TEXTE
52/2025

Towards a standardised approach to Regional Environmental Management Plans in the Area

Interim report

For our Environment

Umwelt Bundesamt

TEXTE 52/2025

Environmental Research of the
Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

Project No. (FKZ) 3717 25 227 0
FB000767/ENG

Towards a standardised approach to Regional Environmental Management Plans in the Area

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On behalf of the German Environment Agency

Imprint

Publisher:
Umweltbundesamt
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Study performed by:
Institute for Advanced Sustainability Studies (IASS)
Berliner Str. 130
14467 Potsdam

Study completed in:
January 2021

Edited by:
Section II 2.3 Protection of the Marine Environment and the polar regions
Hans-Peter Damian

Publication as pdf:
http://www.umweltbundesamt.de/publikationen

ISSN 1862-4804

Dessau-Roßlau, April 2025

Kurzbeschreibung

Wir befinden uns in der Vorbereitungsphase für eine neue industrielle Aktivität, die Gewinnung von mineralienreichem Substrat aus dem Meeresboden im "Gebiet" ("the Area"), dem Meeresboden außerhalb der Grenzen der nationalen Gerichtsbarkeit. Der Tiefseebodenbergbau wird, wenn er einmal begonnen hat, voraussichtlich langfristige und auch großräumige Umweltschäden verursachen, die jedoch wegen der wenig bekannten Tiefseeökosysteme und der Anwendung neuartiger Technologien schwer einzuschätzen sind. Um ihrem gesetzlichen Auftrag nachzukommen, Maßnahmen zu ergreifen, die 'den wirksamen Schutz der Meeresumwelt vor schädlichen Auswirkungen' genehmigter bergbaubezogener Aktivitäten zu gewährleisten, strebt die Internationale Meeresbodenbehörde ISA die Erstellung so genannter regionaler Umweltmanagementpläne (Regional Environmenal Management Plans, REMPs) in den Regionen des Ozeans an, in denen ein Interesse am Bergbau besteht. Diese REMPs werden ein sektorales Management-Instrument sein, bieten jedoch die Möglichkeit zur Umsetzung eines ökosystemaren Managementansatzes, einschließlich des damit verbundenen Strebens nach Transparenz, Partizipation, anpassungsfähigen Managementzyklen, vorsorglichen Verfahren und Entscheidungsfindung. Damit soll sichergestellt werden, dass die Aktivitäten die Integrität der Meeresökosysteme und ihre Funktionsfähigkeit nicht beeinträchtigen. Es ist jedoch noch nicht entschieden, ob REMPs tatsächlich zu einem wirksamen Steuerungsinstrument werden mit der rechtlichen Befugnis, Entscheidungen über die Genehmigung von Ausbeutungsverträgen und Umweltmanagementplänen der Vertragnehmer zu lenken, oder ob sie ein Werkzeug von begrenztem Wert bleiben werden, das keine Kontrolle über die durch Bergbauaktivitäten verursachten Umweltauswirkungen ermöglicht. Die vorgelegte Studie soll einen Beitrag zu dieser Diskussion leisten, indem sie einen Standardansatz für die Entwicklung und Umsetzung von REMPs durch die ISA empfiehlt, der den institutionellen Rahmen, die verfahrenstechnischen Maßnahmen und die erforderlichen Inhalte im Einklang mit dem Best-Practice-Ökosystemansatz für das Management umfasst.

Abstract

We are in the preparatory phase for a new industrial activity, the extraction of mineral-rich substrate from the seafloor in 'the Area', the seabed beyond the limits of national jurisdiction. Deep seabed mining, once it begins, is likely to cause large-scale and long-lasting environmental harm the scale of which is difficult to predict due to great unknowns as regards the deep-sea ecosystems and the novel technical designs. To comply with its legal mandate to take measures to *'ensure the effective protection of the marine environment from harmful effect'* of permitted mining related activities the International Seabed Authority, ISA, is aiming at creating so-called Regional Environmenal Management Plans, REMPs, in those regions of the ocean where there is an interest in mining. These REMPs will be a sectoral management tool, however it offers the opportunity to implement and ecosystem approach to management, including the related strive for transparency, participation, adaptive management cycles, precautionary procedures and decision-making to ensure that the activities do not interfere with the integrity of the ocean ecosystems and their functioning. However, it remains as yet undecided whether REMPs will in fact become an effective governance tool with legal power to direct decisions on the approval of exploitation contracts and contractors´ environmental management plans, or whether it will remain an undertaking of limited value which will not enable the control over environmental impacts caused by mining activities. The study presented aims to contribute to this discussion by recommending a standard approach to the development and implementation of REMPs by ISA, covering the institutional setting, the procedural actions and the required contents, in line with best practice ecosystem approach to management.

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Abbreviations

ABMT	Area-based Management Tool
ABNJ	Areas beyond the limits of national jurisdiction
APEI	Area of Particular Environmental Importance
CBD	Convention on Biological Diversity, 1992
CCZ	Clarion-Clipperton [Fractures] Zone
EAM	Ecosystem Approach to Management of human activities
EBSA	Ecologically and Biologically Significant Area
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESC	Environment and Scienctific Committee
FAO	Food and Agriculture Organisation
IA	Implementing Agreement
ILBI/BBNJ	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 (General Assembly resolution 72/249)
IMO	International Maritime Organisation
IRZ	Impact Reference Zone
ISA	International Seabed Authority
ITLOS	International Tribunal for the Law of the Sea
LTC	Legal and Technical Commission, the Commission
MPA	Marine Protected Area
NEAFC	North-East Atlantic Fisheries Commission
NGO	Non-governmental Organisation
OSPAR	OSPAR Convention for the Protection of the Environment of the North East Atlantic, 1992
PRZ	Preservation Reference Zone
REMP	Regional Environmental Management Plans
RFMO	Regional Fisheries Management Organisation
RRP	Rules, regulations and procedures
SDG	Sustainable Development Goal
s.a.	siehe auch, engl. see also
SEA	Strategic Environmental Assessment
SMS	Seafloor massive sulphides
SRÜ	Seerechtsübereinkommen (UNCLOS)

SUP	Strategische Umweltprüfung, engl. SEA
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea, 1982
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme
UNGA	United Nations General Assembly
VME	Vulnerable Marine Ecosystem

Zusammenfassung

Die regionale Umweltmanagementplanung ist ein Instrument der Umweltpolitik - eines, das die Umweltprobleme erfolgreich angehen kann, die durch die Vielzahl menschlicher Nutzungen, die Zersplitterung der Zuständigkeiten und den derzeitigen Mangel an Ehrgeiz und Koordinierung der Maßnahmen der Politikgestaltung, insbesondere in Bezug auf Gewässer jenseits der Grenzen der nationalen Gerichtsbarkeit, entstehen. Die Internationale Meeresbodenbehörde ISA, wurde 1982 auf der Grundlage des Seerechtsübereinkommens der Vereinten Nationen eingerichtet, um den Meeresboden außerhalb nationaler Gerichtsbarkeit mit seinen Bodenschätzen (das "Gebiet"/the "Area") zum Wohle der Menschheit zu verwalten. Die ISA hat bereits erste Erfahrungen mit einer regionalen Sichtweise auf Umweltauswirkungen gemacht, die möglicherweise durch eine oder mehrere Bergbauaktivitäten verursacht werden. Nach mehrjährigen Vorbereitungen verabschiedete sie 2012 einen regionalen Managementplan, REMP, für die Clarion-Clipperton Zone, CCZ, im nordäquatorialen Pazifik. Die Region im Fokus ist eine Tiefseeebene in 4-5000 m Tiefe, welche die weltweit die höchste Dichte an Manganknollen besitzt, und für die die ISA auch die meisten Verträge zur Erkundung mineralhaltiger Substraten gibt. Bis zu diesem Zeitpunkt wurden die obigen Explorationsverträge für große Meeresbodenabschnitte abgeschlossen, ohne den regionalen Schutz der Biodiversität bei der Aufnahme kommerzieller Bergbauaktivitäten zu berücksichtigen.

Im Falle der Clarion-Clipperton Zone ist die bislang einzige umgesetzte Maßnahme des regionalen Managementplans die Ausweisung eines Netzes von Gebieten von besonderem ökologischen Interesse, so genannten "Areas of Particular Environmental Interest", APEIs, welche derzeit nicht zur Erkundung zur Verfügung stehen. Im Großen und Ganzen ist die Platzierung der APEIs regional repräsentativ, mit Ausnahme von Subregionen mit hoher Knollendichte. Eine Reihe anderer Maßnahmen wurde ebenfalls in den Plan aufgenommen, doch gibt es heute weder periodische regionale Umweltzustandsberichte, noch eine systematische Erfassung der regionalen, subregionalen oder anderen Umwelt-Basislinien, keine Konsistenz in der Datenerhebung und Auswertung zur Ermittlung des Umweltzustands durch Vertragnehmer, keine strategische Bewertung von Umweltbelastungen oder den Versuch, potenziell nützliche Umweltindikatoren und Schwellenwerte zusammenzustellen.

Nichtsdestotrotz hat das Instrument der regionalen Umweltmanagementpläne, insbesondere wenn es in einem kooperativen Prozess mit Akteuren in der Region durch eine Art strategischen Umweltprüfungsprozess entwickelt wird, ein großes Potenzial, nicht nur Maßnahmen in der Zuständigkeit der ISA zu liefern, die die langfristige Gesundheit der Meeresökosysteme sichern, sondern auch regionale Maßnahmen der anderen zuständigen Managementbehörden zu fördern, indem es z.B. eine Plattform für Kommunikation und Interaktion bietet.

