of environmental impact assessments (EIAs), stimulation of marine scientific research and data sharing, and facilitation of strategic environmental assessments. Capacity building, technology transfer and future benefit sharing regime for marine genetic resources would similarly benefit from a global framework.

Regular review of progress through a meeting of the Parties will be essential for maintaining visibility, political will and flexibility to respond to changing ocean conditions. A centralized scientific committee building on the UN Regular Process for the Second World Ocean Assessment, the work of the Intergovernmental Oceanographic Commission and CBD ecologically or biologically sensitive marine areas (EBSA) process could play a valuable role in coordinating scientific input and advice.

Regional management of human activities, including fisheries, will remain essential. What an implementing agreement will do, however, is to infuse cooperation and collaboration among the sectoral organizations such as RFMOs, based on a common purpose, shared principles and accountability to a wider global community. New sources of sustained and meaningful finance, dedicated programs for marine scientific research, monitoring, spatial planning, capacity building and technology transfer could secure effective implementation by sectoral and regional organizations through cooperation and collaboration.[9]

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[6] First Global Integrated Marine Assessment. The UN General Assembly in A/RES/66/231 has also recognized that "problems of ocean space are closely interrelated and need to be considered as a whole through an integrated, interdisciplinary and intersectoral approach."

[7] Mahon, R., L. Fanning, K. M. Gjerde, O. Young, M. Reid, S. Douglas, (2015). Transboundary Waters Assessment Programme (TWAP) Assessment of Governance Arrangements for the Ocean, Volume 2: Areas Beyond National Jurisdiction. IOC-UNESCO, Paris. IOC Technical Series, 119: 91 pp, at 29; available at: http://onesharedocean.org/public_store/publications/ts119Vol2_eo.pdf

[8] Mahon et al at 29

[9] Levin, L., Cheung, W. (2016) Climate Change in Oceans Beyond National Jurisdictions. Nippon Foundation Nereus Program Policy Brief, available at: http://www.nereusprogram.org/policy-brief-bbnj-climate-change/.

1.3. Value of the new agreement for regional fisheries management (RFMOs)

A healthy, resilient and productive ocean is an essential pillar for sustainable fisheries and the conservation of marine biodiversity. Yet there is a robust and growing body of evidence to suggest that fishing is one of the key drivers of biodiversity loss and ecological change in the open-ocean beyond national boundaries. As elaborated in Crespo & Dunn (2016),[10] there are numerous reasons for concern:

- There are much higher levels of overfishing and overfished stocks for straddling and migratory species in the open-ocean in ABNJ than in national waters, with twice the rate of overfished stocks or those experiencing overfishing than stocks within national jurisdictions;
- Bycatch in open-ocean fisheries and the indirect impacts of abandoned, lost or discarded fishing gear have been implicated in the severe decline of fish, sea turtle, shark, seabird and marine mammal populations;
- Open-ocean fisheries have been shown to reduce pelagic biodiversity and ecosystem resilience;
- Fisheries have altered trophic relationships in open-ocean communities, generating trophic cascades that can lead to ecosystem-level impacts and regime shifts; and
- The ecological impacts of open-ocean fisheries and climate change can act synergistically to induce profound transformations of ecosystem dynamics.

It has been 21 years since the UN Fish Stocks Agreement was adopted to provide the framework for fisheries management. The UN Fish Stocks Agreement identifies RFMOs as the mechanism by which States cooperate to manage global fish stocks based on ecosystem-based approaches and the precautionary approach. Such management, however, is still largely focused on addressing the development of comprehensive catch systems in a consensus environment. Despite recent progress as evidenced at the 2016 resumed Fish Stocks Agreement Review Conference and the Deep Sea Bottom Fisheries review workshop, it is widely acknowledged that more work needs to be done to improve sustainability and reduce biodiversity impacts.[11] Lack of resources and lack of political will are often cited as constraining factors.

While it is clear that the implementing agreement will not supplant the role of RFMOs in managing fisheries, an implementing agreement for biodiversity can offer many opportunities to complement and supplement RFMO capacities, functions and knowledge-base. This is particularly so with respect to biodiversity impacts, climate change and ecosystem-based management.

For example, some RFMOs utilize area-based management tools, however, these measures are limited to members; they cannot be imposed upon third-party operators and only cover one activity.[12] Fisheries closures and other area-based management tools may be undermined if potentially conflicting activities are allowed to take place there without appropriate controls. Closed areas free from other impacts may be essential for recovering fish stocks, enhancing ecosystem resilience and monitoring change. Current fisheries monitoring practices however will need to be supplemented and complemented with broader ecosystem monitoring, if we are to understand the many population, community and ecosystem-level impacts from fisheries or other activities that account for cumulative effects including from climate

[10] Crespo, G.O., Dunn, D. C. (2016) Impacts of fisheries on open-ocean ecosystems. http://www.nereusprogram.org/policy-brief-bbnj-impacts-of-fisheries / Nippon Foundation Nereus Program Policy Brief

[11] UNFSA review conference, UNGA deep sea bottom fisheries review workshop

[12] R. Barnes, The Proposed LOSC Implementation Agreement on Areas Beyond National Jurisdiction and Its Impact on International Fisheries Law**,** The International Journal of Marine and Coastal Law 31 (2016) 1–37 http://booksandjournals.brillonline.com/content/journals/10.1163/15718085-12341411 (open access through end of 2016)

change. Few, if any, RFMOs have either the budget or the capacity to provide ecosystem monitoring or the remit to address cumulative or ecosystem-level impacts caused by other sectors.

In addition, the UN Fish Stocks Agreement and some RFMO agreements address environmental impact assessments in general terms but specific terms for EIAs are only spelled out for deep sea bottom fisheries.[13] Moreover, RFMOs are limited in their ability to deliver strategic or integrated EIAs of fishing and other activities in ABNJ. Support for data gathering, monitoring and assessment is needed from a broader group of organizations that can feed into larger processes to understand cumulative impacts, and also to understand the impacts of many other uses of the ocean (both present uses and any future uses such as geo-engineering and off-shore aquaculture). Already new satellite tracking systems offer vast advances in monitoring the full range of activities in ABNJ.[14]

In this respect, a new implementing agreement could do much to advance and structure the conduct of strategic environmental assessments (SEAs). A globally and regionally coordinated approach to SEAs could reduce the burden on individual States or agencies responsible for conducting project-specific EIAs. This approach would however be contingent on ensuring that individual EIAs take account of the SEA.

