

Current Legal Developments
ISA Areas of Particular Environmental Interest in the Clarion-Clipperton Fracture
Zone

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Offsetting to fund scientific research

Deep-sea mining in seabed areas beyond national jurisdiction (ABNJ), or ‘the Area’ as it is called in the 1982 United Nations Convention on the Law of the Sea (LOS¹) is on the cusp of becoming a reality. The International Seabed Authority (ISA) established by LOSC Part XI is mandated with developing and overseeing the regulatory regime for the Area.² ISA’s mandate includes encouraging prospecting in the Area³ while ensuring effective protection of the marine environment and the promotion of marine scientific research. To date, ISA has granted twenty-one 15-year Exploration Contracts.⁴ These contracts require the licensed developers to undertake environmental baseline studies,

¹ United Nations Convention on the Law of the Sea (Montego Bay; 10 December 1982; .in force 16 November 1994), 1833 UNTS 397 [hereinafter LOSC].

² LOSC, Article 157.

³ LOSC, see, respectively, Annex III, Article 2, and Articles 143 and 145.

⁴ International Seabed Authority: Deep Seabed Minerals Contractors. Available at <http://www.isa.org.jm/deep-seabed-minerals-contractors>; last accessed 15 April 2015.

to progressively relinquish percentages of the licensed areas,⁵ and commit to annual reporting and review.⁶ The ISA is currently in the process of formulating a Mineral Exploitation Code⁷ and, as recently discussed in this journal, has some way to go to put in place an holistic environmental management strategy.⁸ The regulatory regime is therefore developing but incomplete. This is especially true of the fiscal regime for exploitation, for which costs and benefits need to be better understood and articulated with environmental management obligations⁹.

The abyssal sediments of the extensive Clarion-Clipperton Zone (CCZ) in the central Pacific represent an established location where a number of State and State Party Contractors to the ISA have been undertaking exploration activities since 2001 and others, including private sector mining corporations, have subsequently been

⁵ E.g. 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 (ISBA/19/C/17: Regulation 25, of 22 July 2013).

⁶ ISBA/19/C/17 (n 6) Section 10 – Annual reports.

⁷ Seabed Authority Launches “Stakeholder survey” on Mineral Exploitation Code. Available at <http://www.isa.org.jm/news/seabed-authority-launchers-stakeholder-survey-mineral-exploitation-code>; accessed 15 March 2015 and Draft Framework for the Regulation of Exploitation Activities (see footnote 67).

⁸ A. Jaeckel, “An Environmental Management Strategy for the International Seabed Authority? The Legal Basis” (2015) 30(1) *International Journal of Marine and Coastal Law* 93-119.

⁹ In March 2015 the ISA published a Discussion Paper on the Development and Implementation of a Payment Mechanism in the Area for consideration by Members of the Authority and all stakeholders. This paper recalled a Technical Study published in 2013 (Technical Study No.11, 26 February 2013) and a working paper to develop a discussion of financial terms under contracts for the future exploitation of the Area (Available on-line at <http://bit.ly/19BLJC9>).

granted exploration licenses.¹⁰ Eventual exploitation in the CCZ will be informed by an Environmental Management Plan (EMP) adopted by the ISA in 2012.¹¹ The CCZ-EMP sets out a framework of license blocks containing Preservation Reference Areas within each license block as well as a mosaic of nine large Areas of Particular Environmental Interest (APEIs)¹² outside the license areas (see Figure 1). The size and location of such APEIs (or preservation reference areas as they were designated then) was proposed at a workshop held in Hawaii in 2007, where experts recognized the existence of latitudinal and longitudinal productivity gradients in the CCZ, which appear to drive

¹⁰ To date, thirteen exploration contracts have been granted in the CCZ (n 5). For a revision of the CCZ and of the developments in this area, see M. Lodge, D. Johnson, G. Le Gurun, M. Wengler, P. Weaver and V. Gunn, "International Seabed Authority Environmental Management Plan for the Clarion-Clipperton Zone: a partnership approach" (2014) 49 *Marine Policy* 66-72.

¹¹ 'Environmental Management Plan for the Clarion-Clipperton Zone' (ISBA/17/LTC/7, 13 July 2011); Decision of the Council of the ISA relating to an environmental management plan for the Clarion-Clipperton Zone (ISBA/18/C/22, 26 July 2012).