In den letzten Jahren hat die Zahl der Explorationsverträge der ISA mit staatlichen oder privaten Einrichtungen, die von einer Vertragspartei des UN-Seerechts und der ISA gesponsert werden, enorm zugenommen und erstreckt sich nun auf alle Ozeane, und die Verhandlungen über die künftige Regulierung der Ausbeutungsaktivitäten sind im Gange. Neben anderen Faktoren erzeugt das Auslaufen der zeitlich befristeten Explorationsverträge zusätzlichen Druck, die Entwicklung des rechtlichen Rahmens für den kommerziellen Abbau von Bodenschätzen im Gebiet zum Abschluss zu bringen. Es geht dabei derzeit um Manganknollen auf den Tiefseeebenen, Massivsulfidablagerungen aus hydrothermaler Aktivität an mittelozeanischen Rücken und kobaltreiche Krusten an den Flanken von Seebergen in mittleren Meerestiefen.

Die Verwaltung der Bodenschätze und ihre mögliche Ausbeutung beinhaltet ein starkes Umweltschutzmandat der ISA durch Bestimmungen im Seerecht der Vereinten Nationen. Neben der rechtlichen Verpflichtung aller Staaten, einzeln und gemeinsam die Meeresumwelt zu schützen, sind die ISA und ihre Mitgliedstaaten ausdrücklich verpflichtet, die notwendigen Maßnahmen zu ergreifen, *"um einen wirksamen Schutz der Meeresumwelt vor schädlichen Auswirkungen, die sich aus solchen Aktivitä-*

ten ergeben können, zu gewährleisten". Dazu gehören die Annahme von Regeln, Vorschriften und Verfahren zur Verhütung, Verringerung und Kontrolle der Verschmutzung und anderer Gefahren, zum Erhalt des ökologischen Gleichgewichts sowie darum, den Schutz und die Erhaltung der natürlichen Ressourcen des Gebietes zu gewährleisten, einschließlich der Verhütung von Schäden an der Flora und Fauna der Meeresumwelt.

Aufbauend auf den Erfahrungen mit dem ersten regionalen Umweltmanagementplan in der Clarion-Clipperton Zone im Pazifik erwies sich die Entwicklung ähnlicher REMPs in den Ozeanbecken in denen Explorationsverträge bestehen, als eine Möglichkeit, die Umweltschutzfrage anzugehen. REMPs wurden nun als ein Element des ISA-Strategieplans und in der Folge im von der Vollversammlung 2019 angenommenen Aktionsplan (ISBA/25/A/15, Anhang II) aufgenommen. Im Strategieplan wird die Absicht bekundet, das Instrument der regionalen Umweltmanagementpläne, REMPs, zu nutzen, um *"regionale Umweltprüfungen und Managementpläne für alle Mineralprovinzen in dem Gebiet, in dem Exploration oder Abbau stattfindet, zu entwickeln, durchzuführen und laufend zu überprüfen, um einen ausreichenden[1] Schutz der Meeresumwelt zu gewährleisten, wie unter anderem in Artikel 145 und Teil XII des Übereinkommens gefordert"* (Strategische Direktive 3.2).

Anschließend wurde eine *"Vorläufige Strategie für die Entwicklung regionaler Umweltmanagementpläne für das Gebiet"*(ISBA/24/C/3) vorgestellt, in der mehrere spezifische Regionen als prioritäre Bereiche für die Entwicklung von REMPs festgelegt wurden. Bei diesen Regionen handelt es sich um den Mittelatlantischen Rücken, im Indischen Ozean den Triple-Junction-Rücken und die Tiefseeebene mit Manganknollen, sowie bestimmte Regionen von Seebergen im Nordwestpazifik und im Südatlantik.

Die Umsetzung dieser Strategie hat mit der Organisation von zwei Workshops begonnen, die im Mai 2018 in Qingdao, China (Erstellung regionaler Umweltmanagementpläne für die Kobaltkrustenregion des nordwestlichen Pazifiks, (International Seabed Authority, 2019c), und im Juni 2018 in Szczecin, Polen (Erstellung regionaler Umweltmanagementpläne für polymetallische Sulfidvorkommen auf mittelozeanischen Rücken, (International Seabed Authority, 2019b), stattfanden. Im Jahr 2019 konzentrierte sich ein anschließender Workshop auf die Region des Mittelatlantischen Rückens im Nordatlantik[2], wo Explorationsverträge nahezu die gesamte untermeerische Gipfelregion abdecken, einschließlich aller bekannten hydrothermalen Schlotfelder.[3] Ein weiterer Workshop versammelte Wissenschaftler, um eine aktualisierte regionale Umweltbeschreibung der Clarion-Clipperton Zone zu erstellen. Mehrere weitere REMP-Entwicklungsworkshops wurden 2020 als virtuelle Arbeitstreffen organisiert[4] (ISBA/26/LTC/2, Zusammenfassung der REMP-Aktivitäten der ISA seit 2012). Trotz der parallelen Entwicklungen in allen Ozeanen gibt es bisher keinen vom Rat angenommenen standardisierten Ansatz für REMPs, weder in Bezug auf

- Den vereinbarten Zweck, Gesamtziele und Zielsetzungen, Prinzipien;
- Die Regelungsbefugnis der REMPs;
- Die Einbindung/Beteiligung von Stakeholdern und Interaktion mit anderen Verwaltungsbehörden in der Region;
- Den Umfang und Verfahren des REMP;
- Noch in Bezug auf Mindestanforderungen an den zu erzielenden Erfolg bei der Umsetzung des Managementplans.

Mit dem Ziel, einen Beitrag zur Arbeit der Internationalen Meeresbodenbehörde bei der Entwicklung von REMPs zu leisten, insbesondere in Bezug auf die Förderung der Annahme eines standardisierten

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[1] die Formulierung in Artikel 145 SRÜ ist wirksamer Schutz

[2] https://www.isa.org.jm/workshop/workshop-regional-environmental-management-plan-area-northern-mid-atlantic-ridge

[3] siehe Karte unter https://www.isa.org.jm/contractors/exploration-areas

[4] see https://www.isa.org.jm/events/workshops

Ansatzes, veranstaltete Deutschland (mit Unterstützung des IASS) zusammen mit den Mitveranstaltern Niederlande und Pew Charitable Trusts vom 11. bis 13. November 2019 in Hamburg einen internationalen Workshop *"Towards a standard approach to Regional Environmental Management Plans in the Area"*.[5] Der dreitägige Workshop wurde durch die Beiträge von 80 Teilnehmern mit Governance-, Rechts-, Wissenschafts- und Verwaltungshintergrund aus der ganzen Welt gestaltet. Insgesamt unterstützten die Teilnehmer nachdrücklich die Notwendigkeit eines standardisierten Ansatzes für REMPs durch die ISA, sowie die Entwicklung einer Vorlage mit Mindestanforderungen, welche von den jeweiligen REMPs zu erfüllen sind. Die Notwendigkeit eines standardisierten Ansatzes für die Entwicklung, Genehmigung und Überprüfung der REMPs wurde ebenfalls befürwortet, es gab jedoch eine beträchtliche Debatte über die Rollen und Verantwortlichkeiten in den Verfahren. Insbesondere die Notwendigkeit für ein unabhängiges REMP-Organisationskomitee wurde nicht von allen geteilt. Auch die Frage nach dem rechtlichen Gewicht der REMPs wurde zwar diskutiert, aber nicht gelöst.

In der Folge wurden zur ISA-Ratstagung im Februar 2020 von Deutschland und den Niederlanden, unterstützt von Costa Rica, zwei Beiträge eingereicht, welche dem Rat Vorschläge für die Gestaltung eines REMP Standardansatzes vorlegen. Das Dokument ISBA/26/C/6 konzentriert sich auf das *"Procedure for the development, approval and review of regional environmental management plans /Verfahren für die Entwicklung, Genehmigung und Überprüfung regionaler Umweltmanagementpläne"*, das Dokument ISBA/26/C/7 schlägt einen standardisierten Ansatz für die Entwicklung von REMP durch die Formulierung einer Vorlage mit Mindestanforderungen vor. Der Rat beschloss, die Eingaben zur Prüfung an die Rechts- und Fachkommission, LTC, weiterzuleiten. Auf beide Dokumente wird im Laufe dieses Berichts gegebenenfalls Bezug genommen werden.

Parallel dazu hat das ISA-Sekretariat eine *"Guidance to facilitate the development of Regional Environmental Management Plans (REMPs)"* (Anleitung zur Erleichterung der Entwicklung regionaler Umweltmanagementpläne) formuliert,[6] ein fortgeschriebenenes Dokument, welches die Rollen und Verantwortlichkeiten der ISA-Organe klären, den Hintergrund für die REMPs liefern, mögliche Raumplanungsansätze diskutieren, sowie einige Datenquellen und mögliche Elemente zukünftiger REMPs identifizieren soll. Der Zweck besteht darin, die Teilnehmer von Workshops zur Vorbereitung der REMPs zu informieren. Auch auf dieses Dokument wird in der vorliegenden Studie verwiesen.