Therefore, IUCN would like to focus on the many ways an implementing agreement can benefit and complement RFMO and other sectoral activities. As part of its cooperation and collaboration role, the implementing agreement could, among other things:

- Contain principles of general application for all States and institutions;
- Create more carefully structured as opposed to ad-hoc cooperation mechanisms;
- Provide the cohesiveness and ideally financial support to ensure that the relevant organizations sit down and work together;
- Provide the political support and visibility through global reporting requirements to improve performance;
- Facilitate protection of ecologically or biologically significant areas and vulnerable marine ecosystems through coordination in the establishment of MPAs and other ABMTs;
- Require EIAs for activities that may impact adversely fish stocks and their environment;
- Enable complementary protection measures in other sectors for spawning grounds and other important habitats for commercial fish species;
- Provide a means to develop no-take reference zones to enhance ecosystem stability;
- Establish baselines, and enable effective long term monitoring of change;
- Involve RFMOs and other stakeholders in establishment of MPAs and other area-based management tools;
- Focus efforts on ways to reduce biodiversity impacts through the preparation of sectoral biodiversity strategies and action plans; and
- Improve access to the best available scientific information to enhance decision-making including through:

[13] FAO, International Guidelines for the Management of Deep-sea Fisheries in the High Seas, 2009, http://www.fao.org/docrep/011/i0816t/i0816t00.htm

[14] Jablonicky, C., McCauley, D., Kroodsma, D., Boerder, K., Dunn, D. (2016) Satellite tracking to monitor area-based management tools and identify governance gaps in fisheries beyond national jurisdiction. Nippon Foundation Nereus Program Policy Brief, available at: http://www.nereusprogram.org/policy-brief-bbnj-global-fishing-watch/

- Enhancing cooperation and collaboration to make fisheries data and other relevant information available, including through EIAs and SEAs;
- Improving information on ways to decrease the likelihood of bycatch through, for example, improved information on species habitat preferences in space and over time;
- Gaining access to a scientific advisory body established pursuant to an implementing agreement;
- Increasing marine ecosystem monitoring, including through enhanced funding for initiatives such as the Global Ocean Observing System (GOOS) under UNESCO's Intergovernmental Oceanographic Commission (IOC) and further international scientific collaboration facilitated through a clearinghouse; and
- Establishing or developing existing scientific bodies to support regional ocean governance and providing a forum for integrated assessments.

1.4. Value of the new instrument: Lessons learned from the Sargasso Sea

The Sargasso Sea is located within the North Atlantic Subtropical Gyre, bounded on all sides by major ocean currents. Dominated by a community of floating *Sargassum* seaweed, the Sargasso Sea is rich in biodiversity and productivity, and a vital habitat for endemic and migratory species, including commercially important fish species. Since 2010, the Sargasso Sea Project – led by the government of Bermuda - has been working with a network of international partners to pursue better protection for this iconic ecosystem. The findings of the Sargasso Sea Project to date help to demonstrate that a new international legally binding instrument on the conservation and sustainable use of marine biodiversity in ABNJ building on UNCLOS is needed to enable a more holistic approach to ocean governance for the Sargasso Sea and other regions in ABNJ.[15]

What we have learned is that the lack of common principles, common criteria and common evidentiary standards for conservation measures has hindered broader efforts for comprehensive management. While the Sargasso Sea Project has succeeded in gaining wide-spread recognition for the Sargasso Sea's significance, the primary legally binding protective measure secured after six years of extensive work has been a closure of several seamounts to deep sea bottom fishing by the North-West Atlantic Fisheries Organization (NAFO). [16]

The concept, developed by the Convention on Biological Diversity (CBD) of the science-driven description of certain marine areas as "ecologically or biologically significant" (EBSAs) does in theory have the potential to act as a unifying concept, which each sectoral regime could recognise and utilise. Unfortunately, the early experience in relation to the Sargasso Sea is that — with the limited exceptions of NAFO and the Western Central Atlantic Fishery Commission (currently without management authority) — EBSAs have not as yet generated action within the various sectoral organisations.

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[15] D. Freestone and K. Gjerde, Lessons from the Sargasso Sea Challenges to the conservation and sustainable use of marine biodiversity beyond national jurisdiction, http://www.un.org/depts/los/biodiversity/prepcom_files/Sargasso_Sea_Commission_Lessons_Learned.pdf
For additional suggestions based on lessons learned through regional, transboundary and national initiatives, see Gjerde et al. 2016. Protecting Earth's last conservation frontier: scientific, management and legal priorities for MPAs beyond national boundaries, Aquatic Conserv: Mar. Freshw. Ecosyst. 26 (Suppl. 2): xx-xx (2016); DOI: 10.1002/aqc.2646 http://onlinelibrary.wiley.com/doi/10.1002/aqc.2646/epdf.

[16] Freestone and Gjerde.

Elements of the new treaty under discussion such as the reaffirmation of basic principles like the precautionary approach and ecosystem-based management as well as elaboration of mechanisms for area-based management tools including marine protected areas; environmental impact assessments and strategic environmental assessments, could provide vital means to safeguard this and other iconic ecosystems. Moreover, such regional initiatives would benefit from efforts to encourage collaborative research ventures, including with developing country partners, to enhance capacity, and grant easier access to marine technologies. Together this support would reap large benefits for the adjacent regional seas as well as the global community through continued ocean health, productivity and resilience.