¹² The unexpected discovery of rich and diverse biological communities in the seabed of the CCZ led to a proposal, in 2007, of the establishment of a representative network of protected areas. The original intention was to protect 30-50% of the total CCZ management area, capturing the full range of habitats and communities therein. The size of each protected area should allow for the maintenance of viable population sizes of potentially endemic species. The final proposal established a mosaic of nine APEIs, one in each biogeographic subregion. Each APEI includes a core area of 200 km x 200 km (40,000km²), surrounded by a buffer zone 100 km wide (120,000km²), resulting in a total area per APEI of 400kmx400km (160,000 km²). This proposal placed roughly 24% of the CCZ management area under protection. The proposed terminology of APEIs was selected, provisionally, to avoid confusion with other initiatives to establish marine protected areas (MPAs) in the high seas. Lodge et al. (n 11), at p. 68.

major changes in the seabed community composition across the region.¹³ Experts thus recommended “that the zone be divided into three east-west and three north-south strata, with representative preservation reference areas being placed in each of the nine resultant subregions”.¹⁴ They further recommended that, in order to “preserve representative and unique habitats, all habitat types for a subregion should be included within a preservation reference area”.¹⁵ However, experts acknowledged that whereas “a variety of general habitat types can be recognized” within the CCZ, the biota of seamounts and fracture zones remain “essentially unstudied so the uniqueness of associated biota cannot be assessed”.¹⁶ Results from the “Kaplan Project”, designed to assess the biodiversity, species ranges, and gene flow in the abyssal Pacific nodule province (CCZ) indicated “high, unanticipated, and still poorly sampled levels of species diversity” of sediment-dwelling faunal components at the sampling locations, and higher habitat heterogeneity than previously assumed.¹⁷ These findings suggest the existence of a characteristic fauna of the abyss, but one which may differ substantially

¹³ ‘Rationale and recommendations for the establishment of preservation reference areas for nodule mining in the Clarion-Clipperton Zone (ISBA/14/LTC/2, 28 March 2012).

¹⁴ ISBA/14/LTC/2 (n 15), at p. 4.

¹⁵ Ibid., at p. 6.

¹⁶ Ibid., at p. 6-7.

¹⁷ C. R. Smith, J. Galeron, A. Gooday, A. Glover, H. Kitazato, L. Menot, G. Paterson, J. Lamshead, A. Rogers, M. Sibuet, F. Nozawa, N. Ohkawara, D. Lunt, R. Floyd, B. Elce, I. Altamira and P. Dyal, *Final report: Biodiversity, species ranges, and gene flow in the abyssal Pacific nodule province: predicting and managing the impacts of deep seabed mining* (J. M. Kaplan Fund and the International Seabed Authority, Kingston, 2007), at p. 2. Available at: <http://www.isa.org.jm/sites/default/files/files/documents/tec>; accessed 15 April 2011.

across the CCZ,¹⁸ increasing concerns regarding appropriate representativeness of selected reference protection areas.

Whilst Contractors gather environmental and technical information on an annual basis, and report this to the ISA for the purposes of constructing a common baseline within their license areas, an ‘Achilles heel’ of the CCZ-EMP is that there is no requirement or incentive for Contractors to carry out similar surveys in the APEIs.¹⁹ This clearly undermines the importance of these areas as environmental ‘reference zones’, and, consequently, hampers ISA’s mission of effectively protecting the marine environment. Our intention here is to suggest a possible approach to address this management gap.

ISA Environmental Impact Assessments requirements

The protection of the environment is a significant part of the ISA’s legal mandate. Potential environmental impacts, together with recovery and rehabilitation possibilities, will be different for the various mining operations planned – whether for manganese nodules, massive sulphides or cobalt crusts.²⁰ Operations in the CCZ are directed at manganese nodules, formed over millennia in abyssal areas rarely subjected to natural disturbance, where recovery times for fauna disturbed by mining operations

¹⁸; M. Lodge, ‘Current Legal Development – International Seabed Authority: Endowment Fund for Marine Scientific Research’ (2009) 24(1) *International Journal of Marine and Coastal Law* 185-193.

¹⁹ Seascope Consultants, *Preliminary evaluation of CCZ-EMP. Report for the ISA*. (2014) Available at: <http://www.isa.org.jm/files/documents/EN/20Sess/LTC/CCZ-EMPRev.pdf>; accessed 6 January 2015.