Die folgende Zusammenfassung konzentriert sich jedoch auf die Vorschläge der Autoren für die Gestaltung eines Standardkonzepts für die Einrichtung, Verwaltung und Überprüfung von REMPs, sowie deren Umweltziele, inhaltliche Anforderungen und Managementansatz.

Das Mandat der ISA zur Entwicklung von REMPs und das rechtliche Potenzial von REMPs

Die ISA hat ein klares Mandat zur Entwicklung von REMPs im "Gebiet". Die Verpflichtung der ISA, den wirksamen Schutz der Meeresumwelt gemäß Artikel 145 des SRÜ zu gewährleisten, verlangt, dass die ISA alle zu diesem Zweck erforderlichen Maßnahmen ergreift. Im Vorfeld der Entwicklung des Umweltmanagementplans für die Clarion-Clipperton Zone wurde das diesbezügliche Mandat der ISA angesprochen und kontrovers diskutiert. Man wurde sich jedoch mit überwältigender Mehrheit darin einig, dass die ISA weitreichende Befugnisse hat, um den wirksamen Schutz der Meeresumwelt zu gewährleisten, und dass die Entwicklung regionsspezifischer Umweltmanagementpläne und die Verabschiedung damit zusammenhängender Maßnahmen genau in dieses Mandat passen würden. Damit ist die Entwicklung von REMPs als eines der Mittel zur Umsetzung von Artikel 145 nun geregelt.

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[5] Christiansen, S., Singh, P., 2020. Towards a standardised approach to Regional Environmental Management Plans in the Area. International Workshop 11 – 13 November 2019, Hamburg, Germany. Hosted by Germany and co-organised with the Netherlands and Pew Charitable Trusts. Workshop Report. p. 96.

[6] https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/remp_guidance_.pdf (aktualisiert November 2019)

Hinsichtlich des rechtlichen Potenzials der REMPs ist es notwendig, darauf hinzuweisen, dass das Leitliniendokument des ISA-Sekretariats keine rechtsverbindliche Wirkung der REMPs vorsieht. Vielmehr wird es als ein Instrument mit Rat gebender Rolle angesehen. REMPs haben jedoch das Potenzial, viel mehr zu bewirken. Um REMPs zu einem wirksamen Instrument zu machen, sollten REMPs einen rechtsverbindlichen Status erhalten. Dies kann z.B. dadurch geschehen, dass REMPs durch die Regeln, Vorschriften und Verfahren der ISA, einschließlich durch ISA-Umweltstandards eine verbindliche Wirkung erhalten. Dies hätte weitreichende Implikationen. Es würde den Entscheidungsorganen beispielsweise ermöglichen, sich bei der Entscheidung, ob ein Antrag für einen Arbeitsplan genehmigt wird oder nicht, auf den jeweiligen REMP zu stützen. Wenn in einem solchen Szenario die Rechts- und Fachkommission der ISA, LTC, oder der Rat der Ansicht ist, dass die Genehmigung eines Arbeitsplans die Ziele eines REMP untergraben oder den Zielen eines REMP widersprechen würde, wäre es voll und ganz gerechtfertigt, seine Entscheidung, den Antrag nicht zu genehmigen, auf den REMP zu stützen. In ähnlicher Weise kann ein REMP, der verbindlichen Charakter hat, die Vertragnehmer auch dazu verpflichten, sicherzustellen, dass die von den Vertragnehmern vorzulegenden und regelmäßig zu aktualisierenden Umweltpläne (insbesondere der Umweltmanagement- und Umweltüberwachungsplan) mit den Zielen und Anforderungen des anwendbaren REMP in Einklang stehen. Darüber hinaus würde die rechtsverbindliche Wirkung für REMPs signalisieren, dass die ISA einem wirksamen Schutz der Meeresumwelt vor schädlichen Auswirkungen verpflichtet ist, die sich aus der Durchführung von Aktivitäten in dem Gebiet ergeben können. Insbesondere würde sichergestellt, dass die Bodenschätze des "Gebiets" mit großer Verantwortung und im Hinblick auf die Interessen künftiger Generationen verwaltet werden.

Übergreifende Ziele und Leitprinzipien

Ein wesentliches Merkmal der regionalen Umweltmanagementpläne, REMPs, sind die übergreifenden Ziele, die das Instrument bestimmen. Diese Umweltziele reflektieren die Bedeutung der REMPs, unterstreichen die Grundprinzipien auf die REMPs gegründet sind, und geben damit den Ton für den Rest des Dokuments an. In Bezug auf die übergreifenden Ziele werden die folgenden fünf als angemessen und notwendig erachtet:

1. Schutz und Bewahrung der Meeresumwelt, um insbesondere die Meeresumwelt zu schützen und zu erhalten, insbesondere im Hinblick auf die

   - Erhaltung der biologischen Vielfalt, der Konnektivität, der Ökosystemstruktur, der Ökosystemdienstleistungen und der Widerstandsfähigkeit;
   - Erhaltung einzigartiger mariner Ökosysteme;
   - Verhinderung des Aussterbens von Arten;
   - Verhinderung von Auswirkungen auf benthische und pelagische Ökosysteme, einschließlich der Fischbestände der Tiefsee;
   - Verhinderung der weiteren Verschlechterung des Zustands anfälliger Ökosysteme, die durch die prognostizierten Auswirkungen des Klimawandels besonders gefährdet sind.

2. Anwendung von Vorsichtsmaßnahmen bei Managemententscheidungen entsprechend dem Grad der Wissenslücken und des Risikos, insbesondere durch

   - Nutzung aller verfügbaren Umweltdaten und -informationen als Grundlage von Managemententscheidungen;
   - Überwachung und Bewertung des Zustands der Umwelt vor, während und nach allen Aktivitäten im Gebiet bei gleichzeitiger Identifizierung und Berücksichtigung von Unsicherheiten;
   - Anwenden von adaptivem Management.

3. Identifizierung und Milderung von Konflikten bei verschiedenen Nutzungen durch Vermeidung von Überschneidungen zwischen Vertragsgebieten, reservierten Gebieten, Gebieten von besonderem ökologischen Interesse, Meeresschutzgebieten und Gebieten, die für andere legitime Nutzungen (wie Fischerei, Unterseekabel) ausgewiesen sind bzw. genutzt werden.

4. Förderung der wissenschaftlichen Meeresforschung und Aufbau von Kapazitäten in der Region.

5. Förderung der Zusammenarbeit zwischen ISA Mitgliedsstaaten, Vertragnehmern und anderen Beobachtern und Interessengruppen unter besonderer Berücksichtigung der Interessen und Bedürfnisse der Entwicklungsländer.

Die folgenden Leitprinzipien liegen der Entwicklung und Umsetzung von REMPs zugrunde:

1. Wertschätzen des gemeinsamen Erbes der Menschheit;

2. Gewährleistung vorsorgender Entscheidungsfindung;

3. Anwendung des Ökosystemansatzes bei der Bewirtschaftung;

4. Erreichen von Transparenz und Rechenschaftspflicht durch transparente Entscheidungsfindung und Beteiligung der Öffentlichkeit gemäß der Aarhus-Konvention;

5. Nutzung der besten verfügbaren wissenschaftlichen und technischen Kenntnisse;

6. Nutzung relevanten traditionellen Wissens indigener Völker und lokaler Gemeinschaften;

7. Anwendung der besten Umweltpraktiken und der besten verfügbaren Technologien;

8. Stärkung der internationalen Zusammenarbeit.

Lehren aus dem Clarion-Clipperton Zone Umweltmanagementplan

Der Umweltmanagementplan für die Clarion-Clipperton Zone im Pazifik, CCZ-EMP, ist ein willkommener erster Schritt zu einem umfassenden Managementplan zum Schutz der Meeresumwelt auf regionaler Ebene. Allerdings fehlen in diesem ersten Plan bisher die Kernelemente eines wirksamen Managementplans, wie z.B. eine Erhebung des regionalen Ökosystems und seines Zustandes vor Beginn der ersten Abbauverträge aus den Daten von Erkundungsverträgen, Überwachungs- und/oder Forschungsprogrammen, sowie die Festlegung von Indikatoren und Schwellenwerten zur Bestimmung des Risikos von Umweltbeeinträchtigungen und -schäden durch Bergbauaktivitäten. Nur auf diese Weise kann auch die Wirksamkeit von Maßnahmen von ISA und Vertragnehmern überprüft werden. Außerdem fehlt es an der Durchsetzung eines Minimums an Konsistenz der Umweltstudien und Datenerhebung der Vertragnehmer, um die regionale Integration von Informationen zu ermöglichen. Aktivitätsbezogene Maßnahmen und Kontrollen müssen die vorsorglichen räumlichen Maßnahmen ergänzen. Schwellenwerte und Maßnahmen sollten für die Entscheidungsfindung der ISA bzw. der Vertragnehmer verbindlich sein. Eine zukünftige Überarbeitung des CCZ-EMP sollte, auf der Grundlage neuer wissenschaftlicher Erkenntnisse, angepasste Maßnahmen ermöglichen. Insgesamt fehlt es an einem Gremium, das für die Überwachung und Leitung der weiteren Entwicklung und Umsetzung des Managementplans verantwortlich ist.