To ensure the effective protection and management of ecologically and biologically significant areas such as the Sargasso Sea, the new instrument could include mechanisms to:

1. Identify and establish high seas protected areas which are legally opposable (*i.e.* applicable) to all, using agreed criteria and procedures;
2. Ensure application of common principles, criteria and evidentiary standards for sectoral management including ABMTs;
3. Require and review environmental impacts assessments of potentially damaging activities in ABNJ before they happen, and ensure management measures are in place to prevent significant harm;
4. Co-ordinate between various sectoral and regional bodies with competence over activities in ABNJ, to ensure they are formally aware of, and can have an input into, each other's decisions e.g., International Maritime Organization (IMO), RFMOs and International Seabed Authority (ISA) and regional seas organizations;
5. Provide more comprehensive coverage of all aspects of the marine ecosystems, which currently slip between the crack – e.g. high seas migratory routes and spawning areas of eels – which are not covered by RFMOs;
6. Facilitate collaboration initiatives in regions such as the Sargasso Sea through a funding mechanism; and
7. Co-ordinate and finance essential research on high sea ecosystems and human impacts.

2. Implications of climate change for conservation and sustainable use of marine biodiversity beyond national jurisdiction

2.1. Impacts and consequences of climate change for the ocean in ABNJ

The ocean has a critical role in moderating Earth's climate. 93% of the heat generated by carbon dioxide (CO_2) emissions, and 26% of the CO_2 itself, are absorbed by the ocean. The scale of ocean warming is staggering and at times hard to comprehend. According to a recent IUCN report, if the same amount of heat that has gone into the top 2000m of the ocean between 1955 and 2010 had gone into the lower 10km of the atmosphere, then the Earth would have seen a warming of 36°C.[17] This regulating function,

[17] Laffoley, D. & Baxter, J. M. (editors). 2016. EXPLAINING OCEAN WARMING: CAUSES, SCALE, EFFECTS AND CONSEQUENCES. Gland, Switzerland: IUCN. 456 pp. Executive Summary: https://portals.iucn.org/library/sites/library/files/documents/2016-046-Summ.pdf; Full report: https://portals.iucn.org/library/sites/library/files/documents/2016-046_0.pdf The report is a collaborative work of

however, is leading to profound alterations of the ocean's physics and chemistry manifested in ocean warming and acidification, which together are predicted to result in ocean deoxygenation, sea level rise, a slowdown of ocean circulation and changes in the structure of marine ecosystems and ocean primary production.[18] Such changes in the ocean are accelerating; leading scientists advise that changes in the ocean ecosystem are taking place 1.5 to 5 times faster than the changes that are taking place on land.

The ocean's service in mitigating the dangerous effects of climate change take place largely in the areas of the ocean beyond national boundaries which account for 64 % of the ocean's surface and 95% of its volume. This climate mitigation service is of enormous value, but is strongly altering open and deep ocean environments down to 4000 m and deeper. The projected consequences of these physical, chemical and biological changes for marine biodiversity include:[19]

- Loss of breeding grounds on land and at sea
- Impacts on breeding success
- Changes in foraging strategy
- Sex ratio shifts
- Seasonality shifts in plankton leading to mismatch in prey and predator occurrences
- Poleward movement of fish shifting from 10s to 100s of km per decade
- Species invasions and local extinctions
- Shifts in community structure
- Shifts in fishing grounds of target species
- Reduction in the physical size of species such as plankton in response to food and nutrient limitations
- Reduction in size of fish leading to reduced fecundity, altered trophic interactions and decreased fisheries yield
- Potential increases in bycatch when overlaps of distributions of target and non-target species increases
- Whole marine ecosystem shifts as species respond to shifting boundaries in ocean temperature and decoupling of community structure

These consequences will also stress existing management capacities and associated measures in the ocean. An effective and rapid response will require stronger efforts to collaborate and coordinate at a global level to monitor, anticipate and incorporate the impacts of climate change on ocean biodiversity in considering human activities to restore and enhance ocean resilience and biodiversity.

An implementing agreement is a platform that can achieve the effective framework for a global collaboration and coordination. While the UNFCCC is the overarching agreement on climate change, an implementing agreement focusing on the ocean in ABNJ will strengthen the goals of UNFCCC and synergistically target the impacts of climate change affecting marine biodiversity in ABNJ so that human activities can be effectively managed. Some suggestions are elaborated below.

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80 scientists from 12 countries published by IUCN in September 2016, and provides a comprehensive review on the ocean warming on species, ecosystems and on the benefits the ocean and its biodiversity provides to humans

[18] Laffoley, D. & Baxter, J. M. (editors). 2016. EXPLAINING OCEAN WARMING: CAUSES, SCALE, EFFECTS AND CONSEQUENCES, Executive Summary

[19] Laffoley, D. & Baxter, J. M. (editors). 2016. EXPLAINING OCEAN WARMING: CAUSES, SCALE, EFFECTS AND CONSEQUENCES, Executive Summary

2.2. Global cooperation in marine scientific research and monitoring

Global cooperation is essential to improve our ability to study, observe and understand ocean ecosystems in a more integrated fashion to underpin management and conservation action at all levels.

As documented in Laffoley and Baxter, vast change in the ecosystem is underway and will be locked in for many decades – there is an urgency to determine what risks such transformation holds for now and for the future so we can mitigate, plan and adapt accordingly. The work to accomplish such goal will entail re-evaluation on the risks that impacts from ocean warming and other stressors pose to humanity, to the viability of the species and ecosystems involved, and to the provisioning of goods and services we derive from them. [20]

There is a need to rapidly assess science, observation and modelling capacity for ABNJ and their needs in light of the widespread changes happening from ocean warming and other stressors imposed by human activities. Fundamental and massive gaps persist in our understanding that compromise our basic ability to understand and predict with any confidence as to what the changes already underway may mean to our wellbeing.