²⁰ World Ocean Review, 3: *Marine Resources – Opportunities and risks* (Maribus, Future Ocean, International Ocean Institute, Mare, 2014, Hamburg, Germany). Available at: http://worldoceanreview.com/wp-content/downloads/wor3/WOR3_english.pdf; accessed 18 March 2015.

are likely to be extremely long if indeed the mining does not create tipping points of no return from which recolonization may not be possible.²¹

Both test mining, within the exploration phase, and licenses for exploitation of deep-sea mineral resources, will require Environmental Impact Assessments (EIAs).²² A fundamental prerequisite for any such EIA is an oceanographic and environmental baseline against which to assess significant effects.²³ Determining such effects, together with recovery potential and restoration strategies that will provide guidance for EIAs are all elements of Project MIDAS an ongoing EU FP7 Project.²⁴

EIA methodology and practice is well established for terrestrial projects (such as major infrastructure projects) and for marine projects within national jurisdiction (e.g. oil and gas exploitation). However, in ABNJ this topic has been subject to further debate and negotiation within the UN Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity

²¹ C. R Smith, S. Gaines, L. Watling, A. Friedlander, C. Morgan, A. Thurnherr, S. Mincks, A. Rogers, M. Clark, A. Baco-Taylor, A. Bernardino, F. De Leo, P. Dutrieux, A. Rieser, J. Kittinger, J. Padilla-Gamino, R. Prescott and P. Srsen, "Areas of Particular Environmental Interest (or "protected Areas" for Ecosystem Based Management of the Clarion-Clipperton Zone: Rational and Recommendations to the International Seabed Authority". Available at <http://www.isa.org.jm/files/documents/EN/Workshops/2010/Pres/SMITH.pdf>; accessed 16 April 2015.

²² "Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area" (ISBA/19/LTC/8, 1 March 2013).

²³ P. Wathern (Ed.) *Environmental Impact Assessment: Theory and Practice* (Routledge, London, 1988), at p. 40.

²⁴ MIDAS: Managing Impacts of Deep-sea resource exploitation. A European Union funded FP7 project of 32 partners which seeks to quantify the impacts of the imminent exploitation of deep sea mineral resources throughout the world. For more information, see <http://eu-midas.net>.

beyond areas of national jurisdiction (BBNJ) as well as at expert workshops convened by the Convention on Biological Diversity (CBD).²⁵ EIA requirements for future activities in ABNJ are within the so-called ‘package’ of considerations to form the basis of a potential Implementing Agreement for BBNJ.²⁶ The situation for seabed mining however is regulated by the ISA, but the specific requirements for seabed mining EIAs will to some extent depend on emerging technologies to be used for exploitation. Consequently, the ISA Legal and Technical Commission will further develop EIA guidance in 2015 as part of the emerging Exploitation Code.²⁷

In developing these requirements the ISA may find it instructive to look at practice relating to EIAs for seabed mining applications within national jurisdictions, as well as emerging best practice for terrestrial EIAs. In New Zealand, EIAs have recently been produced by Trans-Tasman Resources Ltd for the South Taranaki Bight Iron Sands Project,²⁸ and by Chatham Rock Phosphate Ltd in relation to a proposed mining

²⁵ Convention on Biological Diversity (Rio de Janeiro, 5 June 1992, in force 29 December 1993) 1760 UNTS 79.

²⁶ UNGA, “Outcome 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 and Co-Chairs summary of discussions”. A/69/780, 13 February 2015. Available at: http://www.un.org/ga/search/view_doc.asp?symbol=A/69/780; accessed 19 March 2015.

²⁷ ISA Technical Guidance Document: Conducting an Environmental Impact Assessment and Preparing and Environmental Impacts Statement for Mineral Exploitation in the Area – DRAFT. Available at: <http://www.isa.org.jm/files/documents/EN/Workshops/2011/WG1-EIS.pdf>; accessed 19 March 2015.

²⁸ Trans-Tasman Resources Limited, *South Taranaki Bight Iron Sands Project: Impact Assessment Summary*. (Wellington, New Zealand, 2013).

operation on Chatham Rise.²⁹ With respect to the former, consent was refused by the Decision-making Committee (DMC) of the New Zealand Environmental Protection Authority on the basis that conditions proposed by the applicant were not sufficiently certain or robust.³⁰ The DMC was not satisfied that the adverse effects of the proposal could be avoided, remedied or mitigated.³¹ The Marine Consent Application for the latter project has also been refused.³² The mitigation measures proposed included ‘mining exclusion areas’, separation of mining blocks to avoid sediment impacts, consideration of creating hard substrate habitat to enhance recolonization, marine mammal observers and adapted vessel lighting to minimize the risk of collisions by seabirds.³³ Arguably the practicality and potential cost of these measures may have made them unrealistic.³⁴ Mitigation in deep-sea is likely to be similarly fraught with uncertainty and the costs may negate the potential economic benefits of the mining

²⁹ Golder Associates (NZ) Limited, *Proposed mining operation, Chatham Rise: Mining Consent Application and Environmental Impact Assessment. Volume 1* (Chatham Rock Phosphates Ltd., 2014).