Im CCZ EMP wurden mehrere spezifische Maßnahmen festgelegt, die vom ISA-Sekretariat bzw. von Vertragnehmern durchgeführt werden sollen. Eine Überprüfung des Fortschritts bei der Durchführung dieser Maßnahmen hat gezeigt, dass einige der Maßnahmen viel mehr Zeit in Anspruch nehmen als

erwartet (z.B. die Einrichtung einer Datenbank, welche erst seit 2019 verfügbar ist) und andere noch nicht zeitgerecht sind, da bisher noch keine Nutzung unmittelbar bevorsteht (kumulative Folgenabschätzung, Umweltmanagementpläne von Vertragnehmern).

Einige der geplanten, aber nicht abgeschlossenen Maßnahmen wären jedoch von großer Bedeutung für Fortschritte bei der Entwicklung anderer regionaler ISA-Umweltmanagementpläne im Allgemeinen und eines regionalen Umweltausgangszustandes in der Clarion-Clipperton Zone im Besonderen, wie z.B.

- Die Erstellung eines ersten umfassenden Berichts über den Zustand der Umweltqualität in der Region auf der Grundlage von Wissen und Daten aus allen verfügbaren Quellen, einschließlich einer Lückenanalyse und eines Ausblicks auf künftige Veränderungen unter Klimawandel-Szenarien;
- Der Entwurf eines regionalen Überwachungsprogramms, das die Basisstudien der einzelnen Vertragspartner ergänzt und die Harmonisierung der Untersuchungsmethoden und -ziele fördert;
- Die Erstellung eines regionalen Verzeichnisses der Interessenvertreter und aller menschlichen Aktivitäten in der Region, einschließlich ihrer potenziellen Umweltauswirkungen;
- Entwicklung von Ideen, wie andere kompetente Führungsgremien, die Wissenschaft und Interessengruppen am besten einbezogen werden können, z.B. durch ein regionales Beratungsgremium, externe Expertenberatung und Konsultationen;
- Entwicklung der institutionellen Voraussetzungen und Prozesse zur Durchführung einer Strategischen Umweltprüfung, die Informationen über die zur Erfüllung von Art. 145 notwendigen Maßnahmen liefern könnte;
- Die Einrichtung von Expertengruppen, welche die ISA Gremien fachlich beraten, z.B. zur Bewertung kumulativer Auswirkungen, zur Festlegung von Überwachungsstandards, zu Leitlinien für die Gesamtbewertung, zur Identifizierung von Indikatororganismen und -prozessen sowie zu Wissenslücken;
- Die Entwicklung eines regionalen Berichterstattungsformats und von Transparenzkriterien sowie einer Strategie zur Einbeziehung von Interessengruppen.

Auch bei der Entwicklung der Gebiete von besonderem ökologischen Interesse (Areas of Particular Environmental Interest, APEIs) zu international anerkannten Meeresschutzgebieten außerhalb der nationalen Gerichtsbarkeit in Zusammenarbeit mit dem Übereinkommen über die Biologische Vielfalt, CBD, und der Ernährungs- und Landwirtschaftsorganisation der Vereinten Nationen, FAO (ISBA/22/LTC/12, Abschnitt IV, 11) wurden bisher keine Fortschritte erzielt. Ein solches Bemühen könnte einen Präzedenzfall für einen Mechanismus der Zusammenarbeit zwischen internationalen Gremien schaffen und sicherstellen, dass von der ISA ausgewiesene APEI-Netzwerke zu den globalen Erhaltungszielen beitragen.

Darüber hinaus sollte erwogen werden, den derzeitigen CCZ-EMP zu einem wirksamen Managementinstrument aufzuwerten, indem die fehlenden Elemente im Einklang mit dieser Studie und den durch Deutschland und die Niederlande 2020 eingereichten Vorschlägen ergänzt werden. sollte sichergestellt werden, dass zumindest einige Elemente, welche die Belastungen durch den Bergbau begrenzen, eine verbindliche Wirkung für ISA und Vertragnehmer haben. Im Idealfall würde der CCZ-EMP wie alle anderen REMPs zu einem ganzheitlichen Instrument der Umweltprüfung und des Umweltmanagements für "Gebiete außerhalb der Grenzen der nationalen Gerichtsbarkeit", die Hohe See und das Gebiet entwickelt. Es ist anzustreben, diese REMPs mit den Elementen für ein neues internationales Übereinkommen über die Erhaltung und nachhaltige Nutzung der biologischen Vielfalt des Meeres in Gebieten außerhalb der nationalen Gerichtsbarkeit, ILBI/BBNJ, in Vereinbarung zu bringen, welches derzeit im Rahmen der Vereinten Nationen verhandelt wird.

Die oben vorgeschlagenen Maßnahmen würden den CCZ EMP weit in Richtung des Standardtyps für REMPs führen, wie es später in dieser Studie vorgeschlagen wird. Außerdem ist der CCZ EMP ein wichtiger Vorläufer für eine umfassendere regionale Governance im Einklang mit dem ökosystemaren Ansatz für das Management menschlicher Aktivitäten.

Optionen für die Einrichtung und Aufrechterhaltung von REMPs in einem standardisierten Verfahren

Um Kohärenz und Konsistenz zu gewährleisten, sowie für alle Vertragnehmer vergleichbare Bedingungen zu schaffen, müsste sichergestellt werden, dass die Entwicklung aller REMPs einem standardisierten Verfahren unterliegt. Eine Straffung der Gestaltungs- und Überprüfungsprozesse aller REMPs würde sicherstellen, dass REMPs mit größerer Überlegung, breiter Beteiligung und in transparenter Weise auf der Grundlage der besten verfügbaren Wissenschaft und Kenntnisse angenommen werden und wirklich dazu dienen, den wirksamen Schutz der Meeresumwelt zu gewährleisten. Um dies zu erreichen, wäre es notwendig, dass ein mit nur dieser Aufgabe betrautes Gremium die Entwicklung und Überprüfung aller REMP steuert und überwacht. In der gegenwärtigen Praxis liegt die Verantwortung für die Entwicklung von REMP bei interessierten Kontraktoren (NW Pazifik, Indik), bzw. dem ISA Sekretariat in Unterstützung der LTC (CCZ, nördl. Mittelatlantischer Rücken).

Eine Alternative zu diesem Ansatz wäre die Schaffung eines neuen Unterorgans, wie zum Beispiel eine Umwelt- und Wissenschaftskommission, welche die Entwicklung, Implementierung und Überprüfung aller REMPs der ISA koordiniert und steuert. Auch die LTC könnte diese Aufgabe übernehmen. Eine andere Möglichkeit wäre die Einrichtung von unabhängigen *ad-hoc*-Expertengremien für jede Region (zwischen 4 und 6 Personen) unter dem Dach der LTC mit der entsprechenden Fachkompetenz insbesondere für die betreffende Region. Auch hier hätte die LTC die Aufgabe, die Kohärenz zwischen den Regionen sicherzustellen. Mehrere praktische Umsetzungswege scheinen möglich zu sein, unter anderem, könnten die Mitglieder der REMP Gremien entweder ausschließlich LTC Mitglieder, oder zusätzlich unabhängige Experten umfassen. Deren Ernennung könnte entweder durch die LTC, oder direkt durch den Rat auf der Grundlage von Nominierungen der Mitgliedstaaten und anderer Interessengruppen erfolgen.

Nach ihrer Konstituierung würden diese regionalen Gremien die für die Entwicklung der jeweiligen REMP nötigen Vorarbeiten durchführen, mit interessierten Akteuren und Organisationen der Region kommunizieren, den Arbeitsprozess und Workshops organisieren, Teilnehmer auswählen und schließlich einen ersten Entwurf des REMP erstellen. Dieser Entwurf sollte in Übereinstimmung mit einer für alle REMP verbindlichen 'Standardvorlage' erstellt werden, in der die erforderlichen Mindestinhalte für alle REMP angegeben werden. Der besagte REMP Entwurf liegt dann zur weiteren öffentlichen Kommentierung aus, und wird überarbeitet bevor er an das LTC weitergeleitet wird. Das LTC wird den Entwurf unter Einbeziehung der eingegangenen Kommentare prüfen und daraufhin eine Empfehlung an den Rat aussprechen. Die regelmäßige Überprüfung jedes REMPs sollte ebenfalls diesem Verfahren unterliegen, und es wird vorgeschlagen, dass dieselben unabhängigen *ad-hoc*-Gremien, die für die Gestaltung des REMPs verantwortlich ist, auch für den Überprüfungsprozess zuständig ist.

Systematische Entwicklung der REMPs

Der durch Ökosystemansatz und Strategischer Umweltprüfung vorgegebene Rahmen

Nicht nur der CCZ-EMP, sondern auch die Entwürfe der Abbauregularien beziehen sich auf den ökosystemaren Ansatz für die Bewirtschaftung als Mittel zur *"Gewährleistung eines wirksamen Schutzes der Meeresumwelt vor den schädlichen Auswirkungen"* der mit dem Bergbau verbundenen Aktivitäten

während der Ausbeutung von Bodenschätzen in dem "Gebiet".[7] Der ökosystemare Managementansatz, EAM, bedeutet eine Änderung der Managementphilosophie vom sektoralen zum Systemdenken und von der Berücksichtigung von einzelnen Belastungen zur Berücksichtigung von Belastungsauswirkungen in einem ökosystemaren Kontext. Auch die enge Beteiligung von Interessengruppen während des Prozesses zur Entwicklung von Planungsentscheidungen ist ein entscheidendes Element. Der integrative Charakter des ökosystemaren Managementansatzes und insbesondere die Verfahren einer strategischen Bewertung (siehe unten) sollen allen Beteiligten eine Systemsicht auf das jeweilige Gebiet/die jeweilige Region vermitteln und so das Verständnis für das Gesamtausmaß der Belastungen und deren Auswirkungen, potenzielle Nutzungskonflikte und die natürlichen Grenzen der Ökosysteme fördern, so dass diese Kenntnis in die Handlungsentscheidung einfließt. In praktischer Hinsicht beinhaltet ein EAM dass möglichst sektorübergreifende Planungsentscheidungen auf regionaler Ebene getroffen werden, welche

- sich an langfristigen ökologischen Zielen orientieren,
- gegenüber Akteuren und der Öffentlichkeit transparent sind,
- Beteiligungsmöglichkeiten bieten und Stakeholderwerte berücksichtigen;
- Nutzerkonflikte bewerten und reduzieren;
- alle relevanten wirtschaftlichen, sozialen und ökologischen Aspekte des Bergbaubetriebs bewerten, berücksichtigen und integrieren.