Global ocean observation systems and regional observations systems are also needed to better monitor the effects of climate change in addition to the basic monitoring of impacts, including cumulative and ecosystem level impacts. New tools are needed to record climate change's impacts in remote ocean areas. This scale of monitoring is beyond the capacity of any one country or individual sector to accomplish. Projections of the ocean's vulnerability to climate stressors and their effect on resilience are critical to effective spatial planning, strategic environmental assessment, environmental impact assessment, fisheries management, MPA designation and broader spatial planning. [21]

2.3. Incorporating climate change implications in area-based management tools (ABMTs)

There are various climate change implications on the ocean that could be incorporated in the assessment of ABMTs to ensure the effectiveness of the tools. Some elements for consideration include:

- The objectives for ABMTs, including MPAs could include the reduction of direct anthropogenic stressors to increase ecosystem resilience. Climate change can function as a physiological stressor that increases vulnerability to physical disturbance and reduces resilience.
- The design and planning of ABMTs, including MPAs, could incorporate existing climate change (including warming, deoxygenation, acidification) syntheses and projections into evaluation of vulnerability, need for protections, and resilience.
- The design of ABMTs, including MPAs, could recognize that climate change-related impacts can alter habitat suitability and representativeness, redistribute species and modify biodiversity and thus designs and management should ensure replication, adaptive protection of migratory corridors, and incorporate predicted habitat shifts.
- The MPA designation could include a comprehensive approach that includes consideration of climate change impacts on all vertical realms (seabed, seabed and near-bottom waters, seabed and midwater, seabed and entire water column, surface waters). [22]

[20] Laffoley, D. & Baxter, J. M. (editors). 2016. EXPLAINING OCEAN WARMING: CAUSES, SCALE, EFFECTS AND CONSEQUENCES, Executive Summary

[21] Levin and Cheung, 2016.

[22] Levin and Cheung, 2016.

2.4. Incorporating climate change implications in environmental impact assessments (EIAs) and strategic environmental assessments (SEAs)

EIAs are important tools in assessing the potential impacts of specific human activities within the context of the marine ecosystem where the activity is proposed. SEAs on the other hand, provide a broader assessment of potential impacts from various human activities within the context of the marine ecosystem which sets forth a plan for effective management of human activities. For both EIAs and SEAs, as part of the cumulative assessment on the marine ecosystem, climate change implications could be taken into consideration, a point already highlighted in the CBD's Revised Voluntary Guidelines for the Consideration of Biodiversity in Environmental Impact Assessments and Strategic Environmental Assessments in Marine and Coastal Areas.[23] Specifically, IUCN has the following suggestions:

- EIAs and SEAs could recognize that climate change may:
    - Vary biodiversity independent of other stressors;
    - Be a source of cumulative impacts; and
    - Compound anthropogenic disturbance-induced change (e.g. plumes generated from seabed mining may exacerbate climate-induced effects, including from ocean acidification).

For the above reasons, baseline analyses and assessments of single and cumulative impacts could include climate stressors. Where possible, baseline analyses and assessments could be based on information gathered from no-take marine reserves used as reference areas for management.

- The scope of EIAs could include:
    - assessment of vulnerability to climate stressors;
    - assessment of ecosystem services provided by the area of interest; and
    - potential impacts to ecosystem services.

- The scope of EIAs and SEAs could recognize that ecosystem services derive from multiple life stages, migrations, water or chemical movements, and other transboundary processes, and reflect the potential for cumulative impacts to these services by activities in widely separated areas.
- Triggering conditions and thresholds for carrying out EIAs and SEAs could include activities with the potential for significant adverse impacts, recognizing the increasingly vulnerable state of marine ecosystems and resources from climate induced changes, including from ocean acidification.
- Decision making processes related to EIAs and SEAs could ensure the protection of ecosystem services of deep-sea/high seas that may be altered by climate changes, including from ocean acidification. [24]

3. Capacity Building and Technology Transfer

3.1. Building a platform for capacity development

A new implementing agreement can provide an effective platform for enhancing collaboration and coordination for capacity building and technology transfer. At a minimum it can provide a platform

[23] UNEP/CBD/COP/11/23, Annex (2012)
[24] Levin and Cheung, 2016.

where initiatives can be tracked and coordinated so that various options for effective support can be easily navigated by developing countries and the needs easily identified by donors for planning purposes.

As noted in multiple interventions during the Second PrepCom, meaningful capacity building and technology transfer should be long term and meet the needs and goals of the recipient country for the conservation and sustainable use of marine areas and biodiversity beyond national jurisdiction. Due to the vast geographical scale and multitude of stakeholders involved, it is crucial to have participation and commitments from various stakeholders; not only from governments, but also from IGOs, NGOs, academia, the business sector and philanthropic organizations. Coordination and cooperation among these organizations, bringing in their competences, resources, and networks, will be essential for effective capacity development for the conservation and sustainable management of BBNJ.

During the Second PrepCom, several possible areas of convergence of views arose:

- Capacity building and transfer of technology are cross-cutting and vitally important to enable developing States to conserve and sustainably use marine biological diversity of ABNJ;
- Capacity building, including institutional capacity building, and transfer of marine technology should be responsive to national and regional needs, priorities and requests, with flexibility to adapt as needs and priorities change;
- The Intergovernmental Oceanographic Commission's (IOC) Criteria and guidelines on the Transfer of Marine Technology (IOC Criteria)[25] are useful as a guiding tool for further work on the transfer of marine technology in an international instrument; and
- Importance of the involvement of relevant stakeholders in capacity building and transfer of marine technology.

IUCN fully supports the above views. As agreed by many, there is great value and need in improving and expanding capacity building and technology transfer globally as those efforts can be leveraged to achieve conservation objectives of an implementing agreement through the effective participation of all States.

With respect to the applicable principles, capacity building and technology transfer are both important aspects of the principle of *common concern of humankind.* Capacity building and technology transfer also includes practical ways to implement the principle by focusing on the need for cooperation and collaboration to pursue the common interests of all in the conservation and sustainable use of marine biodiversity. This principle is also consistent with numerous sections in UNCLOS, for example, for capacity building, Articles 239, 242 and 244, on technology transfer, Article 266. UNCLOS Articles 202 and 203 also support scientific and technical assistance to developing States.