³⁰ Environmental Protection Authority, “Trans-Tasman Resources Ltd Marine Consent Decision”, June 2014. Available at: http://www.epa.govt.nz/EEZ/EEZ000004/Trans_Tasman_Resources_decision_17June2014.pdf; accessed 19 March 2015.

³¹ *Ibid.*, p. 4.

³² Environmental Protection Authority, “Decision on Marine Consent Application Chatham Rock Phosphate Limited to mine phosphorite nodules on the Chatham Rise”, February 2015. Available: http://www.epa.govt.nz/eez/EEZ000006/EEZ000006_CRP%20Final%20Version%20of%20Decision.pdf; accessed 19 March 2015.

³³ *Ibid.*

³⁴ *Ibid.*, at p. 82.

operation or the contractor's willingness to effectively pay/carry out mitigation.³⁵ As such, it is important to identify alternative funding mechanisms which will effectively promote scientific research and the implementation of environmental measures.

Alternative financial mechanisms for supporting research and conservation efforts: Biodiversity offsets

Biodiversity offsets have been defined as “measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken’.³⁶ The concept is based on the premise that impacts from development can be offset (or compensated for) if sufficient habitat can be protected, enhanced or established elsewhere. Biodiversity offsets are intended to be carried out during the final step of the environmental impact mitigation hierarchy –

³⁵ D. K. Anton and R.E. Kim, “Current Legal Development – New Zealand: The Application of the Precautionary and Adaptive Management Approaches in the Seabed Mining Context: Trans-Tasman Resources Ltd Marine Consent Decision under New Zealand’s Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012” (2015) 30(1) *The International Journal of Marine and Coastal Law* 175-188.

³⁶ Business and Biodiversity Offsets Programme (BBOP), *The Relationship between Biodiversity Offsets and Impact Assessment: A BBOP Resource Paper* (BBOP, Washington DC. 2009.) Available at <http://www.forest-trends.org/biodiversityoffsetprogram/guidelines/eia.pdf>; accessed 30 December 2014.

avoid, minimize, rehabilitate/restore and offset.³⁷ Offsets are more explicitly and proportionately linked to project impacts than several other environmental stewardship approaches.³⁸ According to the Organization for Economic Cooperation and Development (OECD) biodiversity offsets are one of six ‘innovative financial mechanisms’³⁹ that could be used to scale-up financing for biodiversity conservation and sustainable use to help meet the 2011-2020 Aichi Biodiversity Targets, set by the parties to the CBD.⁴⁰

³⁷ J. M. Kiesecker, H. Copeland, A. Pocewicz, N. Nibbelink, B. McKenney, J. Dahlke, M. Holloran and D. Stroud “A framework for implementing biodiversity offsets: selecting sites and determining scale” (2009) 59 *Bioscience* 77-84.

³⁸ An international workshop in 2012 differentiated between biodiversity offsets and bio-banking, the latter serving to transfer liability of the offset from the project developer to the offset provider and often creating offsets further in advance of the development impacts. International workshop on Finance mechanisms for biodiversity: Examining Opportunities and challenges. OECD, World Bank, GEF and the European Commission, together with Sweden and India, 12 May 2012, Montreal, Canada.

³⁹ In 2008, CBD COP-9 Decision IX/II adopted a resource mobilization strategy to assist Parties in establishing national targets, goals, as well as actions for enhancing international financial flows and domestic funding for biodiversity. Part of this Strategy (Goal 4) is to explore ‘new and innovative financial mechanisms’.

⁴⁰ In 2010, CBD COP10 Decision X/2 adopted a Strategic Plan for Biodiversity 2011-2020 with 20 headline targets for 2015 or 2020 (the “Aichi Biodiversity Targets”) grouped under five Strategic goals: A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society; B. Reduce the direct pressures on biodiversity and promote sustainable use; C. Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity; D: Enhance the benefits to all from biodiversity and ecosystem services; and E. Enhance implementation through participatory planning, knowledge management and capacity-building. Available at <http://www.cbd.int/decision/cop/?id=12268>; accessed 19 March 2015. See also OECD, *Scaling-up Finance mechanisms for Biodiversity*, 2013. Available at <http://www.oecd->

Looking beyond application to individual projects, a recent World Bank study favored an ‘aggregate offset approach’, applying this to extractive and other large scale projects with an inherently large footprint, collecting revenues from several development companies.⁴¹ Kormos et al. make the case for national offset strategies taking into account cumulative impacts, identification of priority offset sites, promoting aggregated offsets and ensuring integration with national conservation objectives.⁴² In a review of policies for environmental licensing and biodiversity offsets in Latin America, Villarroya et al. concluded on the need for further guidance to (1) ensure conformance with the mitigation hierarchy; (2) identify the most environmentally preferable offsets within a landscape context; (3) determine appropriate mitigation

ilibrary.org/environment/scaling-up-finance-mechanisms-for-biodiversity_9789264193833-en; accessed 6 January 2015.

