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Introduction

Since its introduction in the international law discourse, the notion of human security had the merit to emphasise that security has not only a military dimension, but also economic, environmental and health components. In this last regard, health security has become a main concern of the international community, in the aftermath of the spread of new and potentially pandemic infections, as it is the case for COVID-19. Scientific advancement made it possible to understand that, due to their peculiar genetic features, some mostly unknown deep-sea species of Areas beyond national jurisdiction (ABNJ) could be of an interest in the treatment of new and old diseases. Specific relevance is attached to marine genetic resources (MGRs) of the deep seabed and the adjacent water column for their ability to survive in extreme conditions. Their protection from anthropogenic threats has long been discussed and gaps have been identified in both their conservation and sustainable use.

After some introductory remarks concerning the deep-sea ecosystems and the symbiotic relations between MGRs and minerals of the seabed, this paper will focus on the normative implications of the regulation of MGRs in ABNJ by analysing the legal frameworks of the Convention on Biological Diversity (CBD)[1] and the United Nations Convention on the Law of the

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[1] Convention on Biological Diversity, concluded on 5 June 1992 and entered into force on 29 December 1993, 1760 U.N.T.S. 79 (CBD).

Sea (UNCLOS or the Convention).[2] In the light of the legal *lacuna* in such agreements, the United Nations (UN) General Assembly invited States to conclude a new international legally binding instrument under the UNCLOS on marine biological diversity of ABNJ, ie the Biodiversity Beyond Nation Jurisdiction or BBNJ treaty.

Building on existing advanced proposals, this contribution will analyse, in its second part, the possible role of the International Seabed Authority (ISA or the Authority) in the regulation of MGRs. Although it is clear from the outset that the Authority is mainly and foremost the organization through which State Parties organise and control their activities related to the minerals of the seabed, article 143 and 145 of the UNCLOS could be used by the ISA to also oversee *all* MGRs. Having focused on the measures adopted by the ISA to this end, the paper will argue that an ecosystem-friendly and holistic approach to the governance of MGRs represents the best option in the interest of the biological integrity and human security. Bearing in mind that bioprospection could be regarded as a form of marine scientific research (MSR) and since the Authority has also competences in this field, the implications of the possible extension of the ISA mandate to MGRs are explored.

1. Regulating marine genetic resources in ABNJ: Normative implications

1.1.The protection and conservation of marine genetic resources for human security

1.1.1. 'The shifting and bridging' concept of security

The concept and content of security have consistently evolved over time. In ancient eras, security was mainly perceived as having an individual dimension. By contrast, since the XIX century, for historical reasons, it was enriched by a collective facet and understood from a State-centric perspective having basically military connotations.[3] As a 'bridging and shifting concept',[4] it was only in 1994 that the expression 'human security' entered the international law discourse through the Human Development Report of the UN Development Programme. Having recognised that 'the search for human security lies in development, not in arms',[5] in the 2005 follow up to the outcome of the Millennium Summit, the Secretary General of the UN clarified that 'the threats to peace and security in the twenty-first century include not just international war and conflict. [...] They also include poverty, deadly infectious disease and environmental degradation. [...] All of these threats can cause death or lessen life chances on a large scale. All of them can undermine States as the basic unit of the international system'.[6]

However, it was only in 2012 that the notion of human security was finally acknowledged and introduced in the language of the UN General Assembly for its 'people-centred, comprehensive,

[2] United Nations Convention on the Law of the Sea, concluded on 10 December 1982 and entered into force on 6 November 1994, 1833 U.N.T.S. 397 (UNCLOS).

[3] See, in this regard, ROTHSCHILD E., *What Is Security?*, in 'Daedalus – Journal of the American Association for the Advancement of Science', Vol. 124, 1995, pp. 53-98.

[4] GLASIUS M., *Human Security from Paradigm Shift to Operationalization: Job Description for a Human Security Worker*, in 'Security Dialogue', Vol. 39, 2008, pp. 31-54. See, in general, ANDERSEN-RODGERS D., CRAWFORD K., *Human security: Theory and Action*, Lanham, 2018.

[5] United Nations Development Programme, *Human development Report 1994*, 16 March 1994, available at http://www.hdr.undp.org/en/content/human-development-report-1994.

[6] United Nations General Assembly, *In larger freedom: towards development, security and human rights for all. Report of the Secretary-General*, 21 March 2005, A/59/2005, para 78.

context-specific and prevention-oriented' character.[7] After wide integration into national policy instruments, the concept admittedly represented a reference for the elaboration and adoption of the 2015 Sustainable Development Goals,[8] particularly for what concerns global health and the promotion of well-being. In roughly three decades, security extended beyond the boundaries of defensive or aggressive military strategy of States and acquired several dimensions, including *inter alia* human economic development and health.

I.1.2. From the 'cold desert' to thriving biodiversity: The deep-sea ecosystems

In the last few months, health security has notably come to the fore. This is part of a recent but continuous trend, by which the emergence and spread of diseases, often in form of epidemics like COVID-19, is increasing at an unprecedented rate with tremendous consequences for people's health and economy.

In a bid to discover and study unknown organisms whose genetic information could reveal helpful for combating new and old diseases, scientific research has focused on some of the rarest and inaccessible regions of our planet, like the deep seabed in ABNJ.[9] A prominent position in this respect has been attributed to oceans since, as a matter of facts, they host higher biodiversity range if compared to the land, which also means wider chemical diversity. While human beings are mainly interested in marine life which can be harvested and eaten, it is evident that such living resources could not exist without complex marine habitats consisting of organisms that belong to webs of life and intricate ecosystems, up to a depth of more than 10 km.

The commercial and industrial interest for MGRs was already apparent at the very beginning of the new millennium when more than 60 patents had been issued for the pharmaceutical industry.[10] This was further confirmed in 2005 by a note of the Executive Secretary to the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) created under the CBD, which relied on the existence of marine biology departments in the major pharmaceutical firms to draw the conclusion that bioprospection activities, i.e. the taking of samples of genetic with possibly valuable commercial information or for further research, would reveal promising to fight certain diseases.[11] The Secretariat was certainly right if one takes into account the recent discoveries in the treatment of COVID-19. Indeed, everyone has lately become familiar with the RNA polymerase inhibitor called *Remdesivir*, already used for diseases like Ebola, SARS and MERS and apparently useful in the current pandemic. This drug has, in effect, been developed from a marine sponge, *Tectitethya crypta*, found in the sea across the Caribbean.[12]

Among the various ecosystems of the deep sea, hydrothermal vents, which have first been discovered in the second half of the 1970s and that are widespread beyond national jurisdiction

[7] United Nations General Assembly, *Follow-up to paragraph 143 on human security of the 2005 World Summit Outcome*, 25 October 2012, A/RES/66/290, para 3.

[8] United Nations General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October 2015, A/RES/70/1.

[9] HADDOCK S., CHOY C., *Treasure and Turmoil in the Deep Sea*, The New York Times, 14 August 2020, available at https://www.nytimes.com/2020/08/14/opinion/deep-ocean-mining-pollution.html.

[10] PROELSS A., *Marine Genetic Resources under UNCLOS and the CBD*, in 'German yearbook of International Law', Vol. 51, 2008, p. 419.

[11] Convention on Biological Diversity, Subsidiary Body on Scientific, Technical and Technological Advice, *Status and trends of, and threats to, deep seabed genetic resources beyond national jurisdiction, and identification of technical options for their conservation and sustainable use*, 22 July 2005, UNEP/CBD/SBSTTA/11/11, paras. 21-2.

[12] See *Bioprospecting in Practice: How a drug goes from the ocean to the clinic*, DSM Observer, available at http://dsmobserver.com/2020/07/bioprospecting-in-practice-how-a-drug-goes-from-the-ocean-to-the-clinic/.

in the Pacific Ocean,[13] are by large home of genetic resources of scientific interest and certainly the best example of symbiotic relationship between MGRs and mineral resources, of whose growth they are mutually responsible.

In these very extreme habitats, life is sustained by consortia of bacteria which harvest chemical energy from the minerals and chemical compounds in order to release sugar and sulphur (chemosynthesis).[14] The abundance of sulphur in the environment allows animal life through sulphides-oxidizing bacteria, to such an extent that hydrothermal vents are believed to support one of the highest levels of biodiversity on Earth.[15] At the same time, such chemical conditions are also favourable for the deposition of metals on the seabed, in the form of polymetallic sulphides, whose exploitation is regulated by the International Seabed Authority (ISA or the Authority).[16]

From a legal perspective, despite most of the scientific development of new drugs takes place onshore, in laboratories, with some capable of synthetically reproduce the chemical properties of MGRs, it is in such inaccessible places that they are collected for further study and it is their location in the ocean which potentially determines the applicable legal framework.

I.1.3. Bioprospecting for human health: the need to protect and conserve marine genetic resources

The growing importance attributed to MGRs located in ABNJ demands a common effort to preserve them and their related ecosystems. The two most immediate anthropogenic threats to MGRs of the hydrothermal vents are bioprospection and mining of polymetallic sulphides deposits associated to vent systems.[17] As for the latter, because of the symbiotic nature of MGRs and such minerals, and considering the broad environmental mandate attributed to the ISA, some sets of regulations, standards and guidelines are under development to ensure that, at the exploitation phase, environmental damages to hydrothermal flora and fauna are minimized.[18]

As far as bioprospecting is concerned, the collection of large quantities of certain MGRs could be required for meaningful scientific research, with the consequence of getting back several times to the same hydrothermal site. Notwithstanding the adoption of voluntary codes of conduct by scientists involved in these activities,[19] uncontrolled exploitation of such resources

[13] CORLISS J. B., DYMOND J., GORDON L. I., EDMOND J. M., VON HERZEN J. R., BALLARD R. D., GREEN K., WILLIAMS D., BAINBRIDGE A., CRANE K., VAN ANDEL T. H., *Submarine thermal springs on the Galapagos Rift*, in 'Science', Vol. 203, 1979, pp. 1073-83.

[14] ROVERE M., *The Common Heritage applied to the resources of the seabed. Lessons learnt from the exploration of deep-sea minerals and comparison to marine genetic resources*, in 'Maritime Safety and Security Law', Vol. 5, 2018, p. 82.

[15] LEARY D. K., *International Law and the Genetic Resources of the Deep Sea*, Leiden, 2007, p. 16.

[16] International Seabed Authority Assembly, *Decision of the Assembly of the International Seabed Authority relating to the regulations on prospecting and exploration for polymetallic sulphides in the Area*, 15 November 2010, ISBA/16/A/12/Rev.1.

[17] Convention on Biological Diversity, Subsidiary Body on Scientific, Technical and Technological Advice, *Status and trends of, and threats to, deep seabed genetic resources beyond national jurisdiction, and identification of technical options for their conservation and sustainable use*, 22 July 2005, UNEP/CBD/SBSTTA/11/11, para 31.

[18] See *infra* and, in general, JAECKEL A. L., *The international Seabed Authority and the Precautionary Principle: Balancing Deep Seabed Mining and Marine Environmental Protection*, Leiden, 2017, pp. 11-3; and LEVIN L., AMON D., LILY H., *Challenges to the sustainability of Deep Seabed Mining*, in 'Nature', available at https://www.nature.com/articles/s41893-0200558x.epdf?sharing_token=b25mKXYK8gl6FfsgegE_MdRgN0jAjWel9jnR3ZoTv0PcmKXz3lXnzAJj_ym-Gh5xjmyo1VsVsfohJGyf32dnAIpP5QvDD36Q7Z39ErIN93KmTAOs5M8drOdhd7jMGsBGAZVGLNPDKJ0eKnMOTM4Q3YZm_jjf3DPE6XIbvm21Nc%3D.