An implementing agreement will need to include a mechanism to identify the capacity building and technology transfer needs of developing countries. Monitoring data from the Sustainable Development Goal (SDG) indicators could be a valuable resource for obtaining data on the capacity building and technology transfer needs of developing countries. SDG 14.a specifically references the IOC Criteria as a tool. An implementing agreement could build on the IOC Criteria and or use it as a model to assess the capacity needs of developing countries. The data from SDG indicators could also be used to assess the needs at the local, national and regional levels for capacity building and marine technology transfer.

Capacity building should address needs related to all relevant natural and social sciences, both basic and applied, including oceanography, chemistry, marine biology, marine geospatial analysis, ocean

[25] *Available at,* http://unesdoc.unesco.org/images/0013/001391/139193m.pdf

economics, international relations, public administration and law. For example, a mechanism could be created to assist developing states in drafting legislation and associated regulatory, scientific and technical requirements on a national or regional level and to design institutions to enable them to effectively implement various components of an implementing agreement. This could include, but not be limited to, how to effectively conduct an environmental impact assessment or participate in a strategic environmental assessment.

Capacity development and technology transfer that are effective result from long-term commitments by the donor governments and organizations. An example of a successful long term effort led by DOALOS at the UN could provide a useful model. DOALOS has run a successful fellowship for advanced education and research in the field of ocean affairs and the law of the sea targeting government officials and other mid-level professionals from developing States, supported by the Nippon Foundation.[26] To avoid what is termed the "brain drain" of trained personnel from developing countries, a strong global professional alumni network could serve as an excellent pool of human resources, networking, mutual learning, and a foundation of international cooperation. For example, the Ocean Policy Research Institute, Sasakawa Peace Foundation (OPRI-SPF), for over 20 years, has been providing scholarships to master's students from developing countries at the World Maritime University and since its inception, over 550 scholarships have been provided. As part of such initiative, OPRI-SPF has created a network of professional alumni that tracks and fosters collaboration among the professionals so that the knowledge gained is effectively applied where it is needed in the developing countries.

3.2. Increasing access to technology

With respect to technology transfer, SDG 14 recognizes the need to "increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology." It goes on to refer specifically to the needs of developing countries, and in particular, small island developing States. Further, SDG 17.6 recommends implementation of technology facilitation mechanisms to implement this and other goals.

Part XIV of UNCLOS, which deals with the development and transfer of marine technology, relates to technology in a broad sense. As mentioned by others, Article 271 of UNCLOS provides for the development of guidelines for technology transfer. The IOC Criteria are an important contribution to implementation of this article. However, additional work may further the goals of technology transfer.[27] For example, describing in operational terms how the measures envisaged in the criteria can be implemented, including on the basis of past and current experiences, possibly organized in the form of an open access information system, may be beneficial.

Because technology facilitation should build on specific existing needs and resources, IUCN encourages undertaking an updated assessment of marine technology needs as we recognize that the last such assessment was done in the early 1990s. Such an assessment could also include what technology may be available to be transferred from developed countries. Such an updated assessment would benefit from the participation of public and private partners, including industry, and should take into account existing and proposed innovation efforts.

[26] http://www.un.org/depts/los/nippon/index.

[27] Harden-Davis, 2016, Marine science and technology transfer: Can the Intergovernmental Oceanographic Commission advance governance of areas beyond national jurisdiction? Marine Policy 74. 260-267.

Some of the technologies and mechanisms that could give support to advancing science and innovation in developing countries may be:

- IT infrastructure, that would allow advanced data analysis and storage of data;
- Access to AUVs and ROVs (deep submergence vehicles) fitted with high resolution cameras, which could be used to map extensive seafloor habitats & define megafaunal species distributions;
- Acoustic & sampling devices (e.g. multi-beam echo sounding, acoustic underwater positioning systems for deep-water mapping);
- High-resolution, large-scale and long-term data collection as well as sharing mechanisms;
- Molecular tools for high-resolution observation of microbes to larger invertebrates that would allow sequencing of DNA at sea and back on shore; and
- Innovative financial mechanisms for marine technologies.

Marine technology development at the public and private sector level has made significant progress in recent years. Facilitating access to various technologies across the international community could play a crucial role in delivering the aims of an implementing agreement. Drawing on the experience of the UNFCCC process and the Paris Agreement can be instructive in this context. The importance of technology transfer to achieve global goals and nationally determined contributions was recently affirmed at the recent UNFCCC COP22 in Marrakech, where Canada, Denmark, the European Union, Germany, Italy, Japan, the Republic of Korea, Switzerland and the US pledged to give over US$23 million to strengthen technology transfer in developing countries.

With respect to marine scientific research, an implementing agreement could establish a mechanism for enhancing the following, keeping in mind the importance of participation by scientists from developing countries:

- access to samples, data and knowledge, including the publication and sharing of scientific knowledge;
- collaboration and international cooperation in scientific research projects and programs, including south-south and triangular cooperation;
- scientific and training and access to resources, research infrastructure and technology;
- socio-economic benefits (e.g. research directed to priority needs such as health and security); and
- facilitating the involvement of public and private sectors and multi-stakeholder partnerships.

There are already numerous bilateral and multilateral capacity building and technology transfer initiatives with respect to marine scientific research that have been conducted or are underway. For example, the IOC has many initiatives underway, such as the Marine Biodiversity Observation Network led by the Group on Earth Observations, in partnership with the IOC; Capacity Building Strategy[28]; Regional Network of Training and Research Centres on Marine Science; International Oceanographic Data an Information Exchange (IODE) and IODE's Ocean Teacher Program. In addition to the IOC, various organizations have been contributing to the capacity building and technology transfer efforts. For example, the Islands and Oceans Network (IO-Net) was established at Small Island Developing States 2014 for organizations and individuals to voluntarily coordinate their efforts for better conservation and management of islands and their surrounding ocean areas.