⁴¹ Public information note: Ongoing World Bank Study of Biodiversity Offsets (Working Draft September 17, 2013). Available at <http://www.profor.info/sites/profor.info/files/docs/OFFSETS-PUBLIC%20INFORMATION%20NOTE.pdf>; accessed 19 March 2015. Aggregated offsets are ‘measurable conservation outcomes resulting from coordinated actions designed to compensate for the combined residual adverse biodiversity impacts arising from more than one development project in a specific geographical area, after appropriate prevention and mitigation measures have been taken’. An ongoing study in selected African countries, mainly under the World Bank’s Program for Forests (PROFOR), is consolidating this methodology. In R. Kormos and C. Kormos, *Towards a Strategic National Plan for Biodiversity Offsets for Mining in the Republic of Guinea, West Africa With a Focus on Chimpanzees* (Arcus Foundation, 2011). Available at <http://www.bicusa.org/wp-content/uploads/2013/07/GuineaBiodiversityOffsetKormosKormos2011.pdf> ; accessed 19 March 2015.

⁴² R. Kormos, C. F. Kormos, T. Humle, A. Lanjouw, H. Rainer, R. Victurine, R. A. Mittermeier, M. S. Diallo, A. B. Rylands and E. A. Williamson, “Great Apes and Biodiversity Offset Projects in Africa: The Case for National Offset Strategies” (2014) 9(11) *PLoS ONE* e111671.

replacement ratios; and (4) ensure appropriate time and effort is given to monitor offset performance.⁴³

There is also merit in considering lessons learned from mining on land in regions containing similarly irreplaceable habitat and ecosystems that may take decades to regenerate.⁴⁴ General guidance on biodiversity offsets as applied specifically to the

⁴³ A. Villarroya, A. C. Barros and J. Kiesecker, “Policy Development for Environmental Licensing and Biodiversity Offsets in Latin America” (2014) 9(9) PLoS ONE e107144.

⁴⁴ In a ‘landscape-scale’ project, the government of Mongolia and The Nature Conservancy are attempting to illustrate how a set of priority conservation areas (termed the ‘conservation portfolio’) can be used to offset impacts associated with mining. The Mongolian Gobi encompasses the southern third of the country covering an area of 510,000 km². The conservation portfolio proposed comprises a set of representative areas for biodiversity and ecological processes, selected based on existing designations and using the conservation planning software MARXAN, within a larger landscape matrix. This initiative represents an opportunity to reconcile biodiversity conservation with economic growth in a relatively data-poor setting. It requires mitigation laws to modify EIA requiring implementation of the mitigation hierarchy. Development by design (using landscape scale mitigation) will avoid piecemeal mitigation actions, acknowledging cumulative impacts, and investment is envisaged over a decade with individual developments contributing to regional conservation goals. Offsets are mandatory having been initiated at ministerial level; they take into account cumulative impact by applying mitigation hierarchy at the landscape level; the system relies on clear guidance (creating a level playing field for developers and regulator); and offsets are instituted gradually. M. Heiner, Y. Bayarjargal, J. Kiesecker, D. Galbadrakh, N. Batsaikhan, G. Munkhzul, I. Odonchimeg, O. Enkhtuya, D. Enkhbat, H. von Wehrden, R. Reading, K. Olson, R. Jackson, J. Evans, B. McKenney, J. Oakleaf and K. Sochi, *Identifying Conservation Priorities in the Face of Future Development: Applying Development by Design in the Mongolian Gobi* (Ulaanbaatar, 2013).

mining sector has been developed jointly by the International Council on Mining and Metals (ICMM) and the International Union for Nature Conservation (IUCN).⁴⁵

The juxtaposition of resource needs and biodiversity values is also by no means exclusive to mining and deliberations can be informed by other sectors, such as oil and gas development.⁴⁶ Considerations for biodiversity funding mechanisms also include the Equator Principles, a 'credit risk management framework for determining, assessing and managing environmental and social risk in project finance transactions.'⁴⁷

Although targeted at terrestrial projects, the Business and Biodiversity Offsets Programme (BBOP) have produced a set of ten fundamental principles and a 'Standard' to help developers, conservation groups, communities, governments and financial institutions that wish to consider and develop best practice related to biodiversity

⁴⁵ It is noted in this guidance that research as an offset investment is defined by the Australian government as an 'indirect offset'. ICMM IUCN, *Independent report on biodiversity offsets* (The Biodiversity Consultancy, 2012). Available at www.icmm.com/biodiversity-offsets; accessed 16 November 2014.