[19] The InterRidge Code of Conduct for the Scientific Study of Marine Hydrothermal Vent Sites is available at http://www.interridge.org/IRStatement.

could well pose threats to their conservation and sustainable use, which need to be internationally regulated to ensure the widest possible commitment.[20]

In a seminal article in 1996, Glowka was the first to highlight that a clear-cut legal framework applicable to MGRs is lacking. He labelled as the deepest of ironies that the international community spent many years in defining norms for minerals of ABNJ – which so far have not been exploited – while the most immediately lucrative source of profit, i.e. MGRs, remains to be properly regulated.[21] It is only recently that the international community has engaged in negotiations on the topic, and so far different approaches and solutions have been explored, with some guidance also provided by existing treaties. While some outcomes seem more desirable than others, the pole star to follow is an ecosystem and integrated approach, which could ensure the effective governance of MGRs in marine ABNJ, irrespective of their location in the vertical spaces identified under the UNCLOS.

I.2. Addressing marine genetic resources through the existing legal framework: a legal *lacuna*

I.2.1. The legal framework of the Convention on Biodiversity

When considering the development of an adequate legal framework for MGRs, it is worth starting from the existing agreements concerning marine ABNJ, whose governance appears fragmented and manifold. Apart from the UNCLOS which sets an overarching regulatory framework, the most relevant treaties can be divided in two main categories: sectoral and conservation oriented.[22] While the former deal with specific marine issues, such as the Protocol to the International Convention for the Prevention of Pollution from Ships,[23] the latter include global arrangements such as the CBD, that introduced the protection of biodiversity in modern international law and that, together with the UNCLOS, is of particular relevance in this context.

Both the CBD and the UNCLOS take an anthropocentric perspective in allowing certain types of activities related to living and non-living resources of the sea, but with different implications embedded in their scope. In fact, it is commonly held that the CBD is oriented towards the conservation of biodiversity for the future generations, whilst the UNCLOS is more short-term and resources-oriented.[24] The different philosophy underpinning the two legal instruments is evident. In fact, the former relies on the so-called ecosystem approach which, referred to in Principle 7 of the Rio Declaration,[25] is based on the assumption that oceans and their resources constitute ecological units. This entails that it would not be conceivable to protect certain species and ensure their long-term sustainability without providing for the conservation of the entire ecosystem of which they are part. On the assumption that the ecosystem approach 'strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties of

[20] GLOWKA L., *Putting marine scientific research on a sustainable footing at hydrothermal vents*, in 'Marine Policy', Vol. 27, 2003, pp. 303-12.

[21] GLOWKA L., *The Deepest of Ironies: Genetic Resources, Marine Scientific Research, and the Are*a, in 'Ocean Yearbook Online', Vol. 12, 1996, pp. 154-6.

[22] ARDRON J. A., RAYFUSE R., GJERDE K., WARNER R., *The sustainable use and conservation of biodiversity in ABNJ_ What can be achieved using existing international agreements*?, in 'Marine policy', Vol. 49, 2014, p. 99.

[23] Protocol to the International Convention for the Prevention of Pollution from Ships, concluded on 17 February 1978 and entered into force on 2 October 1983, 1340 U.N.T.S. 61.

[24] WOLFRUM R., MATZ N., *Interplay of the United Nations Convention on the Law of the Sea and the Convention on Biodiversity*, in 'The Max Planck Yearbook of United Nations Law', Vol. 4, 2000, pp. 207-10.

[25] United Nations Conference on Environment and Development, *Rio Declaration on Environment and Development*, 14 June 1992, A/CONF.151/26, Annex I, Principle 7. See MARCHISIO S., *Il diritto internazionale dell'ambiente*, in CORDINI G., MARCHISIO S., FOIS P. (dir.), *Diritto ambientale: profili internazionali, europei e comparati*, Torino, 2017, p 18.

biotic, abiotic and human components of ecosystems and their interactions',[26] it foresees the overcoming of traditional management schemes, mainly focused on specific living resources. Indeed, its core features lie in the acknowledgment of the dynamic biological processes, including the interaction among different species, and in the relevance of non-living resources of certain habitats. As a matter of facts, the ecosystem approach attaches to biodiversity an intrinsic value, which counters the commercial and economic significance commonly attributed to living resources.

On the contrary, as far as the UNCLOS is concerned, many of its provisions refer to the maximum sustainable yield (MSY) of marine living resources.[27] This approach focuses on the maximum catch of certain species over a period of time, so that stocks are exploited at a level which ensures a natural rate of increase. As clarified under article 119 (1) (a) of the Convention, the MSY approach entails that States use the best scientific evidence available to 'maintain or restore population of harvested species' and to promote the optimum utilisation of the resources. As a management tool focused on single species, the MSY does not consider the interrelations between living resources of the same or connected ecosystems at all, which is instead particularly relevant when protecting the most vulnerable and unknown. Indeed, despite article 119 (1) (b) requires that conservation measures are applied for the protection of associated species, they only amount to a small part of all the living organisms of a certain marine ecosystem. As a consequence, even when complying with the conventional provisions on non-target organisms, there is no guarantee that a given ecosystem could nonetheless be affected.[28]

Based on the assumption that protection goals shall not limit to harvested species but shall encompass all living resources and their interdependence,[29] the CBD reiterates the ecosystem approach especially in those provisions aiming at conserving, rehabilitating and restoring natural habitats. The general aims of the CBD are illustrated in its Article 1 and there are: the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. As far as MGRs are concerned, the CBD also provides some relevant definitions. In particular, since biological diversity means the 'variability among living organisms from all sources'[30] including diversity within species, between species and of ecosystems, genetic resources account for one of three level of biodiversity protected under the CBD, and precisely the diversity within species: they are defined as 'genetic material of actual or potential value'.[31]

The negotiations leading to the conclusion of the CBD mostly focused on terrestrial biodiversity, with marine biological issues being introduced later on in the debate,[32] so that a significant change of course was imposed during the second session of the Conference of the Parties (COP): with the so-called Jakarta Mandate on Marine and Coastal Biological Diversity,[33]

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[26] Food and Agriculture Organisation, *The Ecosystem Approach to Fisheries*, Technical Paper 443, Rome, 2003, p. 6.

[27] However, the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, concluded on 4 August 1995 and entered into force on 11 December 2001, 2167 U.N.T.S. 3 acknowledges the ecosystem approach among its general principles.

[28] RENGIFO A., *Protection of Marine Biodiversity: a New Generation of Fisheries Agreement*, in 'Review of European, Comparative and International Environmental Law, Vol. 6, 1997, pp. 313-21.

[29] See, in this regard, Convention on Biological Diversity, Conference of the Parties, *Strategic Plan for Biodiversity*, 29 October 2010, UNEP/CBD/COP/DEC/X/2.

[30] CBD, Article 2.

[31] Ivi.

[32] See VERHOOSEL G., *Prospecting for Marine and Coastal Biodiversity: International Law in Deep Water*, in 'International Journal of Marine and Coastal Law', Vol. 113, 1998, pp. 91-104.

[33] Convention on Biological Diversity, Conference of the Parties, *Ministerial Statement on the implementation of the Convention on Biological Diversity*, 6-17 November 1995, available at https://www.cbd.int/doc/publications/jm-brochure-en.pdf.

the COP and the SBSTTA explored conservation issues related to the marine biodiversity, including MGRs of the deep-sea.

In this respect, article 4 of the CBD draws a distinction between those MGRs found in areas within and beyond national jurisdiction.[34] Indeed, if under the sovereignty of its Parties the CBD applies to all components of biological diversity, in ABNJ the scope of application is limited to processes and activities carried out under the jurisdiction and control of States. This approach could appear *prima facie* conflictual with the overarching ecosystem strategy pursued by the same CBD. In fact, the protection of the biodiversity of marine ecosystems in ABNJ cannot certainly depend on the single process carried out under the jurisdiction of a State, but should instead be dealt with in a manner which takes into account the whole range and scale of activities in a certain area, as well as their cumulative impact on biological components. However, it shall be noticed that the distinction operated by the CBD is in line with the applicable law on territorial sovereignty, particularly with respect to the law of the sea. Indeed, since under the UNCLOS and customary international law no State enjoys territorial jurisdiction in ABNJ, the CBD could not subject such areas to the same measures on conservation and sustainable use, as well as monitoring, access and exchange of information that States are required to adopt and implement in their territory.[35] This is further clarified under article 22 (2) of the CBD according to which 'Contracting Parties shall implement this Convention with respect to the marine environment consistently with the rights and obligations of States under the law of the sea'.

The limit set in article 22 did not prevent the Contracting Parties to contribute, to a certain extent, to the protection of MGRs in ABNJ. A decisive turning point in this regard was the study circulated during the eight meeting of the SBSTTA and conducted by the CBD Secretariat.[36] It focused on the interplay between the CBD and the UNCLOS with respect to the conservation and sustainable use of MGRs of the deep-seabed.[37] On the assumption that the regulations of the ISA could be a model to develop clear and enduring rules relating to bioprospection in the Area,[38], the SBSTTA, lacking a clear obligation in this respect, considered recommending 'Parties and other States to cooperate within the framework of the International Seabed Authority with respect to measures necessary for the conservation and sustainable use of genetic resources'.[39]

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[34] Article 4 of the CBD states that 'Subject to the rights of other States, and except as otherwise expressly provided in this Convention, the provisions of this Convention apply, in relation to each Contracting Party: (a) In the case of components of biological diversity, in areas within the limits of its national jurisdiction; and (b) In the case of processes and activities, regardless of where their effects occur, carried out under its jurisdiction or control, within the area of its national jurisdiction or beyond the limits of national jurisdiction.'

[35] Some authors have indeed considered the distinction operated under article 4 of the CBD arbitrary. See GLOWKA L., BURHENNE-GUILMIN F., SYNGE H., *A guide to the Convention on Biological Diversity*, in 'Environmental Policy and Law Papers', No. 30, 1994, p. 27, available at https://portals.iucn.org/library/sites/library/files/documents/EPLP-no.030.pdf

[36] The study was undertaken under the terms of reference of Convention on Biological Diversity, Conference of the Parties, *Conservation and Sustainable Use of Marine and Coastal Biological Diversity*, 6-17 November 1995, UNEP/CBD/COP/DEC/II/10, para 12.

[37] Convention on Biological Diversity, Subsidiary Body on Scientific, Technical and Technological Advice, *Study on the relationship between the Convention on Biological Diversity and the United Nations Convention on the Law of the Sea with regard to the conservation and sustainable use of genetic resources on the deep seabed*, 22 February 2003, UNEP/CBD/SBSTTA/8/INF/3/Rev.1.

[38] Ibidem, para. 59.

[39] Convention on Biological Diversity, Subsidiary Body on Scientific, Technical and Technological Advice, *Conservation and sustainable use of deep seabed genetic resources beyond national jurisdiction: study of the relationship between the Convention on Biological Diversity and the United Nations Convention on the Law of the Sea*, 20 February 2003, UNEP/CBD/SBSTTA/8/9/Add.3/Rev.1.