[28] *See*, http://www.ioc-cd.org/

While there are already a multitude of ongoing initiatives, what is currently lacking is coordination and a focus on marine biodiversity in ABNJ. An implementing agreement could include a provision to support coordination and collaboration of existing and new initiatives, including but not be limited to the initiatives by IOC and other stakeholders. IOC could be given additional financial support or resources to play an important role in providing a structure for fostering coordination and collaboration and taking it steps further. The IOC could be charged with utilizing the Ocean Biogeographic Information System (OBIS) to develop an international meta-database or clearing house mechanism to facilitate an effective mechanism for accessing and exchanging information relevant to capacity building and technology transfer for the conservation and sustainable use of marine biodiversity in ABNJ.[29] Such meta-database or a clearing house mechanism can also be used to monitor needs, fulfillment of such needs to facilitate planning for future initiatives as well as foster projects and programs that are tailored to the needs at the local, national, and regional level. Taking into consideration such data, a meeting of the States Parties could be convened on a regular basis to assess the needs and to fill in the gaps using the funding discussed below.

3.3. Financial implications and options

For an implementing agreement to be effectively implemented in all the range of measures, be they area-based, EIAs, MGR etc., adequate funding will be crucial to give all States access to sufficient technical and scientific knowledge and tools to match their needs, but also to address global concerns. At the same time it should be recognized that protection of marine biodiversity in ABNJ has in itself an important economic value. By strengthening ocean ecosystem resilience, key ecosystem services such as carbon sequestration as well as provisioning and other services can be strengthened, delivering significant economic benefits for all.

In addition to traditional donor models such as multilateral institutions and funds, innovative financing will be needed to support international cooperation, development of technologies and collaborative research and thus should be key priority areas under the new agreement.

One example where all four initiatives (i.e. innovative financing, international cooperation, development of technologies and collaborative research) are needed to address global, regional and national needs would be the development of a global sensor infrastructure. Specifically, a global sensor infrastructure that augments existing ocean observing systems could support effective monitoring and deliver operational benefits to a broad group of ocean users and thus would be a key tool to fill knowledge gaps, allow for effective monitoring and enforcement and deliver operational benefits to a broad group of ocean users. Such an effort could not only serve to achieve the aims of an implementing agreement itself, but it could also provide a way to rapidly increase the transfer of marine technology to developing countries. For example, the investment needed could contribute to a sustainable marine monitoring infrastructure. It will require innovative financial mechanisms and partnerships with research, technology and other private and public entities but it has the potential to deliver a long term economic return, if structured appropriately. Such opportunities could be widely communicated to seek interest from various stakeholders, including the private sector.

New ocean sustainability finance tools could be an important part of the technology transfer framework. Delivering innovation, scalability and standardization though a “blue finance hub” as a knowledge, skills and project preparation center, for instance in the format of an “Ocean Sustainability Bank” could be an important tool to significantly increase marine technology impact. New initiatives such as the recently launched Coalition for Private Investment in Conservation could be taken into consideration when

[29] Harden-Davies, Marine Policy 74 (2016) 260-267.

developing further participation in the effort. Additional funding can be found by structuring blended financial instruments that allow both public and private participation.

Regional marine science centers, research institutions and universities could also play a key role in coordinating and conducting marine scientific research and enabling technology transfer. An implementing agreement could include a process to establish a multilateral fund to support regional scientific and technological centers with pooled global resources in order to enhance technology transfer efforts. Further voluntary payments could be made by ocean users, for instance taking into account their carbon footprints, as a means to support ocean conservation efforts.

To maintain a stable and sustainable level of funds to effectively finance an implementing agreement, there could be a mechanism to monitor the impacts of the capacity building and technology transfer programs with a periodic review to assess funding needs, and funding sources so that the recipient countries and regions' needs can be adequately met on a stable and long-term basis.

The above recommendations for funding will be more effectively implemented if they could be tracked and coordinated, similar to the capacity building and technology transfer initiatives. An implementing agreement can be the platform where such coordination and collaboration can be achieved.

4. Marine genetic resources

4.1. Principle

As discussed earlier in this paper, *common concern of humankind* is a principle that could be applied to access and benefit sharing of MGRs in ABNJ since the focus of an implementing agreement is on the sustainable use of the MGRs and utilization of the shared benefits for conservation of marine biodiversity in ABNJ.

MGRs from ABNJ are very valuable, both for the ecosystems of the ocean and for humanity, as "[t]he rich biological diversity of the deep-sea is a source of vast genetic and biochemical diversity with a range of potential applications, from advancing scientific knowledge to developing new commercial products."[30] Further, "[g]enetic resources play a growing role in various economic sectors…including: pharmaceuticals, agriculture, biotechnology, bioremediation, cosmetics, food, nutraceuticals, industrial processes and scientific research."[31]

4.2. Types of benefit sharing

Benefit sharing can be thought of as being of the monetary and non-monetary characteristics, though they are perhaps better thought of as a continuum.[32] Monetary benefits may include payments (i.e. up-front, milestone or royalties), fees (access, license or special), research funding, joint intellectual property rights ownership and patents are also a possibility.[33] To date, research that occurs in marine areas beyond national jurisdiction is limited for a number of reasons: the large costs ; limited number of

[30] Harden-Davies, H., 2016. Deep-sea genetic resources: New frontiers for science and stewardship in areas beyond national jurisdiction. Deep-Sea Research II. In press. http://www.sciencedirect.com.ezproxy.uow.edu.au/science?_ob=ArticleListURL&_method=list&_ArticleListID=-1101498659&_sort=r&_st=13&view=c&md5=e0bd7d59bdd7741435cf73c788addb22&searchtype=a.
[31] Id.
[32] http://www.un.org/depts/los/biodiversity/prepcom_files/WWF_BBNJ_Prep_Com1_2016.pdf.
[33] Harden-Davies, H., 2016. Deep-Sea Research II. In press.

vessels; and the need for expensive equipment. This is compounded further in respect of MGRs used for pharmaceutical purposes by the high cost, complex and lengthy biodiscovery research and development process.[34] Such challenges allow a very limited number of commercial successes for pharmaceutical products after decades of work and investments.[35] However, as discussed above, an increasing number of economic sectors may commercialize MGRs by incorporating them in their products. The cost and time associated with biodiscovery research and development will vary by the sector and the process of commercialization may take less time and investments than in the pharmaceutical sector.