Ziel ist die Gewährleistung der Nachhaltigkeit, die Erhaltung der ökologischen Gesundheit unter Anerkennung der menschlichen Bedürfnisse und die Integration wirtschaftlicher Faktoren. Dabei sind die Komplexität und Dynamik des Ökosystems, geeignete zeitliche und räumliche Maßstäbe, die Wiederherstellbarkeit von Umweltschäden, der Wert der Güter und Dienstleistungen des Ökosystems und die Unsicherheit zu berücksichtigen.

Die Strategische Umweltprüfung, SUP, engl. SEA, ist eines der Instrumente zur Umsetzung des Ökosystemansatzes in die Praxis. Es handelt sich um einen proaktiven Prozess, der darauf abzielt, die Umweltauswirkungen bestimmter Pläne, Programme und Politiken zu antizipieren, anstatt auf die Umweltauswirkungen bestimmter Projekte zu reagieren. Daher untersucht die SUP idealerweise die Politiken/Pläne/Programme zusammen mit den Interessengruppen, während sie sich noch in der Entwicklung befindet und angepasst werden können. Die Elemente und Schritte, die an einem SUP-Prozess beteiligt sind, könnten eine hilfreiche Anleitung für die ISA bei der Entwicklung ihrer REMPs sein. Die einzelnen regionalen Managementpläne in den verschiedenen Ozeanbecken sind Pläne, die im Zusammenhang mit einem globalen REMP-Programm stehen, das auf der globalen Politik der ISA basiert. Der Managementplan für jede Region, REMP, wird die ISA-Projektebene unter der Verantwortung von Vertragnehmern in eine umfassendere regionale Vision integrieren. Die SUP ist ein geeignetes Instrument zur Bewertung der kumulativen Auswirkungen von einem oder mehreren Sektoren und gewinnt zunehmend an Bedeutung für die strategische Prioritätensetzung und die Initialisierung eines Multi-Stakeholder-Prozesses. Ein Ansatz, der auf den Erfahrungen mit SUPs auf der ganzen Welt beruht, bietet die Möglichkeit, die Erstellung eines Managementplans zu unterstützen, in diesem Fall für eine Region, der einen langfristigen, wirksamen Schutz der Meeresumwelt vor den schädlichen Auswirkungen dieser neuen Industrie im Zusammenhang mit den laufenden Umweltveränderungen aufgrund der globalen Erwärmung und anderer menschlicher Aktivitäten ermöglicht.

In den jeweiligen Regionen hat die ISA nur die Befugnis, die Aktivitäten im Zusammenhang mit dem Mineralienabbau im "Gebiet" zu regeln. Allerdings würde ein umfassender EAM orientierter Ansatz für das Management der REMPs zumindest eine regionale Harmonisierung der Umweltschutzprioritäten, -

[7] International Seabed Authority, 2019. Draft Regulations on Exploitation of Mineral Resources in the Area. ISBA/LTC/25/WP.1. https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/isba_25_c_wp1-e.pdf

techniken und -indikatoren sowie der zulässigen Schwellenwerte mit anderen regional tätigen Regierungs- oder Managementbehörden und den angrenzenden Küstenstaaten erlauben. Zusätzlich sollte die oben genannte Zusammenarbeit und Kohärenz auf eine Harmonisierung mit dem SUP-ähnlichen Prozess ausgedehnt werden, wie er in den laufenden Verhandlungen unter den Vereinten Nationen für ein neues internationales Übereinkommen über die Erhaltung und nachhaltigen Nutzung der biologischen Vielfalt des Meeres in Gebieten außerhalb der nationalen Gerichtsbarkeit (ILBI/BBNJ) entwickelt wird.

Diese Verhandlungen zielen darauf ab, die Kohärenz mit den einschlägigen Rechtsinstrumenten, -rahmen und -organen zu ergänzen und zu fördern, und der vorliegende Entwurf des Verhandlungstextes[8] sieht in Artikel 6 Absatz 1 mehrere Mechanismen der Zusammenarbeit vor, unter anderem *"durch Stärkung und Verbesserung der Zusammenarbeit mit und zwischen den einschlägigen Rechtsinstrumenten und -rahmen und den einschlägigen globalen, regionalen, subregionalen und sektoralen Gremien und deren Mitgliedern"*. Im Entwurf des Artikels 21 wird das Ziel formuliert, einen kohärenten Rahmen für die Umweltverträglichkeitsprüfung von Aktivitäten in Bereichen außerhalb der nationalen Gerichtsbarkeit, einschließlich strategischer Umweltverträglichkeitsprüfungen und kumulativer Auswirkungen, zu erreichen. Einige Parteien sprechen sich dafür aus, andere Gremien wie die ISA an die durch das neue Abkommen festgelegten Mindeststandards zu binden. Das im ILBI/BBNJ derzeit geplante künftige wissenschaftlich-technische Gremium könnte zu mehr Kohärenz beitragen.

Entwicklung der Inhalte der REMPs

Im Einklang mit dem oben Gesagten werden die folgenden, für jeden REMP obligatorischen Schritte vorgeschlagen, die dazu beitragen, die notwendigen Elemente und die Grundlagen der im Plan festgelegten Maßnahmen zu liefern (s. a. Kapitel 4 und Abb. 4, Seite 97)

1. Einrichtung eines REMP-Gremiums, das für den gesamten Verfahrens- und Managementzyklus auf Dauer verantwortlich ist;
2. Verfahrensvorbereitungen für die Entwicklung von REMP. Dabei sollten die folgenden Elemente berücksichtigt werden:
    a. Organisation des Planungsprozesses, einschließlich Zeitplan, der Angabe von Rollen und Verantwortlichkeiten für die Entscheidungsfindung (siehe Kapitel 3) sowie obligatorische öffentliche Konsultation und unabhängige Überprüfung;
    b. Bestandsaufnahme der bestehenden Vorschriften und Verwaltungsbehörden in der gesamten Region;
    c. Identifizierung und Benachrichtigung von Interessenvertretern, Kommunikations- und Beteiligungsstrategie, Clearing-House-Mechanismus, Stimulation der Zusammenarbeit zwischen Organisationen;
    d. Festlegung der geographischen Grenzen der im Plan berücksichtigten Region.
3. Erstellung eines regionalen Umweltberichts mit einer *à-priori*-Bewertung der Auswirkungen des Bergbaus. Dies ist das Kerndokument, auf das sich die Entscheidungsfindung in Bezug auf bergbaubezogene Maßnahmen und eventuelle Konsultationen mit anderen zuständigen Organisationen über Interessenkonflikte stützen werden. Im Idealfall sollten ökologische, soziale und wirtschaftliche Aspekte berücksichtigt werden, um die im Sinne der Nachhaltigkeit beste Lösung zu finden. Ein von der ISA herausgegebenes Leitliniendokument wird erforderlich sein. Im Großen und Ganzen sollte der regionale Umweltbericht, unterstützt durch eine umfassende Kartierung und räumliche Analyse, Folgendes enthalten

[8] verfügbar unter https://www.un.org/bbnj/sites/www.un.org.bbnj/files/textual_proposals_compilation_article-by-article_-_15_april_2020.pdf

a. Eine Beschreibung des Umweltzustands der Region auf der Grundlage des besten verfügbaren Wissens (ökologische Ausgangsbedingungen);

b. Die langfristige regionale Vision und die operativen Ziele für Umweltschutz und Nutzung, welche gemeinsam mit den Interessenvertretern entwickelt wurden und auf einem vereinbarten Satz von Indikatoren mit geeigneten Schwellenwerten basieren;

c. Eine Bewertung der gegenwärtigen und zukünftigen Bedrohungen für Arten/Habitate/Ökosysteme in der Region, auch durch zukünftige Bergbauaktivitäten. Dazu muss die Regulierungsbehörde die folgenden Bewertungen vornehmen:

   i. Kumulative Folgenabschätzung;

   ii. Sensibilitäts-/Verwundbarkeitsbewertung von ökologischen, kulturellen und sozialen Werten;

   iii. Risikobewertung von bergbaubezogenen Aktivitäten;

   iv. Prüfung von Alternativen - d.h. die Prüfung verschiedener Hypothesen über die zukünftige Entwicklung der Bergbauaktivitäten;

   v. Identifizierung potentieller Konfliktgebiete mit anderen Akteuren;

   vi. Lückenanalyse und Unsicherheiten.