Building on the consultations held at COP-7 during which State Parties agreed on the need to strengthen international cooperation,[40] the status of MGRs in ABNJ was discussed at length in the course of COP-9. Notwithstanding opposing arguments, [41] the COP converged on setting criteria for the identification of Ecologically or Biologically Significant Areas (EBSAs) needing protection in both areas within and beyond national jurisdiction, including open ocean waters and deep-sea habitats. They are selected in the light of, *inter alia*, their uniqueness or rarity, the presence of vulnerable, fragile or sensitive ecosystems, biological diversity and naturalness.[42] Through a systematic analysis of the relevant marine areas, the EBSA process, with more than 150 'described' areas, is increasingly advancing knowledge on some of the rarest ecological areas on Earth. However, although a number of EBSAs has been identified in ABNJ, particularly along the oceanic fracture zones where hydrothermal vents strive, the CBD lacks authority to autonomously create and enforce marine protected areas (MPA) and to restrict their use.

As a result, while the CBD provides an effective framework for the protection and conservation of MGRs within national jurisdiction, the provisions directly applicable to those in ABNJ are limited. Apart from the use of a precautionary approach as generally recalled in the preamble, article 3 and 5 are of a relevance. In particular, article 3 includes among the principles on which the CBD is framed the prevention of any transboundary damage also in ABNJ, when States conduct activities under their jurisdiction and control.[43] To this end, article 14 imposes on every State the obligation to introduce appropriate procedures on environmental impact assessments (EIAs) for projects conducted under the jurisdiction and control of a State and having adverse effects on the biological diversity.[44] Although such EIAs would strongly benefit from shared standards and practices when conducted in ABNJ, to date only voluntary guidelines have been developed.[45] As for article 5, it establishes a general obligation on States to cooperate, as possible and appropriate, with other Parties on matters of mutual interest for the

[40] Convention on Biological Diversity, Conference of the Parties, *Review of the programme of work on marine and coastal biodiversity*, 13 April 2004, UNEP/CBD/COP/DEC/VII/5.

[41] PROELSS A., *supra note 10,* p. 434; and see also WYSSBROD V., *L'exploitation des ressources génétiques marines hors juridiction nationale*, Leiden, 2018, pp. 88-91.

[42] Convention on Biological Diversity, Conference of the Parties, *Marine and Coastal Biodiversity*, 9 October 2008, UNEP/CBD/COP/DEC/IX/20.

[43] CBD, article 3 reads: 'States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction'.

[44] CBD, article 14 (1) reads: 'Each Contracting Party, as far as possible and as appropriate, shall:
(a) Introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects and, where appropriate, allow for public participation in such procedures;
(b) Introduce appropriate arrangements to ensure that the environmental consequences of its programmes and policies that are likely to have significant adverse impacts on biological diversity are duly taken into account;
(c) Promote, on the basis of reciprocity, notification, exchange of information and consultation on activities under their jurisdiction or control which are likely to significantly affect adversely the biological diversity of other States or areas beyond the limits of national jurisdiction, by encouraging the conclusion of bilateral, regional or multilateral arrangements, as appropriate;
(d) In the case of imminent or grave danger or damage, originating under its jurisdiction or control, to biological diversity within the area under jurisdiction of other States or in areas beyond the limits of national jurisdiction, notify immediately the potentially affected States of such danger or damage, as well as initiate action to prevent or minimize such danger or damage; and
(e) Promote national arrangements for emergency responses to activities or events, whether caused naturally or otherwise, which present a grave and imminent danger to biological diversity and encourage international cooperation to supplement such national efforts and, where appropriate and agreed by the States or regional economic integration organizations concerned, to establish joint contingency plans'.

[45] Convention on Biological Diversity, Conference of the Parties, *Impact Assessment: Voluntary Guidelines on Biodiversity-inclusive Impact Assessment*, 15 June 2006, UNEP/CBD/COP/DEC/VIII/28.

conservation and sustainable use of biological diversity in ABNJ.[46] While MGRs are certainly included, the cooperation among Parties within and outside the COPs have not resulted to any arrangement on their management.

I.2.2. The legal framework of the United Nations Convention on the Law of the Sea

As far as MGRs are concerned, it is undoubtable that the UNCLOS could not regulate activities that were unknown when it was drafted. This is the reason why neither the term 'bioprospecting' nor the expression 'genetic resource' appear in the Convention. However, since the UNCLOS is correctly understood as 'a solid basis for the regulation of any matters'[47] in the field of the international law of the sea, two possible alternatives have been put forward to fill such gap: the extension of its Part XI to MGRs or the application of the high seas' regime to MGRs.

Due to the symbiotic relation between mineral resources and MGRs and the difficulties in clearly identifying the boundaries between those living in the water column and on the deep sea-bed, the doctrinal debate largely focused on the possible extension of the common heritage of mankind regime set out in Part XI of the UNCLOS to MGRs, since it already applies to the Area and its resources on which the ISA exercise its mandate.[48] The Area is defined in Article 1 of the Convention as 'the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction',[49] while the term resources shall be interpreted as 'all solid, liquid or gaseous mineral resources *in situ* in the Area at or beneath the seabed, including polymetallic nodules'.[50] Although it is clear that the definition of resources provided under Part XI of the UNCLOS does not fit with MGRs, two considerations shall nonetheless be made. The first one builds on the Declaration of Principles Governing the Sea-Bed and the Ocean Floor, and the Subsoil Thereof, beyond the Limits of National Jurisdiction adopted by the General Assembly in 1970 and upon which the current legal regime of Part XI has been framed.[51] In recognizing that the Area and its resources are the common heritage of mankind, the Declaration does not specify the resources to which this regime applies, which could hence comprehend both living and non-living assets. In support of this view, it shall be mentioned that the very same text of the UNCLOS only explicitly refers to polymetallic nodules, while as of today a much wider range of resources, including cobalt rich crusts, have been discovered and regulated for exploration and, *de lege ferenda*, exploitation by the Authority.[52] On the other hand, as the *travaux préparatoires* show, during the Third Conference on the Law of the Sea there was no agreement on the inclusion of living resources in the definition provided under Part XI of the UNCLOS,[53] which was hence restricted to minerals.

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[46] WARNER R., *Conserving Marine Biodiversity in Areas Beyond National Jurisdiction: Co-evolution and Interaction with the Law of the S*ea, in ROTHWELL D. R., OUDE ELFERINK A. G., SCOTT K. N., STEPHEN T. (eds.), *The Oxford Handbook of the Law of the Sea*, Oxford, 2017, p. 755; and DE LA FAYETTE L. A., *A New Regime for the Conservation and Sustainable Use of Marine Biodiversity and Genetic Resources beyond the limits of National Jurisdiction*, in 'International Journal of Marine and Coastal Law', Vol. 24, 2009, p. 243.

[47] SCOVAZZI T., *The exploitation of resources of the Deep Seabed and the Protection of the Environment*, in 'German Yearbook of International Law', Vol. 57, 2014, p. 200.

[48] UNCLOS, article 137 (2).

[49] Ibid., article 1.

[50] Ibid., article 133.

[51] United Nations General Assembly, *Declaration of Principles Governing the Sea-Bed and the Ocean Floor, and the Subsoil Thereof, beyond the Limits of National Jurisdiction*, 17 December 1970, A/RES/2749 (XXV).

[52] See, for instance, the provisions contained in Annex III to the UNCLOS.

[53] DIVISION FOR OCEAN AFFAIRS AND THE LAW OF THE SEA, *The Law of the Sea: Concept of the Common Heritage of mankind*, New York, 1996, pp. 228-9; PARDO A., CHRISTOL C. C., *The common interest: tension between the whole and the parts*, in MACDONALD R. S. J., JOHNSTON D. M. (eds.), *The Structure and Process of International Law: Essays in Philosophy, Doctrine and Theory*, The Hague, 1986, pp. 654-5; and TREVES T., *Protection of the Environment of*

Yet one could argue, and this amounts to the second relevant observation, that the broad definition of the Area could already *per se* encompass MGRs. Indeed, on the assumption that the ocean is home of interconnected ecosystems which do not always fit the distinction between the seabed and the water column,[54] it has been correctly pointed out that two criteria shall be taken into account when determining whether certain resources are part of the Area and thus fall under the proper regime of the UNCLOS: the location with respect to the seabed and the possibility to clearly distinguish certain features of the seabed from the surrounding waters.[55] By way of example, the water flowing from hydrothermal vents is part of a given sea-bed system and it can be distinguished, for its own chemical characteristics, from the surrounding waters above the Area. As a result, the whole hydrothermal vent structure, hosting those MGRs dependent on its water flow, would be covered by Part XI of the UNCLOS. This seems supported by the rules on treaty interpretation too. In particular, under article 31 (1) of the Vienna Convention on the Law of Treaties,[56] the terms contained in a treaty shall be interpreted in their ordinary meaning. The very general terms 'seabed, ocean floor' and 'subsoil', do not – in their regular significance – suggest the exclusion of any of their living or non-living components.[57] If such a views is upheld, then it would imply that MGRs would fall under the common heritage of mankind regime.

From the opposite perspective, and on the ground that not all the MGRs of scientific or economic interest can be found on the seabed, but also in the water column, some States and a part of the doctrine believe that the legal framework applicable to MGRs is Part VII of the UNCLOS on the high seas.[58] This conclusion is based on the assumption that such regime is applicable to every activity in ABNJ unless otherwise provided by the Convention and it is also in line with the traditional understanding of the law of the sea according to which every natural resource beyond national jurisdiction, whether living or non-living, was considered a *res communis omnium*.[59] Assuming that the regime of the Area is limited *ratione loci* to the seabed, ocean floors and subsoils *stricto sensu* and to the mineral resources as identified under Part XI of the UNCLOS, the governing rules for the use of MGRs shall then be found in the freedoms of the high seas, whose non-exhaustive list is contained in article 87 of the UNCLOS, already

the High Sea and in Antarctica, in KOUFA K. (ed.), *Protection of the Environment for the New Millennium*, Athens, 2002, p. 91.

[54] JUNG-EUN K., *The Incongruity between the Ecosystem Approach to High Seas Marine Protected Areas and the Existing High Seas Conservation Regime*, in 'Aegean Review of the Law of the Sea and Maritime Law', Vol. 2, 2013, pp. 1-36.

[55] OUDE ELFERINK A., *The Regime of the Area: Delineating the Scope of Application of the Common Heritage Principle and Freedom of the High Seas*, in 'International Journal of Marine and Coastal Law', Vol. 22, 2007, p. 148.

[56] Vienna Convention on the Law of Treaties, concluded on 23 May 1969 and entered into force on 27 January 1980, 1155 U. N. T. S. 331, article 31.

[57] OUDE ELFERINK A., *supra note 55*, p. 150; SALAMANCA AGUADO E., *La zona internacional de los fondos marinos: patrimonio comùn de la humanidad*, Madrid, 2003, pp. 274-5. According to TANAKA Y., *Towards Sustainable Management of Marine Natural Resources*, in KOTZUR M., MATZ-LÜCK N., PROELSS. A, VERHEYEN R., SANDEN J. (eds.), *Sustainable Ocean Resource Governance: Deep Sea Mining, Marine Energy and Submarine Cables*, Leiden, 2018, p. 118, generic terms are included in treaties with a view to allow their evolutionary interpretation over time. This is also recalled in Permanent Court of Arbitration, *Arbitration regarding the Iron Rhine Railway case (Belgium v. the Netherlands)*, 24 May 2005, Reports of International Arbitral Tribunal, Vol. 27, para 79 and in World Trade Organisation, *Appellate Body Report, United States – Import Prohibition of Certain Shrimp and Shrimp Products*, 12 October 1998, para 130, WT/DS58/AB/R.