⁴⁶ Energy & Biodiversity Initiative, "Guidance on Integrating Biodiversity Conservation into Oil and gas Development", 2003. Available at http://www.theebi.org/pdfs/ebi_report.pdf; accessed 19 March 2015.

⁴⁷ Equator Principles, "A financial industry benchmark for determining, assessing and managing environmental and social risk in projects", 2013. Available at: <http://www.equator-principles.com/index.php/about-ep>; accessed 30 December 2014; The Equator Principles are themselves based on the International Finance Corporation's Performance Standards. Within the latter, Performance Standard 6 requires a net gain for impacts on critical habitat and No Net Loss where feasible for impacts to natural habitat. International Finance Corporation (IFC), "Performance Standard 6. Biodiversity Conservation and Sustainable Management of Living Resources", 2012. Available at http://www.ifc.org/wps/wcm/connect/bff0a28049a790d6b835faa8c6a8312a/PS6_English_2012.pdf?MOD=AJPERES; accessed 6 January 2015.

offsets.⁴⁸ A stepwise approach, detailed in three separate handbooks, deals with offset design, associated cost-benefit analysis and biodiversity offset implementation. Some of the key questions identified and addressed within this framework are: operation and management; long term financing; and monitoring and evaluation. This builds on considerations of how the process of designing and delivering biodiversity offsets should/could be integrated with impact assessment.⁴⁹

Implementing biodiversity offsets through Conservation Trust Funds

Offsets can take the form of positive management interventions. Implementing them requires: i) experts to select and apply metrics and indicators to compare expected biodiversity losses and gains (with the aim of achieving no net loss and preferably a net gain of biodiversity); ii) market support services to provide a transparent system; and iii) a legal regime obliging developers to compensate for their environmental damage. An analysis of the state of biodiversity markets found that some 40 countries already require offsets/compensation for development impacts and more countries are developing similar policies.⁵⁰ The same study identified 45 compensatory mitigation

⁴⁸ The ten principles are: 1) Adherence to the mitigation hierarchy; 2) Limits to what can be offset; 3) Landscape context; 4) No net loss; 5) Additional conservation outcomes; 6) Stakeholder participation; 7) Equity; 8) Long-term outcomes; 9) Transparency; 10) Science and traditional knowledge. Business and Biodiversity Offsets Programme (BBOP), “Standard on Biodiversity Offsets”, BBOP, Washington, D.C, 2012. Available at http://www.forest-trends.org/documents/files/doc_3078.pdf; accessed 19 March 2015.

⁴⁹ BBOP, 2009 (n 36); BBOP, 2012 (n 50).

⁵⁰ B. Madsen, N. Carroll, K. Daniel and G. Bennett, *Update: State of Biodiversity Markets* (Forest Trends, Washington, DC, 2011). Available at www.forest-trends.org/documents/files/doc_2848.pdf; accessed 30 December 2014.

programmes (banks and offsets), with 27 more in development and numerous individual offset sites. Such programmes often involve the establishment of a Conservation Trust Fund or a dedicated sub-account within a ministry.

Conservation Trust Funds can be defined as ‘private, legally independent grant-making institutions that provide sustainable financing for biodiversity conservation and often finance part of the long-term sustainable management costs of a country’s protected area system’.⁵¹ One notable example is the Global Environment Facility (GEF), “a mechanism for international cooperation for the purpose of providing new and additional grant and concessional funding to meet the agreed incremental costs of measures to achieve agreed global environmental benefits” in five focal areas: biological diversity, climate change, international waters, land degradation, chemicals and wastes.⁵² The fund consists of the endowments received from Contributing Participants (nations) and from other donors. The World Bank acts as the trustee of the fund and is

⁵¹ Conservation Finance Alliance, “Rapid review of Conservation Trust Funds.” Prepared for the CFA Working Group on Environmental Funds by Barry Spergel and Philippe Taieb, 2008. Available at <http://www.cbd.int/financial/trustfunds/g-rapidassess.pdf>; accessed 30 December 2014.