Benefits, including monetary benefits, could be allocated to a fund for capacity building, including training, and technology transfer. There was a strong convergence of view as to such allocation during the last PrepCom. The specific allocation could ensure that the benefits are used for conservation and sustainable use of the ocean and marine biodiversity beyond national jurisdiction.

Non-monetary benefits may include: access to samples, data and knowledge, including the publication and sharing of scientific knowledge; collaboration and international cooperation in scientific research; capacity building and technology transfer including scientific training and access to resources, research infrastructure and technology; and other socio-economic benefits (e.g. research directed to priority needs such as health and security.[36] Most notably, benefits from MGR in ABNJ can be derived from each phase throughout a biodiscovery process, from collection of the MGR through the commercialization of a product because research and development inherently generates knowledge and opportunities to share data and samples, collaborate and to derive and share benefits.[37] Therefore, benefit sharing will bring near and long-term, effective benefits for scientific research, development and discovery for developing countries.

Benefits consist of knowledge and resources that are currently in much need, such as consistent, effective and long-term international collaboration and cooperation in scientific research and scientific training and access to resources research infrastructure and technology. The benefit sharing listed above is consistent with the implementation of the Sustainable Development Goals, in particular, SDG 14. Further, the above elements also support the implementation of the provisions of Parts XIII (marine scientific research) and XIV (technology transfer) of UNCLOS and reflect the goals of the Adis Ababa Action Agenda,[38] the Unite Nations General Assembly resolutions on law of the sea[39] and the Rio+ 20 document, "The Future We Want."[40]

Building in robust provisions in an implementing agreement for benefit sharing is key for fostering scientific research and development and significant benefits will be gained thereby.

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[34] Jaspars, M., et al., Journal of the Marine Biological Association of the United Kingdom, 2016, 96(1), 151–158.

[35] Martins et al. 2014. Marketed marine natural products in the pharmaceutical and cosmeceutical industries: tips for success. Marine Drugs. 12. 1066-1101.

[36] Harden-Davies, H., 2016. Deep-Sea Research II. In press at 3-4. See also, Nagoya Protocol at: https://www.cbd.int/abs/text/articles/default.shtml?sec=abs-37

[37] Harden-Davies at 4.

[38] http://www.un.org/esa/ffd/wp-content/uploads/2015/08/AAAA_Outcome.pdf

[39] http://www.un.org/depts/los/general_assembly/general_assembly_resolutions.htm

[40] http://www.un.org/disabilities/documents/rio20_outcome_document_complete.pdf

4.3. Operationalizing the principle

In terms of operationalizing the principle of *common concern of humankind*, the fair and equitable sharing of benefits could focus on facilitating marine scientific research to increase our understanding of biodiversity in ABNJ and to sustain the biodiscovery pipeline. To achieve such goals, providing a clear set of rules and giving legal certainty to users of MGRs is critical. For example, for monetary benefits, having clear requirements as to when, how and the amount of payment that would be required will help those who will make investment decisions. The highest level of compliance amongst users can be achieved not only by having a transparent scheme for accessing and utilizing MGRs, but also by having procedures consistent with the CBD.

To promote the involvement of users from developing countries, access to MGR from ABNJ could come with the condition of making the material and/or genetic information publicly available in open source databases, biorepositories and/or biobanks, thus contributing to the already existing common pools of genetic resources. Making data available will also maximize the potential for new discoveries by all participating scientists, benefitting all humankind and support technology transfer.[41] In addition to making data accessible, capacity building and technology transfer could be regarded as core components of fair and equitable benefit sharing so that scientists in developing countries have the means to conduct research and development. Such proposed approach can lead to greater transparency, availability of data and innovation.

Additional discussion on capacity building and technology transfer are available in section 4 of this brief.

4.4. Geographical and material scope of MGRs

MGRs do not observe legal geographical boundaries but instead, are or could be mobile where they could be attached to rocks at times or may be in the water column at different stages of their life cycle and they could also exist in areas within national jurisdiction. However, since the geographical scope of an implementing agreement is limited to the areas beyond national jurisdiction, the same geographical scope should apply to MGRs in the agreement. To clarify, for purposes of benefits, it should be noted that the geographical scope of MGRs in an implementing agreement would be for MGRs obtained or derived from and existing in both the Area and the high seas.

Further, as to the material scope, the MGRs could include both those that are *in situ* and *ex situ*. Including *ex situ* samples could be included in addition to *in-situ* samples. An implementing agreement could include a requirement for a set of procedures to be established for collection, transportation and storage (or a minimum metadata i.e. collection location, depth, temperature, etc.) which will promote a global standardization of procedures that would benefit all for a better global coordination, cooperation and collaboration.

Specifying the geographical and material scope of MGRs, in addition to the definition of MGRs, will help clarify what MGRs would be part of benefit sharing.

4.5. Definition of MGRs

As scientists are already familiar with the CBD in their practice, it may be sensible to start with similar definitions that are used in the CBD and adapt them for genetic resources in marine areas beyond national jurisdiction to reduce the chances of confusion or non-compliance.

[41] Harden-Davies, Marine Policy 74 (2016) 260-267.

IUCN proposes to use the definitions “genetic material” and “genetic resources” pursuant to Article 2 of CBD as the basis of the definition while specifying that such materials would be originating from the ocean:

“Marine genetic resources” means any marine genetic material of plant, animal, microbial or other origin, containing functional units of heredity, being of actual or potential value.

As stated by the US and others, a distinction should be made between fish used as a commodity and fish valued for their genetic properties. Inserting the word “genetic” before “material of plant, animal….” is intended to make such a distinction.

4.6. MGR data and information

There are three broad categories of information and within such categories, there are various types of data per category.