[58] PROELSS A., *supra note 10*, p. 444.

[59] OPPENHEIM L., *International Law: a Treatise*, Vol. I, London, 1955, pp. 628-9; SCHWARZENBERGER G., *A Manual of International Law*, London, 1960, p. 127; LAUTERPACHT H., *Sovereignty Over Submarine Areas*, in 'British Yearbook of International Law', vol. 27, 1950, p. 402; O'CONNELL D. P., *Sedentary Fisheries and the Australian Continental Shelf*, in 'The American Journal of International Law', Vol. 49, 1955, p. 190; and YOUNG R., *The Legal Regime of the DeepSea Floor*, in 'The American Journal of International Law', Vol. 62 , 1968, p. 645.

encompassing, *inter alia*, scientific research.[60] This would also entail, *mutatis mutandis*, the application to MGRs of the conservation and management framework set out in Part VII, which only foresees an obligation to cooperate to that end. However, as it is the case for Part XI, at the time when the UNCLOS was concluded, MGRs had not been discovered yet, so that one cannot maintain with certainty that their collection and use falls under the *res communis omnium* regime.

Generally speaking, it seems that the application of the common heritage of mankind to MGRs is to be preferred. It is supported by the preamble of the UNCLOS, which highlights that the treaty 'will contribute to the realization of a just and equitable international economic order which takes into account the interests and needs of mankind as a whole and, in particular, the special interests and needs of developing countries, whether coastal or land-locked'.[61] According to some authors, if delegates to the Third conference on the law of the sea had known of MGRs, they would have certainly treated them on equal footing with polymetallic nodules.[62] By the same token, it is also safe to say that the UNCLOS took note of the progressive erosion of the traditional freedoms of the high seas. In fact, they are in no way absolute but shall be balanced with other concurring interests,[63] which are often considered of general relevance for the international community as a whole: as it has been maintained, 'far from being an immutable theological dogma, the principle of the sea is to be understood [...] in the light of the peculiar circumstances to which it applies'.[64]

Irrespective of the view that one takes, it is evident that the current uncertain situation constitutes a legal *lacuna* which needs to be filled in order to avoid that, lacking a clear framework, the protection and sustainable use of MGRs is fatally undermined.

I.2.3. The protection and conservation of marine genetic resources from the Ad hoc Working Group on BBNJ to the Intergovernmental Conference

In 2004, the opposing views relating to the status of MGRs under the UNCLOS prompted the UN General Assembly to establish an *Ad Hoc* Open-ended Informal Working Group with the mandate to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction (BBNJ Working Group). Its first meeting was held in 2006. Since 'divergent views were expressed on the relevant legal regime, [...] in particular whether those marine genetic resources were part of the common heritage of mankind and therefore fell under the regime of the Area, or were part of the regime of the high seas',[65] the stalemate lasted until 2011, when it was agreed that biodiversity issues should be addressed through the international application of conservation and management tools like EIAs and

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[60] The list comprehends freedom of navigation, overflight, of laying submarine cables and pipelines, of constructing artificial islands and other installations, of fishing and of scientific research.

[61] UNCLOS, 5th preambular paragraph.

[62] See ARMAS-PFIRTER F., *How can Life in the Deep Sea be Protected?*, in 'The International Journal of Marine and Coastal Law, Vol. 24, 2009, pp. 281-307; DE LA FAYETTE L. A., *Institutional Arrangements for the Legal Regime Governing Areas Beyond National Jurisdiction – Commentary on Tullio Scovazzi*, in OUDE ELFERINK A., MOLENAAR E. (eds.), *The International Legal Regime of Areas beyond National Jurisdiction: Current and Future Developments*, Leiden, 2010, pp. 77-9; and United Nations General Assembly, *Report of the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction*, 20 March 2006, A/61/65, para. 71.

[63] CONFORTI, B., *Does Freedom of the Seas Still Exist?*, in 'Italian Yearbook of International Law', Vol. 1, 1975, pp. 13-4.

[64] SCOVAZZI T., *The exploitation of marine genetic resources in Areas beyond national jurisdiction*, in ANDREONE G. (ed.), *Jurisdiction and Control at Sea: some environmental and security issues*, Napoli, 2014, p. 38.

[65] United Nations General Assembly, *Letter dated 15 May 2008 from the Co-Chairpersons of the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction addressed to the President of the General Assembly*, 16 May 2008, A/63/79, para. 36.

MPAs.[66] Together with benefit sharing, such measures lately became known as the 'package deal'. In June 2015, pursuant to resolution 69/292 and following the recommendations of the BBNJ Working Group, the UN General Assembly decided to develop a third implementation agreement of the Convention, and precisely an international legally binding instrument under the UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ treaty).[67] To this end, a Preparatory Committee was established with a view to make substantive recommendations on the elements of a draft text in the light of the agreed package deal.

Once again, delegations expressed different views on the topic and while for some 'there is no legal gap in regard to marine genetic resources in areas beyond national jurisdiction',[68] for others 'the living resources of ABNJs are the common heritage of humankind, deserving coordinated conservation and sustainable use by the international community lest the resources are forever depleted'.[69] As no consensus could be reached at that stage on a number of issues, Section B of the Report of the Preparatory Committee highlighted a number of fields in which divergences persisted, including the status of MGRs, the benefit-sharing deriving from their access and use, a capacity building mechanism and the transfer of marine technology.[70]

Nonetheless, in 2017 the UN General Assembly acknowledged that the time had come to convene an intergovernmental conference, to negotiate a new implementation agreement under the UNCLOS in the light of the consultations undertaken within the Preparatory Committee and taking into account the package deal agreed on in 2011.[71] The UN General Assembly also reaffirmed that 'this process and its result should not undermine existing relevant legal instruments and frameworks and relevant global, regional and sectoral bodies'.[72] The term 'undermine', which has an 'undeniably significant ambiguity',[73] was first introduced in the negotiations when it became clear that not all the delegates at the BBNJ Working Group shared

[66] United Nations General Assembly, *Oceans and the Law of the Sea*, 24 December 2011, A/RES/66/231, Annex. The elements of such package deal are marine genetic resources, including questions on the sharing of benefits, measures such as area-based management tools, including marine protected areas, and environmental impact assessments, capacity-building and the transfer of marine technology.

[67] United Nations General Assembly, *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*, 19 June 2015, A/RES/69/292.

[68] *Views Expressed by the United States Delegation Related to Certain Key Issues Under Discussion at 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*, 9 September 2016, available at https://www.un.org/depts/los/biodiversity/prepcom_files/USA_Submission_of_Views_Expressed.pdf.

[69] *Views of the Government of the Federated States of Micronesia on the elements of a draft text 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*, 14 March 2016, para. 5, available at https://www.un.org/depts/los/biodiversity/prepcom_files/Federated_States_of_Micronesia.pdf.

[70] United Nations General Assembly, Preparatory Committee established by General Assembly resolution 69/292: 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, *Report of the Preparatory Committee established by General Assembly resolution 69/292: 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*, 31 July 2017, A/AC.287/2017/PC.4/2, p. 17.

[71] United Nations General Assembly, *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*, 19 January 2018, A/RES/72/249.

[72] Ibid., para 7.

[73] CANLON Z., *The art of not undermining: possibilities within existing architecture to improve environmental protections in areas beyond national jurisdiction*, in 'ICES Journal of Marine Science', Vol. 75, 2018, p. 405.

the same attitude towards the creation of new institutions potentially conflicting with the actual global and regional ones. This also led the President of the Conference Rena Lee, already member of the Legal and Technical Commission (LTC or the Commission) of the ISA, to include the concepts of coherence, complementarity, cooperation, coordination and compatibility throughout her 'Aid to Negotiations'[74] for the second session. By then, it had become clear that the focus had rather shifted to compatibility, a concept which was already taken into account for the development of the Fish Stocks Agreement in 1995.

Interestingly, among the proposals aimed at avoiding any overlap in the competences of existing or new global and regional organisations, 'a number of delegations mentioned that the International Seabed Authority constituted an existing mechanism in this area and that consideration should accordingly be given to the possibility of broadening its mandate'.[75] This option would give priority to the protection of MGRs in ABNJ by reflecting an ecosystem approach. Moreover, since it would overcome the territorial division referred to in the UNCLOS between the Area and the adjacent water column, the broadening of ISA mandate would also entail a holistic approach to MGRs.

I.2.4. Regulating marine genetic resources: three approaches

In accordance with the General Assembly resolution 72/249, the first session of the Intergovernmental Conference on BBNJ was held in 2018. It was largely perceived as successful,[76] and after the second session a draft text for the third implementing agreement was released.[77] With delegations cooperating for the advancement of the treaty, and each one setting different areas of priority, there seemed to be broad convergence on some general principles applicable to the conservation and use of MGRs, namely international cooperation, the precautionary approach, the sustainable and equitable use of MGRs, a transparent and open decision making process, and the existence of some conditionalities to the freedoms of the seas. Still it cannot be ignored that, with the third substantive session discussing the core of the agreement, a number of divergent comments and proposals emerged, so that the revised draft text prepared for the last session reflected unsettled issues related to, as far as MGRs are concerned, their definition, the conditions for their access and collection, the due regard for the interests of coastal States in whose national jurisdiction a certain MGRs can also be found and the exercise of sovereignty rights over such resources.[78] In this respect, it is definitely striking that, with the only exception of draft article 7 on the objectives, the part of the agreement

[74] United Nations General Assembly, Intergovernmental Conference on 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, *President's aid to negotiations*, 3 December 2018, A/CONF.232/2019/1.

[75] United Nations General Assembly, *Report of the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction*, 20 March 2006, A/61/65, para. 71.

[76] TILLER R., DE SANTO E., MENDENHALL E., NYMAN E., *The once and future treaty: Towards a new regime for biodiversity in areas beyond national jurisdiction*, in 'Marine Policy', Vol. 99, 2019, 239-42.

[77] United Nations General Assembly, Intergovernmental Conference on 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, *Draft text of an agreement 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*, 17 May 2019, A/CONF.232/2019/6.