⁵² Instrument for the Establishment of the Restructured Global Environment Facility. (GEF, Washington DC, USA, 2015). Available at http://www.thegef.org/gef/sites/thegef.org/files/publication/GEF_Instrument-Interior-March23.2015.pdf; accessed 15 April 2015. The GEF is the financial mechanism for the implementation of the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), the Stockholm Convention on Persistent Organic Pollutants (POPs), the UN Convention to Combat Desertification (UNCCD), the Minamata Convention on Mercury, and supports the implementation of the Montreal Protocol on Substances that Deplete the Ozone Layer in countries with economies in transition. Webpage of the Global Environment Facility. Available at <http://www.thegef.org/gef/whatisgef>; accessed 15 April 2015.

also one of its implementing agencies, together with the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP).⁵³

According to Freestone,⁵⁴ the GEF operates under the principle of “common but differentiated responsibility” as set out in the Rio Declaration on Environment and Development, and resulting from recognition that “in view of the different contributions to global environmental degradation, States have common but differentiated responsibilities”.⁵⁵ The same author highlights that calculation of “incremental costs”, i.e., “the cost of those activities and investments that represent a gain to the international as opposed to the national environment” in certain focal areas, such as biodiversity or international waters, is a challenging task.⁵⁶

A dedicated trust fund replenished by voluntary contributions from public and private sources was also the financial mechanism found to further the Hamilton Declaration on Collaboration for the Conservation of the Sargasso Sea, “the first non-binding instrument designed to provide a framework for intergovernmental collaboration to promote measures, through existing international organizations, to

⁵³ GEF, 2015 (n 54).

⁵⁴ D. Freestone, “The establishment, role and evolution of the Global Environment Facility: operationalizing common but differentiated responsibility?” in T. M. Ndiaye and R. Wolfrum (eds.) *Law of the Sea, Environmental Law and Settlement of Disputes* (Martinus Nijhoff Publishers, Leiden, The Netherlands, 2007), pp. 1077-1107.

⁵⁵ UN Doc. A/Conf.151/5/Rev.1, 13 June 1992; 31 ILM (1992), at p. 874.

⁵⁶ Freestone, (n 56), at p. 1098.

minimize the adverse effects of human activities in an ecosystem that is primarily in ABNJ”.⁵⁷

Potential application of these mechanisms to the ISA in the CCZ

APEIs as Strategic Offsets

Within the context of the CCZ, the whole system of APEIs can be seen as a strategic offset, which to be effective need baseline studies to confirm equivalency (i.e. that gains through safeguarding APEIs are commensurate with losses incurred in mined areas). Determination of an equivalent ‘fair exchange’ could for example consider a ratio between exploited area or mine days and research effort or research days. It should be noted, however, that determining and maintaining equivalency, especially in marine systems, is a controversial issue.⁵⁸

For the CCZ, the ISA has agreed to systematic conservation planning through the CCZ-EMP. In biodiversity offset terminology, the APEIs are appropriate ‘No Net Loss offset locations’, for which the ISA can determine cost-benefits (i.e. quantifying the

⁵⁷ D. Freestone and K. K. Morrison, “The Signing of the Hamilton Declaration on Collaboration for the Conservation of the Sargasso Sea: A new paradigm for high seas conservation?” (2014) 29 *The International Journal of Marine and Coastal Law* 345-362, at pp. 345-346.

⁵⁸ See H. Levrel, S. Pioch and R. Spieler, “Compensatory mitigation in marine ecosystems: Which indicators for assessing the ‘no net loss’ goal of ecosystem services and ecological functioning?” (2012) 36 *Marine Policy* 1202 -1210. Based on their experience, these authors draw attention to the increasing cost of compensation measures in recent years, which, in some cases, “have shown to be inadequate to compensate ecosystem services destroyed by authorized impacts” (p. 1209). They suggest that the main cause of the problem may be the lack of an “environmental champion”, in whose absence, “consensus regarding compensatory measures is always oriented toward specific stakeholders interest and not toward environmental goals” (ibid.)

associated conservation gain) and specify implementation measures (i.e. how the biodiversity offset will operate and be managed, financed over the long-term and then monitored and evaluated) on behalf of relevant stakeholders.⁵⁹ An offset calculation would need to be determined on this basis. Also, if Parties so decide, the ISA could use its scientific and technical body, the Legal and Technical Commission (or an Advisory Panel comprised of LTC members), to determine the research priorities in APEIs (e.g. perhaps concentrating on those closest to where mining is most likely to become a reality?) and evaluate research proposals.