Categories	Categories of information	Explanation	Types of data
Category I	Data only	Raw data (e.g. genetic sequence data)	• Metadata associated with the samples (depth, location, temperature etc.) • Taxonomic analysis of the samples from metadata associated with the samples • Genetic sequence data (DNA) • Transcriptome data (RNA of the genes that are functional at that time) • Gene/transcriptome function annotations • Protein sequence data (DNA/RNA data translated to give amino acid sequence) • *Protein structure data* • *Metabolite data*
Category II	Data and analysis	Genetic sequence data which has been annotated with putative gene functions using an algorithm	• Taxonomic analysis of the samples from metadata associated with the samples • Gene/transcriptome function annotations • Protein sequence data (DNA/RNA data translated to give amino acid sequence) • *Protein structure data* • *Metabolite data*
Category III	Data, analysis and interpretation	Critical evaluation of the data and its analysis conducted by an expert	• Taxonomic analysis of the samples from metadata associated with the samples • *Protein structure data* • *Metabolite data*

Except for protein structure data and metabolite data (in italics), all other data in the chart above are freely available, accessible via the internet. Protein structure data could be proprietary, but in that case, it could also be shared on the protein databank after a time allowed to withhold the information if a fee is paid (i.e. embargo period) before the data becomes open access. Metabolite data may also be proprietary and it is often accessible via a fee, however, there are many free databases beginning to be available (e.g. ChemSpider[42]). Further, metabolite data is often shared, especially in publicly funded research.

It is important to consider the trend of increasing open access to scientific data in considering the definitions associated with MGRs. There are various initiatives already underway *via* different organizations, such as the Biobricks Foundation[43], Open Source Drug Discovery[44] and Biological Innovation for Open Society[45] and it is expected that such global open access of scientific data is likely to accelerate in the future. Further, almost all genetic sequence data (GSD) are available through open access gene banks. Moreover, GSD cannot be patented, and thus cannot be held as proprietary. It is a common practice of biological scientific community to make the data available without restrictions as soon as it is sequenced as the information is considered as benefitting all humankind.

What an implementing agreement can do to is to expand the scope of the data and information that will be shared globally. Most importantly, an implementing agreement can create a platform where various data/information exchange initiatives can be organized and tracked in a way that will be easy to navigate. Finally, an implementing agreement can create a platform for various organizations to cooperate and collaborate for better sharing of data/information that will lead to scientific innovation around the world.

4.7. Definition of "utilization of MGRs"

As was discussed for the definition of MGRs, it is sensible to start with similar definitions that are used in the CBD and adapt them for genetic resources in marine areas beyond national jurisdiction to reduce the chances of confusion or non-compliance. Therefore, IUCN proposes the following definition for sharing data and information of MGRs via the following definition:

"Utilization of Marine Genetic Resources" means to conduct research and development on the genetic and/or biochemical composition of Marine Genetic Resources, including through the application of biotechnology.[46]

[42] http://www.chemspider.com
[43] https://biobricks.org
[44] http://www.osdd.net
[45] http://www.bios.net/daisy/bios/home.html
[46] The Nagoya Protocol provides the following additional definitions:
(d) "Biotechnology" as defined in Article 2 of the Convention means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use;
(e) "Derivative" means a naturally occurring biochemical compound resulting from the genetic expression or metabolism of biological or genetic resources, even if it does not contain functional units of heredity.

IUCN believes that for benefit sharing to be meaningful, “genetic and/or biochemical composition” in this definition includes all the data/information described in the above chart (*see* section 5.6) as Category I as well as Category II[47] with a periodic review for broadening the category of data/information to be part of benefit sharing.

[47] Data and/or information that is deemed to be proprietary may be withheld from disclosure for a specified time for a fee.

Annex: IUCN resolutions relevant to marine biodiversity conservation adopted at the IUCN World Conservation Congress (1-10 September 2016, Honolulu, Hawaii)

At the IUCN World Conservation Congress in September, 2016, multiple sessions explored the topic of the high seas and two major motions elaborated on goals and expectations of IUCN members for outcomes over the next few years. Below are some of the adopted motions that are relevant to ocean conservation.[48]

Increasing marine protected area coverage for effective marine biodiversity conservation (https://portals.iucn.org/congress/motion/053)

"…2. ENCOURAGES IUCN State and Government Agency Members to designate and implement at least 30% of each marine habitat in a network of highly protected MPAs and other effective area-based conservation measures, with the ultimate aim of creating a fully sustainable ocean at least 30% of which has no extractive activities, subject to the rights of indigenous peoples and local communities"

Advancing conservation and sustainable use of biological diversity in areas beyond national jurisdiction (https://portals.iucn.org/congress/motion/049)

> "1. … URGES Member States to include the following measures in their recommendations to the General Assembly: a. the rapid identification, designation and effective management of an ecologically representative and well-connected system of MPAs, including reserves, in ABNJ;"
>
> "2. ENCOURAGES Members to support science-based processes that allow for the establishment of an ecologically representative and well-connected system of MPAs including reserves as an element of the new agreement;"

Take greater account of the ocean in the climate regime (https://portals.iucn.org/congress/motion/061)

> "b. recognise the role that marine protected areas play in both climate change mitigation and adaptation, and the importance of preserving marine and coastal ecosystems from climate change by promoting the establishment of coherent, resilient, ecologically connected, and efficiently managed networks of protected marine areas."

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[48] Other relevant motions adopted at the IUCN Congress include:
Achieving representative systems of protected areas in Antarctica and the Southern Ocean (https://portals.iucn.org/congress/motion/031)
Cooperation for the conservation and protection of coral reefs worldwide (https://portals.iucn.org/congress/motion/050)
Monitoring and management of unselective, unsustainable and unmonitored (UUU) fisheries (https://portals.iucn.org/congress/motion/018)
"CALLS ON coastal and fishing States, and economic integration entities and other authorities and Regional Fisheries Management Organisations to: …(b) integrate marine biodiversity and ecosystem considerations into national and regional regulation of fishing activities and to take precautionary action to protect the environment, vulnerable marine ecosystems and ecosystem functioning;"