[78] United Nations General Assembly, Intergovernmental Conference on 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, *Revised draft text of an agreement 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*, 18 November 2019, A/CONF.232/2020/3.

relating to MGRs is still almost in brackets and no final arrangement has been reached on the way in which benefits are to be shared in a fair and equitable way.[79]

A major issue for determination has been whether a different or unique legal framework would apply to MGRs of the Area and the high seas. Several approaches were identified. The first one clearly run contrary to the ecosystem approach and relied on the territorial division instead. When the UNCLOS was concluded, such vertical division between the water column and the seabed, was perceived as modern and apt to serve the interests of the international community. However, today it would be unable to secure the protection of the marine environment to such an extent that, if rigidly applied, it could undermine, in the long term, the unique oceanic ecosystems. In particular, it would imply that the regime to apply to a certain MGR depends on its location in the ocean: this neglects that some can be equally found on the seabed and in the water column so that different frameworks would apply to the same living resource.[80]

A second approach consisted in a sedentary species test, as contained in article 77 (4) of the UNCLOS concerning the continental shelf.[81] The definition of sedentary species ('organisms which, at the harvestable stage, either are immobile on or under the sea or are unable to move except in constant physical contact with the sea-bed or its subsoil') is not only resources-oriented and privileges a commercial perspective over the overarching ecosystem goal but has some major drawbacks as well. The experience from Part VI of the UNCLOS shows that States are unable to find a common understanding even on lobsters and crabs which, capable of independently move on the seabed, are alternatively classified as sedentary or non-sedentary species.[82] The inconsistency of this approach is further clarified by the life cycle of some living resources: they can spend part of their lives in the water when still at the larvae stage, before settling in the seafloor and contributing to the formation of mineral resources as adults. Moreover, since the sequencing of their DNA is what really matters for research and commercial exploitation, it is increasingly frequent that scientists are able to collect it in the seawater environment, without the physical presence of the organisms (environmental DNA).[83]

Finally, a third approach focused on the activities which could cause harm to MGRs, rather than on their location. This approach, which adopts an integrated perspective in response to the rigid territorial division provided by the UNCLOS, has the advantage to come up with a regime that is applicable to all the MGRs of an ABNJ. The last draft of the treaty and the relative informal discussions at the Intergovernmental Conference have finally endorsed this method, since it foresees a *sui generis* legal framework for collecting and accessing, and thus bioprospecting, MGRs in both the Area and the high seas.[84]

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[79] United Nations General Assembly, Intergovernmental Conference on 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*, Statement by the President of the conference at the closing of the third session*, 13 September 2019, A/CONF.232/2019/10, p. 5.

[80] MOSSOP J., *Towards a Practical Approach to Regulating Marine Genetic Resources*, in 'ESIL Reflections', Vol. 8, 2019, pp. 5-6.

[81] Article 77 (4) of the UNCLOS states: 'The natural resources referred to in this Part consist of the mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species, that is to say, organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil'.

[82] MOSSOP J., *The relationship between the continental shelf regime and a new international instrument for protecting marine biodiversity in areas beyond national jurisdiction*, in 'ICES Journal of Marine Science', Vol. 75, 2018, p. 447.

[83] BARNES M. A., TURNER C. R., *The Ecology of Environmental DNA and Implications for Conservation Genetics*, in 'Conservation genetics', Vol 17, 2016, pp. 1-17.

[84] United Nations General Assembly, Intergovernmental Conference on 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*, Statement by the President of the conference at the closing of the third session*, 13 September 2019, A/CONF.232/2019/10, p. 5.

Now, bioprospecting, understood as 'the exploration of biodiversity for commercially valuable genetic and biochemical resources',[85] is a form of MSR, which is in turn regulated under Part XIII of the UNCLOS. While no definition of MSR occurs in the Convention, guidance can be sought in article 246 which, although only referring to the exclusive economic zone and the continental shelf, both mentions pure research in paragraph 3 and applied research in paragraph 5. This confirms that MSR not only covers endeavours aimed at advancing knowledge on marine habitats and their effective protection, but also includes those activities eventually having a commercial purpose, as it is the case for bioprospecting.

With a view to determine whether and to what extent the ISA has any competence in the field and if, as proposed by some delegations, its mandate should be broadened to regulate MGRs, the next part will first address the Authority's institutional features. Taking into account the evident linkage between MSR and the protection of the marine environment, the recent practice of the ISA will also be considered to finally dwell on its possible role under the new implementation agreement.

2. The protection and conservation of marine genetic resources in Areas beyond national jurisdiction: Institutional perspectives

2.1. The International Seabed Authority: An effective tool for the protection of marine biodiversity?

2.1.1. The International Seabed Authority and its mandate: from mineral to genetic resources?

With 167 Member States plus the European Union, the ISA is the international organization created by the UNCLOS through which, according to article 157 (1), they 'organize and control activities in the Area'.[86]

Unlike the majority of the treaties establishing international organisations, the UNCLOS does not refer to the purposes pursued by the Authority and even article 157, apart from referring to the administration of mineral resources, does not elaborate on them.[87] Indeed, in view of the competences recalled in the subsequent articles – ranging from scientific research to the sharing of benefits from activities in the Area and to the protection of the marine environment – article 157 is clearly not exhaustive.[88] The first implementing agreement of the UNCLOS (New York Agreement),[89] which relates to Part XI and that in part modified some of the ISA competences, partially mitigates this uncertainty by enumerating at the fifth paragraph of the first section of its Annex the aims the Authority will pursue until the first workplan for the exploitation of resources is approved. Until that moment, in fact, the competences related *inter alia* to the direct exploitation of mineral resources through the Enterprise and the redistribution

[85] Convention on Biological Diversity, Conference of the Parties, *Progress Report on the Implementation of the Programmes of Work on the Biological Diversity of Inland Water Ecosystems, Marine and Coastal Biological Diversity, and Forest Biological Diversity*, 20 April 2000, UNEP/CBD/COP/5/INF/7, para 6.
[86] UNCLOS, article 157; and JAECKEL A. L., *supra note 18*, p. 89.
[87] PAOLILLO F. H., *The Institutional Arrangements for the International Sea-Bed and Their Impact on the Evolution of International Organizations*, in *Collected Courses of the Hague Academy of International Law*, Vol. 188, 1984, p. 182.
[88] PROELSS A., *The role of the Authority in Ocean governance*, in SCHEIBER H. N., PAIKS J. H. (eds.), *Regions, Institutions and the Law of the Sea*, Leiden, 2013, pp. 146-7.
[89] Agreement relating to the implementation of Part XI of the United Nations Convention on the Law of the Sea, concluded on 28 July 1994 and entered into force on 16 November 1994, 1836 U.N.T.S. 3 (New York Agreement).

of the benefits arising from such metals will not be exercised by the Authority.[90] It will instead focus on the analysis of requests for approval of an exploration plan and the monitoring of compliance with contract terms for seabed activities, but also on the adoption of rules, regulations and procedures necessary to conduct activities in the Area, to preserve the marine environment and to promote and encourage scientific research activities.[91]

Under article 156, all States Parties to the UNCLOS are *ipso facto* Members of the Authority. Such universal character is also confirmed by the absence of any provision on the possible expulsion of its Members.

The Authority consists of three main organs – the Assembly, the Council and the Secretariat – in addition to the Enterprise and the subsidiary organs created in accordance with Part XI and the New York Agreement.

In particular, the Assembly is the plenary body of the ISA, in which all the States that are Parties to the UNCLOS are represented.[92] Article 160 contains a rather comprehensive list of its powers, ranging from the election of the Members of the Council,[93] to the creation of subsidiary bodies, the adoption of decisions relating to the equitable sharing of benefits from activities in the Area, and the promotion of scientific studies related to the Area. However, the UNCLOS grants the Council and its subsidiary bodies a more proactive role in the functioning of the Authority. The Council, which is the ISA executive body, is composed of 36 Members, elected by the Assembly for four years, according to a sophisticated mechanism that applies the principles of representation of specific interests and the equitable geographical distribution.[94] As for its powers, while the executive bodies of international organisations are often given decisive powers but with a narrow scope,[95] the Council is an exception, as its law-making, policy-making and control powers cover all areas of the ISA competence.[96] In particular, it proposes to the Assembly the regulations relating to exploration and exploitation of mineral resources and approves the plans of work for the activities in the Area.

The technical knowledge required for the Council to carry out many of its functions was well-known by the same drafter of the UNCLOS who foresaw the establishment of two subsidiary bodies: the LTC and the Economic Planning Commission, whose function are, according to the New York Agreement, carried out by the former. The LTC is made up of 15 members, elected by the Council among the candidates proposed by Member States, on the basis of their competences and taking into account the geographical representation.[97] The Commission, although formally being the Council's subsidiary body, is in fact at the heart of the Authority's work, and it has a radical influence on its decision-making. Indeed it is called upon to make recommendations on any issues relating to the operation of the ISA at the request of the Council, and specifically to suggest any measures on the protection of the marine environment,[98] to formulate and submit to

[90] Ibid., Annex, Section 1, para. 5.

[91] Ivi. See also International Seabed Authority Assembly, *Functions of the International Seabed Authority in the First Year of its Full Functional Phase, Including Matters Pending from the Work of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea*, 26 July 1996, ISBA/A/10.

[92] UNCLOS, article 159 (1).

[93] See, for instance, International Seabed Authority Assembly, *Decision of the Assembly of the International Seabed Authority relating to the election to fill the vacancies on the Council of the Authority in accordance with article 161, paragraph 3, of the United Nations Convention on the Law of the Sea*, 26 July 2018, ISBA/24/A/9.

[94] New York Agreement, Annex, Section 3, paras. 5-6.

[95] FENCERS H. G., BLOKKER N. M., *International Institutional Law*, Leiden, 2011, p. 298.

[96] JAECKEL A. L., *supra note 18*, Leiden, 2017, p. 93; and KIRGIS F., *Specialized Law-Making Processes*, in SCHACHTER O., JOYNER C. C. (eds.), *United Nations Legal Order*, Cambridge, 1995.

[97] The membership of the LTC has been extended several times to the actual composition of 30 experts.

[98] International Seabed Authority Council, Legal and Technical Commission, *Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area*, 30 March 2020, ISBA/25/LTC/6/Rev.1.; and International Seabed Authority Council, Legal and Technical Commission, *Recommendations for the guidance of contractors on*

the executive body the rules, regulations and procedures for exploration and exploitation operations,[99] to recommend the adoption of any emergency orders and to direct the staff in charge of conducting inspections.

In general terms, the breadth of the subjects on which the LTC has powers is a clear confirmation of its central role in the development of activities in the Area and the willingness of delegates at the Third conference on the law of the sea to filter policy decisions through the best technical expertise available to the Council. Indeed, the existence of a technical body is an essential guarantee that political and economic assessments do not prevail, in particular, on the protection of the marine environment, a key element of the effective preservation of the common heritage of mankind.

Following developments in the framework of the United Nations Informal Consultative Process on the Law of the Sea on the status of MGRs and bioprospection, the former Secretary General of the ISA Nandan held that the Authority 'has a broader role concerning the protection and preservation of the marine environment (including its biodiversity) and the promotion of marine scientific research in the international seabed area'.[100] This led the LTC, which at the time was mainly focusing on the approval of plans of work for the exploration of mineral resources and on the regulations on polymetallic sulphides, to investigate the extent of its competences on biodiversity of ABNJ, including MGRs. While recognising the importance of improving the understanding of the deep-sea ecosystems and noting that biological processes are a known factor in mineralisation, the LTC emphasized 'the need to work within its mandate under the 1982 Convention and the 1994 Agreement'.[101] If on the one hand such recognition was tantamount to a refusal to take up the management of biodiversity of ABNJ *at large*, the Commission also decided to further analyse the issue through a paper presented in open session by one of its members, Ms Armas Pfirter, on the legal implications related to the management of seabed living resources in the Area. While acknowledging that the provisions of Part XI of the UNCLOS on exploration and exploitation are only limited to mineral resources, the study also admitted that the Area regime is not restricted to such activities, but also extends to environmental protection and marine scientific research. As the powers and functions of the Authority are not limited to those explicitly referred to in Part XI, in the light of the incidental powers it has been attributed under article 157 (2),[102] the study concluded that the Authority shall take a proactive role in the protection of biological resources through article 145 of the UNCLOS, with the adoption of rules, regulations and procedures to ensure the effective protection of the marine environment, including the 'sedentary species of the Area'.[103]

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the relinquishment of areas under exploration contracts for polymetallic sulphides or cobalt-rich ferromanganese crusts, 23 July 2019, ISBA/25/LTC/8.