4. Managementmaßnahmen zur Erreichung der regionalen REMP-Vision, Ziele und Vorgaben, die von der ISA ergriffen werden können;
5. Überwachung, Bewertung und periodische Überprüfung des verabschiedeten REMP
6. Wissenschaftliches Programm;
7. Entwicklung von Kapazitäten.

Eine vollständige Dokumentation und Transparenz sind in allen Phasen der Entwicklung und Überprüfung des REMP erforderlich.

Die obigen Punkte im Detail:

1. Einrichtung eines REMP-Gremiums

Um REMPs zu einem wirksamen Instrument für den wirksamen Schutz der Meeresumwelt vor den Auswirkungen von Bergbautätigkeiten zu machen, müssen die daraus resultierenden Maßnahmen durchgesetzt und überwacht, Veränderungen der Umwelt überwacht und bewertet sowie regelmäßige Überprüfungen und Anpassungen des Plans durchgeführt werden. Daher sind sowohl die Daten- und Wissenssammlung als auch ihre Verarbeitung notwendigerweise eine kontinuierliche Arbeit. Dies erfordert die Einsetzung einer ständigen Lenkungsgruppe in jeder Region, die für die Überwachung der Umsetzung, sowie der Wirksamkeit der Maßnahmen, einschließlich eines Überwachungsprogramms, verantwortlich ist, und die Überprüfung und Anpassung des Plans veranlasst, wenn nötig. Diese Gruppe würde auch die Kommunikation mit der Wissenschaft und anderen Interessengruppen, einschließlich Vertragnehmern und Datenlieferanten, aufrechterhalten.

Im Vergleich zu den internen, an das ISA-Sekretariat/LTC/Vertragnehmer gebundenen Lösungen (wie im Leitfaden des ISA-Sekretariats, 2019, angegeben) könnte eine externe Lenkungsgruppe mit Unterstützung des ISA-Sekretariats für ein breiteres und transparenteres Engagement der Interessengruppen sorgen, das über den gesamten Managementzyklus realisiert wird. Ihr könnten zum Beispiel Vertreter verschiedener Gruppen, einschließlich wissenschaftlicher Experten, und Mitglieder des ISA-Sekretariats angehören. Das Mandat könnte z.B. die Vergabe von Aufträgen für wissenschaftliche Studien,

die Organisation von Workshops und die Erstellung von REMP-Dokumenten zur öffentlichen Konsultation und Überprüfung durch die Kommission umfassen (siehe Kapitel 3).

2. Verfahrenstechnische Vorbereitungen

Ein erster hilfreicher Schritt, der auch für die Information der Interessengruppen und der Öffentlichkeit über die bevorstehende Entwicklung des REMP nützlich ist, wäre ein Informationsdokument mit einer kurzen Beschreibung des Zwecks, des geografischen Gebiets und der relevanten ISA-Richtlinien und -Vorschriften. Ein Überblick über die relevanten Governance-Mechanismen, sektoralen Führungsgremien und schließlich Maßnahmen in der Region könnte im Großen und Ganzen Aufschluss darüber geben, welcher Personenkreis über den REMP-Prozess zu informieren ist.

Vorzugsweise in Zusammenarbeit oder zumindest in Absprache mit Vertragnehmern und Interessenvertretern muss eine Reihe von Verfahrensschritten durchgeführt werden, bevor mit der Entwicklung der Inhalte des REMP begonnen werden kann, welcher dann auf der Grundlage von Berichtsentwürfen, die entweder von der organisierenden Einrichtung oder von externen Experten zusammengestellt werden zusammengestellt wird. Die zu treffenden Entscheidungen umfassen

- Die Einigung auf die Abgrenzung der Region (4.2.1.1)
- Die Planperiode und den Überprüfungsmechanismus (4.2.1.2)
- Die Einrichtung eines Clearing-House-Mechanismus und einer kontinuierlichen Dokumentation aller Maßnahmen im Zusammenhang mit der Entwicklung, Umsetzung und Überprüfung des REMP (4.2.1.3);
- Die Veröffentlichung einer Kommunikations- und Beteiligungsstrategie (4.2.1.4);
- Die Festlegung öffentlicher Konsultationen (4.2.1.5)
- Die Festlegung eines Mechanismus für eine unabhängige Überprüfung (4.2.1.6)
- Erste Schritte hin zu einem Kooperationsmechanismus mit anderen Gremien 4.2.1.7).

3. Regionaler Umweltzustandsbericht mit à-priori-Bewertung der Auswirkungen des Bergbaus

Ein dem Stand der Technik entsprechender regionaler Umweltbericht bildet die Grundlage für die Entscheidungen über Maßnahmen, die im regionalen Umweltmanagementplan festgelegt werden. Der Umweltbericht sollte aus allen verfügbaren Quellen synthetisiert werden und enthält[9]

3.1. Eine kontextsetzende Einführung (4.2.2.1)

*3.2 Eine **Umweltbeschreibung**, die auf einer soliden Wissensbasis basiert (4.2.2.2)*

- Eine Beschreibung und Bewertung des Zustands der regionalen Umwelt (z.B. in einem Qualitätszustandsbericht), einschließlich der beobachteten natürlichen Variabilität, der Verflechtungen mit anderen Regionen und der Anfälligkeit für Auswirkungen menschlicher Aktivitäten sowie aller ökologischen und kulturellen Werte;
- Eine Bestandsaufnahme vergangener, gegenwärtiger und geplanter menschlicher Aktivitäten und ihrer gegenwärtigen Regulierung;
- Beschreibung bekannter Umweltherausforderungen und -probleme, wenn möglich einschließlich einer Bewertung der Wahrscheinlichkeit, Dauer, Häufigkeit und Umkehrbarkeit vorherrschender Umweltauswirkungen und Bedrohungen durch direkte und indirekte Belastungen, ihres Ausmaßes und ihrer räumlichen Ausdehnung. Dabei sollten kumulative, synergistische und wahrscheinlich grenzüberschreitende Auswirkungen, sowie die Auswirkungen der globalen Erwärmung auf die Meeresökosysteme erörtert werden, um die

[9] auf der Grundlage der Richtlinie 2001/42/EG des Europäischen Parlaments und des Rates vom 27. Juni 2001 über die Prüfung der Umweltauswirkungen bestimmter Pläne und Programme. 2001/42/EG, Anhang 1; Jones, D.O.B., Durden, J.M., Murphy, K., Gjerde, K.M., Gebicka, A., Colaço, A., Morato, T., Cuvelier, D., Billett, D.S.M., 2019. Existing environmental management approaches relevant to deep-sea mining. Marine Policy 103, 172-181; Billett, D.S.M., Jones, D.O.B., Weaver, P.P.E., 2019b. Improving Environmental Management Practices in Deep-Sea Mining. In: Sharma, R. (Ed.), Environmental Issues of Deep-Sea Mining. Impacts, Consequences and Policy Perspectives. Springer Nature Switzerland AG, Cham, Switzerland, pp. 403-446.

wahrscheinlichen signifikanten Auswirkungen auf die Umwelt, einschließlich der biologische Vielfalt, der Fauna, der Flora und des Wassers, zu bestimmen.

- Beschreibung tatsächlicher oder potenzieller Nutzungskonflikte - zwischen ISA-Vertragspartnern, mit anderen legitimen Nutzern - und grenzüberschreitende Fragen;
- Die Identifizierung von Wissenslücken und Unsicherheiten.

3.2.1 Die langfristige **regionale Vision und die operativen Ziele** für Umweltschutz und Nutzung, (4.2.2.3), einschließlich geeigneter Indikatoren und Schwellenwerte. In dem Bericht ist zu erläutern, wie diese Ziele und etwaige Umweltbelange bei der Erstellung des Berichts berücksichtigt wurden.

3.2.2 **Umweltbewertung** (einschl. kumulativer Effekte, Empfindlichkeit/Verletzlichkeit, Risiko) der regionalen Informationen (4.2.2.4). und der zu erwartenden Umweltauswirkungen der bergbaulichen Aktivitäten aus einem oder mehreren kommerziellen Bergwerken im Hinblick auf die Bestimmung

- der Langfristigen Trends in der Entwicklung von Indikatoren für die Meeresgesundheit;
- der Langfristigen Trends im Erhaltungszustand von kritischen Arten und Lebensräumen;
- der Langfristigen Trends auf der Ebene menschlicher Aktivitäten und potentieller Konfliktgebiete;
- des Beitrags der durch den Bergbau verursachten Umweltauswirkungen;
- Der Wahrscheinlichkeit, die jeweiligen Management- und Erhaltungsziele zu erreichen.

Eine soziale und wirtschaftliche Folgenabschätzung wäre von Nutzen, wird hier jedoch nicht weiter in Betracht gezogen.

3.3. ***Managementmaßnahmen*** *zur Erreichung der regionalen Vision, Ziele und Vorgaben unter der Autorität von ISA* (4.2.3). Die räumlichen und nicht-räumlichen Erhaltungsmaßnahmen sollen alle signifikanten nachteiligen Auswirkungen auf die Umwelt, einschließlich potentieller Gebiete von Erhaltungsinteresse nach globalen und sektoralen Maßnahmen und Kriterien verhindern, reduzieren und so vollständig wie möglich ausgleichen;

3.4. *Berücksichtigung von Handlungsalternativen* (Umfang, Intensität, Häufigkeit der Maßnahmen, technische Bedingungen usw.) und der Option "keine Maßnahmen"; (4.2.2.5).