The merits of an APEI Trust Fund

As stated earlier the financial regime for deep-sea mining is still under active consideration by the LOSC parties within the Assembly and the other organs of the ISA. One option is to create an APEI Trust Fund. Under the ISA Financial Regulations both Trust and Special Funds may be established at the direction of the ISA Assembly or Council. The ISA already hosts an Endowment Fund to support the participation of and opportunities for scientists from developing countries to study deep-sea ecosystems. This Fund, established in 2006 by the Assembly of ISA, can be endowed, by the ISA, its members, other States, international (including philanthropic) organizations, academic, scientific and technical institutions, corporations and private persons.⁶⁰ It is administered by the ISA Secretariat, allows additional contributions to supplement initial Fund capital and is operationalized on the basis of agreed administrative and

⁵⁹ ISBA/14/LTC/2 (n 15), at p. 3 enumerates stakeholders in the Area as including the International Seabed Authority, signatories to LOSC, mining claim holders, non-governmental organizations (NGOs), and the science community.

⁶⁰ Lodge, (n 18).

utilization rules and procedures. An Advisory Panel appointed by the ISA Secretary-General ensures rigor and transparency.

Creation of an APEI Trust Fund, e.g., in the context of the Exploitation Mining Code, could support systematic ecological research in APEIs in the CCZ (and possibly be extrapolated to/used in other ocean regions) to confirm their appropriateness as environmental reference areas and biodiversity offset areas. Such a Fund would be endowed directly by interested parties (e.g. contractors), which derive economic advantage from the exploitation (often with inescapable and potentially irreversible environmental impacts) of non-renewable resources which are the common heritage of mankind. The advantage of implementing such a mechanism is to establish a process in which a dedicated part of the revenue made from exploiting the common heritage of mankind directly reverts to the benefit of mankind, through the promotion of research activities and environmental protection measures, including in areas beyond the contractors' license blocks. Increasing scientific knowledge of the Area (specifically concerning habitats and species distribution), resulting from the implementation of such a trust fund, may also help to fine-tune methodological approaches, minimize environmental impacts of extracting activities and pinpoint areas better suited for extraction or conservation within license blocks. It is important to stress that the proposed mechanism is not a donors' fund, but rather a payment for the privately retained revenue of exploiting irreplaceable commons. Such a payment, however, should not be understood as a definite guarantee, either relieving contributors from further environmental responsibility or countering the required "flexibility" in management required by the ISA's LTC.⁶¹ A significant problem remains, related to the

⁶¹ ISBA/14/LTC/2 (n 15); ISBA/18/C/22 (n 13).

need to carry out further research before mining starts. In this case, up-front payments by contractors in the form of credits against future levies are a possible consideration. Active debate is currently being encouraged in the context of a draft framework for the regulation of exploitation activities in the Area.⁶² This draft framework suggests that any Social Impact Assessment and Action Plan, submitted as part of an application for a plan of work for exploitation, could include a contribution to marine research. Furthermore the need is recognized for a working paper articulating the concept and targeted objectives of a so called ‘Seabed Sustainability Fund’, based on the Aggregate Levy Sustainability Fund in the UK, analogous to the APEI Trust Fund proposed here.

Conclusion

Under Article 143 of the Convention, ISA has a general responsibility to promote and encourage the conduct of marine scientific research in the Area. Further research is still needed to establish baselines within the CCZ APEIs. Guidance on producing EIAs for deep-sea mining projects in the Area is currently under development. However, initial scientific assessments suggest rehabilitation or recovery of deep-sea ecosystems within acceptable timeframes will be unlikely or impossible. Putting in place an offset mechanism as part of an evolving EIA and SEA regime for ABNJ could counterbalance and compensate for the inevitable long-term impact associated with mining. In the CCZ, and possibly for other ocean regions, an offset Trust Fund could provide core funding for ecological research in APEIs. Deep-sea research is expensive. Cruises with multiple objectives have to be planned, resourced and coordinated well in advance. No single

⁶² Report to Members of the Authority and all Stakeholders containing a draft framework for the regulation of exploitation activities in the Area as requested by the Council. ISBA/Cons/2015/1. Available online at: <http://www.isa.org.jm/files/documents/EN/Survey/Report-2015.pdf>

contractor is likely to significantly advance research within APEIs, even if sampling is undertaken in association with exploration of licensed areas. If properly implemented an APEI Trust Fund could be a bold and proactive move in accordance with the essential duty necessary to safeguard the common heritage of mankind. Early consideration of the application of an aggregated biodiversity offset rationale to deep-sea mining environments might therefore provide a neat and necessary solution.

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