[99] International Seabed Authority Council, *Decision of the Council of the International Seabed Authority Relating to the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area*, 13 July 2000, ISBA/6/C/12; International Seabed Authority Assembly, *Decision of the Assembly of the International Seabed Authority relating to the regulations on prospecting and exploration for polymetallic sulphides in the Area*, 15 November 2010, ISBA/16/A/12/Rev.1; and International Seabed Authority Assembly, *Decision of the Assembly of the International Seabed Authority relating to the regulations on prospecting and exploration for Cobalt-rich Ferromanganese Crusts in the Area*, 22 October 2012, ISBA/18/A/11.

[100] United Nations Informal Consultative Process on the Law of the Sea, *Statement by Ambassador Satya Nandan*, 7-11 June 2004, p. 1, available at https://www.un.org/Depts/los/consultative_process/documents/5s_nandan.pdf.

[101] International Seabed Authority Council, *Report of the Chairman of the Legal and Technical Commission on the work of the Commission during the ninth session*, 1 August 2003, ISBA/9/C/4, para. 15.

[102] Article 157 (2) states: 'The powers and functions of the Authority shall be those expressly conferred upon it by this Convention. The Authority shall have such incidental powers, consistent with this Convention, as are implicit in and necessary for the exercise of those powers and functions with respect to activities in the Area'.

[103] ARMAS PFIRTER F., *The management of Seabed Living Resources in 'The Area' under UNCLOS*, in 'Revista Electrónica de Estudios Internacionales', Vol. 11, 2006, p. 21.

2.1.2. The environmental mandate of the International Seabed Authority

Part XI of the UNCLOS and its Annex III complement the general legal framework related to the protection and preservation of the marine environment set out in Part XII, whose article 192 simply maintains that 'States have the obligation to protect and preserve the marine environment'. Under article 194 (5) they are also required to protect rare or fragile ecosystems and habitats whose species are endangered, threatened or depleted: this amounts to an 'early recognition of the need for ecosystem-based management of the oceans'.[104] Despite Part XI of the UNCLOS is mainly devoted to seabed mining activities, its drafters imposed a specific obligation on the ISA to prevent and monitor damages to the marine environment *at large* resulting from such activities. Indeed, under article 145 the Authority enjoys a broad capacity to adopt those rules, regulations and procedures which are necessary for the prevention, reduction and control of pollution and other hazards to the marine environment, including its flora and fauna, in a way that overcomes the territorial limits created by the UNCLOS and which affects the approval and the monitoring of a plan of work for activities in the Area.[105] The protection of the flora and fauna thus extends well beyond the Area, despite being limited to the 'activities' taking place therein, which – in the understanding of the Seabed Dispute Chamber in its 2011 Advisory opinion – encompass the recovery of minerals from the seabed and their lifting to the water surface, the evacuation of water from the minerals, the preliminary separation of materials of no commercial interest, including their disposal at sea and the transportation within that part of the high seas, when directly connected with extraction and lifting.[106]

Although the environmental mandate of the ISA is limited *ratione materiae* to seabed mining, it is no surprise that article 145 has become central for the debate on MGRs of the seabed and the water column. Indeed, for the Authority to ensure that the marine flora and fauna is duly protected it has to acquire the necessary knowledge on biodiversity, including MGRs. In other terms, while only indirectly, the ISA is already engaged in the conservation of such resources through marine scientific research and the exercise of its law-making and policy-making power. A number of instruments have been developed in this respect.

To start with, the Mining Code is a set of regulations on the prospection and exploration of polymetallic nodules,[107] sulphides and cobalt-rich crusts in the Area enacted by the ISA that, as of today, does not cover exploitation activities yet. Since 2000, when the regulations on the exploration of polymetallic nodules were adopted by the Authority after a long and inclusive negotiating process,[108] the protection of the environment from possible damages resulting from activities in the Area was attributed great importance. Given that the other exploration regulations have been adapted from the text on polymetallic nodules, this first set of rules will be considered as representatives for the others.[109]

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[104] WARNER R., *Protecting the Ocean beyond National Jurisdiction: Strengthening the International Law Framework*, Leiden, 2009, p. 49.

[105] DRAZEN J. C., SMITH C. R., GJERDE K., HADDOCK S. H. D., CARTER G. S., CHOY C. A., CLARK M. R., DUTRIEUX P., GOETZE E., HAUTON C., HATTA M., KOSLOW J. A., LEITNER A. B., PACINI A., PERELMAN J. N., PEACOCK T., SUTTON T. T., WATLING L., YAMAMOTO H., *Opinion: Midwater ecosystems must be considered when evaluating environmental risks of deep-sea mining*, in 'Proceedings of the National Academy of Sciences of the United States of America', Vol. 117, 2020, pp. 17455-60.

[106] International Tribunal of the Law of the Sea, Seabed Disputes Chamber, *Responsibilities and obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area*, Advisory Opinion, 1 February 2011, I.T.L.O.S. Reports 2011 p. 10, paras. 95-7 (Advisory opinion).

[107] International Seabed Authority Council, *Decision of the Council of the International Seabed Authority relating to amendments to the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area and related matters*, 22 July 2013, ISBA/19/C/17 (Regulations).

[108] LODGE M. W., *International Seabed Authority's Regulation on Prospecting and Exploration for Polymetallic Nodules in the Area*, in 'Journal of Energy and Natural Resources Law', Vol. 20, 2002, pp. 270-95.

[109] WOLFRUM R., *The Contribution of the Regulations of the International Seabed Authority to the Progressive Development of International Environmental Law*, in LODGE M. W., NORDQUIST M. H. (eds.), *Peaceful Order in World's Oceans*, Leiden, 2014, p. 243.

As a first guarantee of the mitigation of the impacts of proposed exploration activities, regulation 18 establishes that each application for a plan of work submitted to the ISA shall include a description of the programme for oceanographic and environmental baseline studies to assess the potential environmental impacts on biodiversity; a prior EIA, which shall be complete enough to allow the LTC to determine the possible risks of environmental damages; and a description of proposed measures for the prevention, reduction and control of pollution and other hazard to the marine environment, including its flora and fauna.[110]

Under Part V of the regulations, devoted to the preservation of the marine environment, two key terms can be found, namely 'precautionary approach' and 'best environmental practices'.[111] As the Seabed Dispute Chamber made it clear, the application of the precautionary approach is not new under international law, and through the regulations, which apply in the Area to every Member State, it has evolved from a non-binding to a binding provision.[112] Indeed, regulation 31 explicitly mentions Principle 15 of the Rio Declaration.[113] It has been questioned whether the limits of the available capabilities of States and the cost-effectiveness requirement embedded in the principle also apply to the exploration of mineral resources of the seabed, since they are not referred to in regulation 31.[114] From the standpoint of the ISA the answer should be for the negative. In fact, according to the standard clause for exploration contracts in Annex 4, section 5.1, 'the Contractor shall take necessary measures to prevent, reduce and control pollution [...] as far as practically possible'. In other terms, there is no difference among States in applying the precautionary principle and the reasonableness of the necessary measures shall be evaluated in the face of the environmental uncertainties of the conducted activities.

In order to keep considering the possible occurrence of environmental damages even after the approval of a plan of work, the ISA has to establish and implement, together with contractors, sponsoring States and other interested countries, programmes for monitoring. To this extent, when necessary, the Council can require the creation of impact reference zones and preservation reference zones.[115] The former are areas used to assess the effects of activities in the Area on the marine environment and shall be representative of the biological characteristics of the region to be mined or test mined. The latter, instead, are areas having the same features of the previous, but in which no mining activity takes place to ensure stable biota of the seabed and to compare changes in the biological, physical and chemical status of the environment. Despite the regulations do not clearly indicate at which point in time such zones should be established, the ISA still requires contractors to gather environmental baseline data throughout the exploration phase.[116]

Regulation 33 then establishes that the Secretary-General of the ISA shall immediately inform the LTC and the Council for appropriate measures to be taken in the aftermath of any incident which can possibly cause a serious harm to the marine environment.[117] In particular, the Council is empowered to issue emergency orders, including the suspension of operations, and can also take by itself all the arrangements deemed necessary to minimize the harm.[118]

The other key term in the Mining code, which for chronological reasons was included only in the regulations for sulphides and cobalt crusts, is 'best environmental practices', a requirement for the ISA, the sponsoring States, prospectors and contractors to comply with. While it is not an

[110] Regulations, regulation 18.
[111] *Supra note 99*.
[112] Advisory opinion, para 127.
[113] Principle 15 of the Rio Declaration reads 'In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'.
[114] WOLFRUM R., *supra note 109*, p. 247.
[115] Regulations, regulation 31.
[116] Ibid., regulation 32.
[117] Ibid., regulation 33.
[118] UNCLOS, article 162 (w).

easy task to identify which are the best environmental practices in this context, guidance can be sought in the draft regulations on exploitation,[119] referring to 'the application of the most appropriate combination of environmental control measures and strategies, taking into account the criteria set out in the applicable guidelines'.[120] The recommendations issued by the LTC are certainly an example of best environmental practices. Of utmost importance in this respect are the recommendations for guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area, which have been amended several times, and whose last version has been adopted in 2020.[121] They describe the procedures to follow in order to acquire baseline data and monitor performance during and after the exploration activities with a view to define the biological, chemical, geological and physical components to be measured for ensuring the effective protection of the marine environment. As far as biodiversity is concerned, the recommendations suggest to gather data on biological communities, taking into particular account the samples of variable habitats and seabed characteristics, the collection of communities related to the megafauna, macrofauna, microfauna, meiofauna and the fauna directly associated with the resources and the assessment of regional distribution of species and genetic connectivity. In order to ensure that an adequate level of protection of the marine environment is granted, the recommendations also highlight which activities, within a plan of work for exploration, require a prior EIA. They do not include DNA screening of biological samples, which is of direct relevance for bioprospection, but still refer to the use of sediment disturbances, test-mining, test of mining components and discharge systems, drilling activities, sampling with epibenthic sled, dredge or trawl and sampling to test land base processes which could all entail major damages to marine biodiversity. Such EIAs are revised by the LTC: pending its assessment, the planned activity can either be conducted, be modified in the way it is undertaken or shall not be carried out at all. While the fully internationalized procedure for EIA should certainly be prized as an *unicum* in ABNJ, it is to be underlined that it is still lacking a certain degree of transparency, which would be needed in accordance with Principle 10 of the Rio declaration.[122] Indeed, only recently EIAs for test mining have been made available for comments to the civil society, whilst no public access is granted to those submitted during the application phase yet.[123]

Some authors have also maintained that EIAs are not sufficient tools for the protection of the marine environment and have proposed the introduction of strategic environmental

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[119] International Seabed Authority Council, *Draft regulations on exploitation of mineral resources in the Area*, 22 March 2019, ISBA/25/C/WP.1 (Draft regulations).