All dies wird Teil des endgültigen Managementplans, der dann auch das Maßnahmenpaket enthält, ebenso wie die Programme zur Überwachung der regionalen Umwelt (4.2.4). und der Einhaltung der Vorschriften durch die Vertragnehmer, die Forschung zur Schließung von Wissenslücken (4.2.5) und den Aufbau von Kapazitäten (4.2.6).

Öffentliche **Konsultationen** während der Beurteilungphase der Plan- oder Programmentwicklung sowie die Erörterung "vernünftiger Alternativen" sind wichtige Komponenten, um eine Abwägung von Nutzen und Kosten neuer Politiken, Programme oder Pläne zu ermöglichen. Eine geeignete ISA-Anleitung für die Erstellung eines Umweltberichts auf der Grundlage einer Standardvorlage für den Inhalt (wie die in ISBA/26/C/7 vorgeschlagene Vorlage) ist erforderlich und sollte den Abbauregularien beigefügt werden. Es ist auch wichtig, sich auf einen regionalen Bewertungsrahmen für Umweltauswirkungen und -risiken zu einigen, der dann den Vertragnehmern zur Anwendung auf Aktivitäten in ihrem Verantwortungsbereich zur Verfügung gestellt werden kann. Zu den wichtigen Aufgaben des Umweltberichts gehört auch die explizite Darstellung von Wissenslücken und daraus resultierenden Unsicherheiten. Dieses Wissen dient dann dazu, entweder Programme zu entwickeln, um die Wissenslücken durch Forschung und/oder Überwachung zu schließen, oder um auf die Vereinbarung geeigneter regionaler Erhaltungs- und Bewirtschaftungsziele und der damit verbundenen Bewirtschaftungsmaßnahmen hinzuarbeiten.

4 Managementmaßnahmen

Auf der Grundlage des Umweltberichts (4.2.2) und unter Berücksichtigung der regionalen Vision, Ziele und Vorgaben wird der REMP die Maßnahmen festlegen, die zu ergreifen sind, um einen wirksamen Schutz der Meeresumwelt vor schädlichen Auswirkungen der Bergbauaktivitäten zu gewährleisten, wobei auch andere Belastungen berücksichtigt werden. Mit den vereinbarten Prozessen und Maßnahmen wird operativ gesteuert, wie die vorgegebenen Ziele und Vorgaben erreicht werden können, u.a. durch die Reduzierung der Ursachen für die Umweltauswirkungen.

Bei guter Vorkenntnis wäre ein systematischer Erhaltungsplanungsprozess angebracht. Angesichts der bestehenden großen Wissenslücken über die Tiefsee könnte ein erster Schritt zur vorsorglichen Erhaltung der Ökosysteme dort die ökologische Modellierung der vermuteten ökologischen Ausgangsbedingungen einschließlich der vertikalen und horizontalen Konnektivität, der Nahrungsnetze und der zeitlichen Dynamik sein. Daraus würde auch der langfristige Forschungsbedarf hervorgehen. Eine solide regionale Wissensbasis ist die Voraussetzung dafür, dass (a) die qualitativen und quantitativen regionalen Umweltauswirkungen auf allen relevanten zeitlichen und räumlichen Skalen nach Beginn des Bergbaus beurteilt werden können; (b) beurteilt werden kann, ob es möglicherweise eine Größenordnung, Dauer und Intensität der Umweltauswirkungen der bergbaubezogenen Aktivitäten gibt, die nicht zu einer irreversiblen, großräumigen Schädigung auf lokaler und regionaler Ebene führt; (c) die erforderliche Art und Richtung der Bewirtschaftungsmaßnahmen bestimmt werden kann.

Aufgrund dieser Wissensabhängigkeit kommt der Wissenschaft eine entscheidende Rolle zu, wenn es darum geht, den REMP-Prozess hinsichtlich der diversen Auswirkungen verschiedener Bewirtschaftungsszenarien zu beraten und darüber zu informieren, was als ″sicherer Handlungsraum″ für menschliche Aktivitäten angenommen werden kann, um das Risiko einer nicht nachhaltigen Wechselwirkung mit den Meeresökosystemen zu vermeiden. Der ″sichere Handlungsraum", wie er im REMP festgelegt wird, muss in hohem Maße vorsorglich sein, da die zahlreichen und langanhaltenden Wissensdefizite und Unsicherheiten es unmöglich machen werden, die sozialen, kulturellen, wirtschaftlichen und ökologischen Auswirkungen vor Beginn des kommerziellen Bergbaus vollständig zu bewerten. Nach dem Beginn der Aktivitäten wird die Abmilderung der Auswirkungen schwierig oder wenig wirksam sein. Dies unterstreicht, wie wichtig es ist, dass, ausgehend von größter Vorsorge, die Maßnahmen der REMPs im Laufe der Zeit angepasst werden, so dass Tiefseebodenbergbau nur schrittweise und in seinen ökologischen Auswirkungen gut kontrolliert als neuer, die Tiefsee belastender Industriezweig eingeführt werden wird.

4.1. Regulatorische Kontrolle der Aktivitäten von Vertragnehmern

Räumlicher Schutz reicht möglicherweise nicht aus, um den Verlust der biologischen Vielfalt auf lokaler und regionaler Ebene zu verhindern. Maßnahmen zur Minimierung von Emissionen sind ein noch wirksameres Instrument zur Minimierung von Umweltschäden. Solche Maßnahmen werden weltweit am besten durch ISA-Standards und -Richtlinien sowie durch Leitlinien zur besten Umweltpraxis und zu den besten verfügbaren Technologien geregelt, müssen jedoch möglicherweise für regionale oder subregionale Zwecke angepasst werden. Die Emissionskontrolle könnte z.B. Maßnahmen zur Minimierung von Sedimentfahnen, zur Verringerung des Gewichts/Drucks auf dem Meeresboden, zur Minimierung von giftigen Abfällen und Einleitungen usw. umfassen.

Zu diesem Zweck müssen alle mit dem Bergbau zusammenhängenden Aktivitäten aufgelistet, spezifiziert und hinsichtlich ihrer Auswirkungen auf Biota im Betrieb bewertet werden (dies sollte in der Phase der Gefahrenidentifizierung im Prozess der Risikobewertung erfolgen). Alternativ könnten auch Vorsorgemaßnahmen ergriffen werden. Zum Beispiel könnten Vertragnehmer gezwungen werden, das Ausmaß der Störungen durch Bergbauaktivitäten auf die Grenzen ihres Bergwerksgeländes zu beschränken, um die technische Minimierung von z.B. Sedimentfahnen und Verschmutzung sowie die Lärmreduzierung und ein minimalistisches Beleuchtungskonzept zu fördern.

Wenn detaillierte Emissionsgrenzwerte auf der Grundlage der nachgewiesenen/vorgeschlagenen Umweltveränderung geplant werden, dann werden zunächst folgende Schritte notwendig sein:

- Identifizierung geeigneter biotischer und abiotischer Indikatoren mit in geeigneten Zeiträumen messbaren Kennwerten;
- Identifizierung vorläufiger Schwellenwerte der Indikatoren für verschiedene Schadensstufen;
- Bestimmung der maximal zulässigen Umweltbelastung insgesamt - Minimierung der kumulativen Umweltauswirkungen;
- Bestimmung der maximal zulässigen Umweltschäden durch den Abbau von Mineralien in der Region;
- Bestimmung der maximal zulässigen Umweltbelastung durch einzelne Projekte;
- Bestimmung der maximal zulässigen Größenordnung der betrieblichen Auswirkungen von z.B. Baggerarbeiten, Bohrungen, Volumen des Sedimenteintrags, Ausbreitung von Sedimentfahnen, d.h. Ermittlung der besten verfügbaren Technologie und der besten Umweltpraxis.

Auf der Grundlage der obigen Informationen, sowie der Projekt-Umweltverträglichkeitsprüfung, kann die ISA die Genehmigung eines Abbauarbeitsplans mit Bedingungen versehen. Ein Vergleich der Umweltleistung der Anlagen verschiedener Betreiber wird bei der Bestimmung der besten verfügbaren Technologie und der besten Umweltpraxis aufschlussreich sein und schließlich zu Verbesserungen anregen. Eine regulatorisch strenge Durchsetzung der Schadensgrenzen kann zusammen mit wirtschaftlichen Anreizen Innovationen für die am wenigsten invasiven Techniken auslösen.

4.2 Raumordnung und Raumplanung

Eine objektive Kartierung des regionalen Umfelds zusammen mit den laufenden und geplanten Aktivitäten und deren Auswirkungen, sowie eine Raumplanung werden erforderlich sein. Der Nutzen eines solchen Vorgehens besteht in

- erhöhter Transparenz gegenüber Interessengruppen und der Öffentlichkeit;
- der Kartierung von Standorten mit Nutzugskonflikten und potenziellen grenzüberschreitenden und kumulativen Auswirkungen;
- dem Abgleich aller potenziellen Nutzungen und Interaktionen;
- der optischen Untermauerung für Empfehlungen zur ökologisch optimalen Lage von Abbaustandorten innerhalb von Vertragsgebieten;
- Hinweisen auf eine notwendige Begrenzung der maximalen Anzahl von Abbaustandorten/Verträgen.