[120] See also, International Seabed Authority Council, *Key terms: distinguishing between good industry practice and best practices under the draft regulations on exploitation of mineral resources in the Area*, 15 January 2019, ISBA/25/C/11, para. 14-23; and International Seabed Authority Council, *Content and development of standards and guidelines for activities in the Area under the Authority's regulatory framework*, 17 December 2018, ISBA/25/C/3.

[121] International Seabed Authority Council, Legal and Technical Commission, *Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area*, 30 March 2020, ISBA/25/LTC/6/Rev.1.

[122] Principle 10 states 'Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided'. See also BOTHE M., *The protection of the marine environment against the impacts of seabed mining: an assessment of the new mining code of the International Seabed Authority*, in EHLERS P., MANN BORGESE E., WOLFRUM R. (eds.), *Marine Issues: from a scientific, political and legal perspective*, The Hague, 2002, pp. 225-7.

[123] See, for instance, *Environmental Impact Assessment for the testing of a pre-protoype manganese nodule collector vehicle in the Eastern German license area (Clarion-Clipperton Zone) in the framework of the European JPI-O MiningImpact 2 research project*, available at https://www.isa.org.jm/files/files/documents/EIA_BGR_0.pdf.

assessments (SEAs), conducted by the LTC, in the legal framework relating to seabed mining activities.[124] While they are less common under international law, and their conduct does not amount to a customary obligation,[125] they are relevant to assess policies and programmes rather than specific activities and to grant the proper management of certain areas.[126]

If the Authority never included SEAs in its environmental framework, it nonetheless came up with a regional environmental management plan (REMP) for the Clarion-Clipperton Zone (CCZ) back in 2012.[127] The plan, which is the first in its kind, is a scientifically driven policy instrument and an important tool for spatial planning as it highlights those areas deserving protection for their peculiar biological features and, as a consequence, interdicts mining activities therein. Following the repeated calls of the UN General Assembly to consider ways to improve the management of risks to vulnerable marine biodiversity within the framework of the UNCLOS,[128] the LTC analysed a number of guidelines for the identification of a system of areas of particular environmental interest (APEIs), which are *de facto* MPAs that, in addition to protecting representative habitats, are also imagined to facilitate marine scientific research. The plan, which is inspired by the common heritage of mankind principle, the precautionary approach, the conservation and in particular the sustainable use of marine biodiversity, applies to the area located in the eastern central Pacific, to the south and south-east of the Hawaiian Islands, which since the 1960s has been of particular interest for the commercial development of polymetallic nodules. As the biodiversity in the whole fracture area is highly variable, it has been deemed necessary to identify APEIs that are distributed across the gradients and which are large enough to maintain sustainable populations. The main goals are to facilitate the exploitation of seabed mineral resources in an environmentally responsible manner, the preservation of the regional biodiversity and grant the conservation of unique and rare ecosystem structures. The management objectives set out in the CCZ environmental plan are wide and hence divided in accordance with their geographical scope. Indeed, while for the entire CCZ area the collation of information from EIAs, the consideration of cumulative impacts of concurrent activities and exchange of information is encouraged, in the contract areas entities are required to provide environmental data in their annual reports, to identify and designate impact and preservations zones for monitoring the impacts on biological communities and to include in their management plans measures to maximise the potential for the recovery of the biota. As far as APEIs are concerned, the ISA shall ensure that data and assumptions for their selection are reviewed and updated and the LTC is also tasked to encourage research projects and programmes to further knowledge of the biodiversity and to support international organisations in adopting compatible measures for other activities with impacts on biodiversity.

With respect to the establishment of a network of APEIs, it has long been discussed whether the ISA was legally entitled to reserve such areas. The decision by which the Council has endorsed the CCZ management plan and, thus, the creation of the 9 APEIs in 2012 makes explicit reference to article 145 and article 162 of the UNCLOS on the power of the Council to establish specific policies to be pursued including the recognition of areas where exploitation shall be

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[124] KIRKHAM N. R., GJERDE K. M., WILSON A., *DEEP-SEA mining: Policy options to preserve the last frontier – Lessons from Antarctica's mineral resource convention*, in 'Marine Policy', Vol. 115, 2020, p. 162.

[125] According to the Seabed Dispute Chamber, the obligation to conduct EIAs has a customary value also in ABNJ. See Advisory opinion, para. 148.

[126] WARNER R., *Oceans beyond boundaries: environmental assessment frameworks*, in 'International Journal of Marine and Coastal Law', Vol. 27, 2012, p. 491.

[127] International Seabed Authority Council, *Decision of the Council relating to an environmental management plan for the Clarion-Clipperton Zone*, 26 July 2012, ISBA/18/C/22.

[128] United Nations General Assembly, *Oceans and the Law of the Sea*, 23 December 2003, A/RES/58/240, para. 52; United Nations General Assembly, *Oceans and the Law of the Sea*, 17 November 2004, A/RES/59/24, paras. 70-2; United Nations General Assembly, *Oceans and the Law of the Sea*, 29 November 2005, A/RES/60/30 paras. 71-7; United Nations General Assembly, *Oceans and the Law of the Sea*, 22 December 2007, A/RES/62/215, paras. 109-12; United Nations General Assembly, *Oceans and the Law of the Sea*, 5 December 2008, A/RES/63/111, paras. 132-5.

disapproved in case of the risk of serious harm to the marine environment.[129] However, it seems that the most solid basis is represented by article 165 (2), according to which the LTC can make recommendation on the protection of the marine environment taking into account the view of the experts in the field. As no limit is set for the exercise of such recommendatory power, MPAs can be considered as falling among the measures that the LTC can suggest to the Council for implementation under article 162.

As the UN General Assembly invited the ISA 'to consider developing and approving environmental management plans in other international seabed area zones, in particular where there are currently exploration contracts',[130] the Council required the LTC to initiate such process, which to date has not been concluded. This is absolutely relevant since the draft regulations on the exploitation of mineral resources consider the approval of the region-specific management plan as a precondition to the granting of exploitation licenses. To this extent, a standardized approach would be required to properly establish the content of such plans and to ensure consistency at least in those areas which have been considered as a priority, namely the Mid-Atlantic Ridge, the Indian Ocean triple junction ridge, the North West Pacific and South Atlantic Seamounts.[131] A proposal in this regard has been recently advanced by Germany and the Netherlands with the sponsorship of Costa Rica, but it has not yet been adopted by the Council.[132]

REMPs are only one feature of the articulated system of protection of marine environment referred to in the draft regulation on exploitation of mineral resources that ISA Members are currently negotiating. The core of this set of regulations lies in environmental impact statement (EIS) and in the environmental management and monitoring plan (EMMP). As highlighted in draft regulation 47, the rationale of the EIS is 'to document and report the results of the environmental impact assessment':[133] it shall be presented in the form prescribed in Annex IV to the regulations and derive from a prior EIA which identifies, predicts and evaluates the biophysical effects of the mining operations and, in the light of the screening and scoping procedures, foresees the risks associated to the extraction and the relative management measures. To this last extent, the EMMP serves the purpose to show that mitigation measures are in place and can be promptly implemented. It should be based on the EIS and on the relevant REMP and prepared in accordance to the applicable standards and guidelines as elaborated by the LTC in due course. According to such plan, contractors are required to monitor and report annually on the effects of their activities on the environment, grant the currency of the strategy, test the applicability of the mitigation and management measures and update them in the light of the best environmental and industrial practices. On its part, the Council, when risks for the marine environment arise, can decide, under recommendation of the LTC, the suspension of exploitation activities, the issuing of emergency orders to be complied with by the contractor, the direct intervention of the ISA through specific arrangements whenever necessary to avoid further damages to the marine environment and shall require, according to the standard clauses of the contract, the operator to compensate the occurred damages.

For the sake of completeness, it should also be highlighted that the ISA is considering, as suggested by the Seabed Dispute Chamber,[134] the establishment of an Environmental

[129] *Supra note 127*, first, second and third preambular paragraphs.
[130] United Nations General Assembly, *Oceans and the Law of the Sea*, 9 December 2013, A/RES/68/70, para. 51.
[131] International Seabed Authority Council, *Preliminary strategy for the development of regional environmental management plans for the Area*, 16 January 2018, ISBA/24/C/3; and International Seabed Authority Council, *Implementation of the Authority's strategy for the development of regional environmental management plans for the Area*, 28 January 2019, ISBA/25/C/13.
[132] International Seabed Authority Council, *Procedure for the development, approval and review of regional environmental management plans*, 6 January 2020, ISBA/26/C/6; and International Seabed Authority Council, *Decision of the Council concerning a standardized approach for the development, approval and review of regional environmental management plans in the Area*, 21 February 2020, ISBA/26/C/10.
[133] Draft Regulations, Regulation 21.
[134] Advisory opinion, para. 209.

Compensation Fund with a view to cover, as a minimum, the clean-up costs which could not be eventually met by the contractor having caused damages to the marine environment.[135] The funding and the purpose of the Fund have not been agreed upon yet, but there seems to be wide convergence on its institution as an additional guarantee for the protection and restoration of marine ecosystems endangered by mining operations.

With a roadmap for the finalization of the regulations on exploitation set to expire in July 2020,[136] the outbreak of the COVID-19 pandemic has delayed the negotiating process. In any case, during the February 2020 meetings of the Council, many delegations highlighted the necessity to ensure coordination with the BBNJ treaty.[137] This does not mean that the drafting of the regulations should be stopped. On the contrary, that the two processes need to progress in parallel and to duly consider the developments on each side to ensure consistency. As many delegates participating to the BBNJ Conference are also representative of their countries at the ISA, it is likely that the outcome of each negotiating table will also influence the other.

2.2. Which role for the International Seabed Authority under the new treaty on BBNJ?

Assuming that an integrated approach to MGRs is applied under the new BBNJ treaty and considering that bioprospection activities are, as maintained, a form of MSR, it remains to be seen which role, also in the light of the environmental measures already adopted by the ISA, the Authority could play for the sustainable use and management of genetic resources. Indeed, there is an evidently indissoluble link between the protection of marine biodiversity and bioprospecting, as they are each a prerequisite for the other.

Under the UNCLOS, the principles underpinning MSR are distinguished on the basis of the zone in which it is conducted, that in the present case would comprehend both the high seas and the Area. While in the high seas scientific research is listed among the freedoms of States, specific provisions are foreseen for the Area. As 'the scope of the regime of the Area is already broader than may be believed at first sight',[138] its peculiar status also influences fields which are not directly linked to mining activities, including MSR. This entails that, contrary to the high seas, in the Area there is not an absolute freedom to carry out MSR, including bioprospecting, but pursuant to article 143 it shall be conducted for peaceful purposes and for the benefit of mankind as a whole.[139] Hence, research endeavours taking place in the Area, which are not necessarily limited to mineral resources *stricto sensu* by reason of the potential impacts of mining activities on the marine environment *at large*, and that could eventually result in any commercially relevant discovery, shall be subject to benefit sharing by the ISA.[140]

In accordance with the package deal, the BBNJ treaty is equally considering the sharing of benefits deriving from the collection, access and utilization of genetic information of MGRs. While the extent and the character of such benefit sharing as well as the stage at which it should be implemented is far from being agreed upon, it is evident that a proper mechanism needs to be identified. In the light of its peculiar function under article 143, one could wonder whether the ISA could be given any competence in this respect. Indeed, as Parties to the new implementation

[135] Regulations, Regulations 54-6.

[136] See https://www.isa.org.jm/files/2019-11/roadmap_regulatory_development_2019-2020.pdf.

[137] IISD Reporting Services, Earth Negotiations Bulletin, Vol. 25, No. 224, 24 February 2020, available at https://enb.iisd.org/download/pdf/enb25224e.pdf.

[138] SCOVAZZI T., *supra note 64*, p. 49.

[139] SCOVAZZI T., *The evolution of International Law: New Issues New Challenges*, in *Collected Courses of The Hague Academy of International Law*, Vol. 286, 2000, p. 219.

[140] FRANCIONI F., *Genetic resources, biotechnology and human rights: the international legal framework*, in FRANCIONI F. (ed.), *Biotechnologies and International Human Rights*, 2007, p. 14-5. See also International Seabed Authority Council, *Issues associated with the conduct of marine scientific research in exploration areas*, 2 May 2016, ISBA/22/C/3.

agreement should look for a benefit sharing mechanism, with a variable gradient of institutionalization, the Authority already exists and could offer valuable support. Should a fully internationalized benefit sharing mechanism be chosen, as could be the case under draft article 48, it is unquestionably safe to say that the ISA is in the best position to ensure the distribution of material and non-monetary benefits arising from bioprospection, since its institutional features were specifically designed to that purpose.[141]

In the light of the threats to the marine environment associated to MSR,[142] including bioprospection, 'sectoral approaches are not likely to lead to coherent and cost-effective results'[143] as far as the management of MGRs is concerned. Since 'the problems of ocean space are closely interrelated and need to be considered as a whole through an integrated, interdisciplinary and intersectoral approach',[144] relying on the ISA for the conservation, sustainable use and benefit sharing of MGRs, would be advantageous in many respects.

First of all, it is a modern and well-functioning international organization, which is already operational. It has been attributed widespread law-making and policy-making power and largely benefits from the cooperation among its Member States and the coordination with other international organizations for the protection of the marine environment.[145]

As an international organisation operating in ABNJ with a mandate practically extended to more than a single area identified under the UNCLOS, the ISA is provided, has collected and shared, through the encouragement of MSR, the widest available knowledge on deep marine ecosystems. Through its broad environmental competences and guided by such scientific discoveries, it also developed efficient systems for the protection of the marine biodiversity, which to date represents the most complete set of rules, guidelines and standards applicable in ABNJ.[146] This also entailed the creation of *de facto* MPAs, with a view to ensure the conservation of those MGRs having potential uses for human health security and for economic development. The adoption of such measures, including REMPs for specific areas, has been scientifically driven, with the peculiar contribution of the independent LTC which, ensuring that political convenience did not scratch the overarching goal of the protection of the marine environment, has already translated the ecosystem approach to ocean governance into reality.

Most importantly, the extension of the ISA competences – through an implementation agreement, as it was the case with the New York Agreement which modified the competences of the Authority –[147] would enshrine such integrated, holistic and ecosystem-based management of the living and non-living resources as required by the contemporary understanding of the deep ocean environment, with only one international organisation mandated to oversee the protection of *all* marine biodiversity for non-human consumption in ABNJ. In particular, this would prevent that, while for instance contractors for mining operations are required to stick to increasingly stringent environmental provisions, the bioprospection and use of MGRs escape from any guarantee of preserving marine ecosystems. Indeed, since, as pointed out by the ISA former Secretary General Nandan, 'it is practically impossible to distinguish between marine

[141] This is also the case for Payments and contributions with respect to the exploitation of the continental shelf beyond 200 nautical miles under article 82 of the UNCLOS.
[142] *Supra note 37*, para. 54.
[143] SCOVAZZI T., *The Concept of Common Heritage of Mankind and the Genetic Resources of the Seabed beyond the Limits of National Jurisdiction*, in 'Agenda Internacional', Vol. 25, 2007, p. 18.
[144] United Nations General Assembly, *Ocean and the law of the sea*, 11 September 2019, A/74/350, para. 89.
[145] International Seabed Authority Assembly, *Request for observer status in accordance with rule 82, paragraph 1 (d) of the rules of procedure of the Assembly on behalf of the OSPAR Commission*, 12 March 2010, ISBA/16/A/INF.2.
[146] SCOVAZZI T., *Mining Protection of the Environment, Scientific Research and Bioprospecting: Some considerations on the Role of the International Sea-Bed Authority*, in 'International Journal of Marine and Coastal Law', Vol. 19, 2004, p. 409.
[147] *Supra note 37*, para. 123.

scientific research, including bioprospecting, and prospecting for minerals', [148] it follows that the ISA could also extend the existing rules, practices and regulations to all research activities and adopt updated environmental standards in line with the protection of biodiversity in ABNJ.

It goes without saying that the extension of the ISA competences would unequivocally determine that MGRs would fall under the regime of Part XI and, thus, be the common heritage of mankind. While, in the light of the reported opposition of some States, it could seem *prima facie* unfeasible, it shall be acknowledged that if, with the intention to pragmatically rather than ideologically engage in negotiations,[149] any formal reference to the principle was limited in the draft, its core feature, i.e. the sharing of both immaterial and monetary benefits deriving from MGRs is still part of the package deal. Without going into the details of the constitutive elements of the notion of the common heritage of mankind, when comparing the latter with the *res communes omnium*, it is evident that if the conduct of activities in the common areas for the good of the international community is a shared feature,[150] it is the redistribution of the benefits deriving from them, together with the intergenerational equity, which constitutes the *conditio sine qua non* of the common heritage of mankind, i.e. the element without which it would be indistinguishable from the regime of *res communes omnium*.[151] From a less ideological perspective, this means that delegations have already *de facto* accepted to integrate the core of the common heritage in the BBNJ treaty. As a consequence, it would be convenient to stop resorting to the device of the general expression of benefit sharing and rely on the ISA for an effective protection and sustainable use of MGRs. By the way, reliance on the Authority is also favourable to developed countries that, since the New York Agreement, have already resolved to obtain a more balanced control of the ISA institutions and the deletion or modification of those provisions of the UNCLOS which would not be in line with the financial and economic evolutions of the XXI century.

The opponents of such a broadened mandate of the ISA have argued that the Council is elected through a scheme which gives prominence to certain interest groups that, while significant and adjusted for the exploitation of mineral resources, have only limited significance for MGRs. However, if one takes into account the practice of the ISA, the election of the Council should not be overestimated.[152] Indeed, although not elected to the executive body, ISA Members can participate in its sessions and intervene in the debates, as it was the case for the

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[148] NANDAN S., *The International Sebaed Authority and the Governance of High seas Biodiversity*, paper presented at the workshop Governance of High Seas Biodiversity, Cairns, 2003, p. 3, available at http://www.highseasconservation.org/documents/nandan.pdf.

[149] TLADI D., *The Common Heritage of Mankind and the Proposed Treaty on Biodiversity in Areas beyond National Jurisdiction: The Choice between Pragmatism and Sustainability*, in 'Yearbook of International Environmental Law', Vol. 25, 2015, pp. 114-5.

[150] See MARCHISIO S., *Corso di diritto internazionale*, Torino, 2017, pp. 220-1; MARCHISIO S., *Patrimonio commune dell'umanità*, in PATTI S. (a cura di), *Il diritto: enciclopedia giuridica del Sole 24 ore*, Vol. 7 Milano, 2007, p. 729; and ODA S., *The International Law of the Resources of the Sea*, in *Collected Courses of The Hague Academy of International Law*, Vol. 127, 1969, p. 465, who argues that use for the benefit of all countries does not involve unlimited exploitation, but on the contrary a balanced use so that all states can enjoy it.

[151] United Nations General Assembly, First Committee, 1849th meeting, para 163, reproduced in DIVISION FOR OCEAN AFFAIRS AND THE LAW OF THE SEA, *The Law of the Sea: Concept of the Common Heritage of mankind*, New York, 1996, p. 219; SHRAGA D., *The Common Heritage of Mankind: the Concept and Its Application*, in 'Annals d'Études Internationals', Vol. 15, 1986, p. 63; SCOVAZZI T., *Fondi marini e patrimonio comune dell'umanità*, in 'Rivista di diritto internazionale', Vol. 67, 1984, p. 257; and ESPIRITU A. C., *International Seabed Authority and the New International Economic Order*, in 'Philippine Yearbook of International Law', Vol. 8, 1982, pp. 18-22. It should be noted that a benefit *sharing* rule is also contained in the Nagoya Protocol to the Biodiversity Convention. However, mainly referring to resources in areas that fall under national jurisdiction, the Article 10 mechanism on so-called *'global benefit sharing'* has not in fact been implemented.

[152] WOOD M., *International Seabed Authority: The First Four Years*, in 'Max Planck Yearbook of United Nations Law', Vol. 3, 1999, pp. 201-9.

Mining code,[153] albeit without the right to vote. However, since the Council is encouraged to exhaust all the efforts to reach the consensus and has so far never resorted to a formal vote, the differences between Members of the Council and the other States participating to its sessions are only formal and limited.[154] Ultimately, it shall be considered that any regulation on bioprospection, including benefit sharing provisions, would be approved by the Assembly, so that an agreement among all the Parties to the UNCLOS is always needed.

Conclusion

Since when the international community first committed itself to the conclusion of a third implementing agreement on BBNJ, it was evident that the way forward would have not been an easy one. Contrary to what originally believed, under the package deal approach, the uneven parts of the new treaty are not making it easy to reach consensus on every provision. The sensitivity of the issues under negotiation and the very different attitudes of the delegations can, thus, well pose risks for the new treaty not to be ratified by States.

With the 2019 Global Assessment Report on Biodiversity and Ecosystem Services by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services predicting that over 1 million species could disappear entirely over few decades,[155] a timely action for the protection of our ocean is needed: this is in the interest of human security and, in particular, health.

With more than 25 years of experience in the field of ABNJ, an increasingly well-functioning institutional structure and wide commitment of States and civil society to the protection of the common heritage of mankind, the ISA is to date the best platform to address the conservation and sustainable use of MGRs. While apparently complex, the broadening of the ISA competences would be the easiest and more practical way to cope with these new challenges.[156] If the very same history of the law of the sea shows that accommodating all the priorities and conflicting interests of States is not always practically feasible,[157] so far, this has not prevented the UNCLOS and, in particular, the ISA to work in the interest of the international community as a whole; a mantra that, when regulating the future of our ocean, should never be forgotten and which should certainly be borne in mind when approaching the last substantive session of the Intergovernmental Conference.

[153] For the draft suggestions to the exploitation code, see International Seabed Authority Council, *Draft regulations on exploitation of mineral resources in the Area Collation of specific drafting suggestions by members of the Council*, 17 December 2019, ISBA/26/C/CRP.1.

[154] International Seabed Authority, *Rules of procedure of the Council*, Rule 74.

[155] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Global Assessment Report on Biodiversity and Ecosystem Services, 2019, available at https://ipbes.net/global-assessment.

[156] Some authors consider it sufficient an interpretative declaration by the Meeting of the States Parties to the Convention on the meaning of resource contained in article 133.

[157] CHURCHILL R., *The 1982 United Nations Convention on the Law of the Sea*, in ROTHWELL D. R., OUDE ELFERINK A. G., SCOTT K. N., STEPHEN T. (eds.), *The Oxford Handbook of the Law of the Sea*, Oxford, 2017, pp. 25-7 and 32-3.