Das REMP Flächenmanagement beruht auf der vollständigen Zusammenstellung der bestehenden räumlichen (und anderen) Maßnahmen in der jeweiligen Region unter Berücksichtigung von existierenden Flächenbezeichnungen, die unterschiedlichen Managementzielen dienen

4.2.1. Repräsentative Erhaltungsmaßnahmen

Regionaler vorsorgender, und repräsentativer Flächenschutz ist als Versicherung gegen unerwartete Entwicklungen und angesichts der großen Unsicherheiten bezüglich der Umweltauswirkungen von Meeresbergbau und anderen Aktivitäten erforderlich. Es sollte ein flächendeckendes Netz von Schutzgebieten aufgebaut werden, welches den Repräsentationskriterien der CBD (Secretariat of the Convention on Biological Diversity, 2009) entspricht und zu der bis 2020 angestrebten 10%igen Abdeckung mit Meeresschutzgebieten (Marine Protected Areas, MPAs) in allen Ozeanen beiträgt[10]. In Gebieten außerhalb der nationalen Gerichtsbarkeit können derzeit weltweit keine Meeresschutzgebiete

[10] die CBD-Ziele werden derzeit aktualisiert.

mit global verbindlichen Maßnahmen eingerichtet und durchgesetzt werden - auf Hoher See, weil es keinen Rechtsrahmen dafür gibt, und im Gebiet, weil die ISA nur sektorale Maßnahmen wie Bergbauverbotsgebiete schaffen kann. Nichtsdestotrotz hat sich die ISA dafür entschieden, als proaktive Maßnahme gegen die kumulativen regionalen Auswirkungen von Bergbauaktivitäten eine eigene Kategorie von Schutzgebieten, die "Areas of Particular Environmental Interest", APEIs, im Gebiet auszuweisen.

Um den Grundstein für die spätere Einrichtung von MPAs zu legen, entwickelte die CBD das Konzept der "Ecologically and Biologically Significant Areas", EBSAs, welche prioritäre Gebiete darstellen, die nach einer Reihe von Kriterien, darunter der Repräsentativität, für spätere Schutzmaßnahmen in Frage kommen. Das derzeit verhandelte ILBI/BBNJ-Abkommen zielt darauf ab, den Schutz der biologischen Vielfalt u.a. durch die Ausweisung von MPAs in Gebieten jenseits der Grenzen der nationalen Gerichtsbarkeit zu verbessern, die sich auf einige oder alle EBSAs stützen könnte. Eine Kohärenz zwischen den Maßnahmen auf hoher See und im Gebiet ist wünschenswert.

Meeresschutzgebiete (Marine Protected Areas, MPA), die von anderen globalen oder regionalen Management-Organisationen oder -Konventionen ausgewiesen wurden, sollten respektiert und in das REMP einbezogen werden.

Vertragnehmer sind vertraglich verpflichtet, bestimmte Zonen innerhalb ihres Explorationsvertragsgebietes und später des Abbaugebietes zur Überwachung der Auswirkungen des Bergbaus zu bestimmen. Dazu gehört eine Zone, in der die ökologischen Auswirkungen direkt gemessen werden können (Impact Reference Zone, IRZ) sowie eine ökologisch vergleichbare unbeeinflusste Fläche (Preservation Reference Zone, PRZ). Zu den Kriterien für PRZs gehört, dass sie als Zufluchtsort für Arten und Lebensräume in den Abbau-/Auswirkungsgebieten dienen müssen und als solche den Verlust der biologischen Vielfalt verhindern können. Deshalb sollten die PRZ als repräsentative Standorte kartiert werden.

4.2.2. Räumliche Erhaltung gefährdeter, einzigartiger, seltener und anderweitig gefährdeter Arten und Lebensräume

Die Reihe der repräsentativen Gebiete sollte durch prioritäre Gebiete, Arten und Lebensräume für die Erhaltung ergänzt werden, die entweder bereits ausgewiesen sind oder nach den Kriterien der CBD, der FAO und anderer Organisationen, einschließlich regionaler Übereinkommen, ausgewiesen wurden. Die Maßnahmen könnten die vollständige Schließung solcher Gebiete oder eventuell nur eine zeitliche/saisonale Beschränkungen erfordern. Letzteres könnte z.B. der Fall sein, wenn eine bestimmte Art den Ozean neben einer Abbaustätte nur vorübergehend nutzt, z.B. als Kinderstube (siehe auch ISBA/26/C/7, Anhang, Absatz 8.3).

Im Idealfall führt jeder Explorationsvertragnehmer eine räumliche Analyse seines Vertragsgebiets durch und kartiert die Verteilung von mindestens mesoskaligen benthischen Lebensräumen und Gemeinschaften unter Berücksichtigung potentieller Schutzgebiete nach den Kriterien der FAO (2009) und der CBD (Convention on Biological Diversity, 2010a). Die relevanten Kriterien werden sinnvollerweise im Zusammenhang mit den Anforderungen der Artikel 145 und 194(5) des SRÜ gesetzt, siehe auch die *"Beispiele[n] von Habitaten/Ökosystemmerkmalen in dem Gebiet, in dem diese Kriterien Anwendung finden können"* in der REMP-Anleitung des ISA-Sekretariats, Anhang II (wiedergegeben in Anhang 1 dieser Studie).

4.3. Umgang mit potenziellen Konflikten mit anderen legitimen Nutzungen

Der Tiefseebodenbergbau wird eine neue Tätigkeit im Ozean sein und muss mit *"gebührender Rücksicht"* ('due regard', SRÜ Teil VII, Art. 87) auf andere Tätigkeiten wie (Thunfisch-)Fischerei und Wissenschaft, Kabelverlegung und Schifffahrt betrieben werden, die alle garantierte Freiheiten auf hoher See sind, und umgekehrt. Potentielle Konflikte können sowohl in Form einer direkten Konkurrenz um den Raum, z.B. mit der Schifffahrt, der Kabelverlegung, der Fischerei und der Forschung auftreten, in

Form von eingeschränkten Schutzgebieten, als auch indirekt durch eine Verschlechterung der Umweltqualität, die die Möglichkeiten anderer Nutzer, z.B. der Fischerei oder der Suche nach genetischen Meeresressourcen, beeinträchtigen und sich auch auf die Küstengemeinden auswirken könnten.

Daher hat der Tiefseebodenbergbau im "Gebiet" direkte Auswirkungen auf eine ganze Reihe von Interessengruppen. Darüber hinaus muss der direkte Konflikt mit globalen gesellschaftlichen Zielen wie den Biodiversitätszielen der CBD und der Agenda 2030 berücksichtigt werden. Auch die Ziele und Instrumente des derzeit verhandelten ILBI/BBNJ, die den Erhalt der Biodiversität auf Hoher See ermöglichen sollen, müssen in die Analyse mit einbezogen werden, um Konflikte zu vermeiden. Die durch den Bergbau bedingte Zerstörung kritischer Lebensräume kann auch zum Verlust künftiger Möglichkeiten zur Erforschung und schließlich zur Nutzung der so genannten marinen genetischen Ressourcen in dem Gebiet führen. Dies ist besonders relevant für Organismen, die an oder in der Nähe von hydrothermalen Schloten gefunden werden, die oft eine sehr hohe Spezialisierung auf die jeweiligen Lebensbedingungen aufweisen, was für die Entwicklung menschlicher Materialien, Werkzeuge und Heilmittel nützlich sein kann.[11]

Die bereitzustellenden Informationen umfassen die Berücksichtigung des Konfliktpotentials (wer war beteiligt? welche Maßnahmen wurden ergriffen?) und die gefundenen Lösungen, einschließlich eventueller Verfahrensvereinbarungen mit anderen internationalen Gremien (siehe auch ISBA/C/26/7, Anhang Ziff. 8.5).

5 Überwachung, Bewertung und Überprüfung der angenommenen REMPs

Das Ziel eines REMP-weiten Umweltüberwachungsprogramms besteht darin, die Umweltveränderungen in der Region zu verfolgen und den Erfolg des Managementplans im Hinblick auf diese Veränderungen und die tatsächlich durchgeführten Bergbauaktivitäten zu kontrollieren. Ein solches regionales Standardüberwachungsprogramm sollte am besten in Zusammenarbeit mit Nachbarstaaten und einschlägigen regionalen oder globalen Organisationen entwickelt werden und mit den globalen wissenschaftlichen Überwachungsprogrammen kompatibel sein. Insbesondere ist die Mitarbeit von Vertragnehmern erforderlich. Der Entwurf des Überwachungsprogramms, einschließlich der räumlichen und zeitlichen Erfassung der Probenahme und der Methoden sowie des anschließenden Bewertungsrahmens und der unterstützenden Modellierung, sollte von einer Expertengruppe ausgearbeitet werden. Die Überwachung sollte so bald wie möglich beginnen, um den derzeitigen Grundzustand zu erfassen, und sozusagen unbestimmt dauern, da auch eine Erholung nach Beendigung des Abbaus dokumentiert werden sollte. Im Laufe der Zeit werden die Einzelheiten des Überwachungsprogramms angepasst werden müssen.

Die Auswertung der aus dem Monitoringprogramm gewonnenen Informationen dient der Beurteilung der Umweltleistung des REMP im Hinblick auf das Erreichen der regionalen Ziele sowie der Ziele zur Erhaltung der Biodiversität im gesamten Planungsgebiet. Die Ergebnisse sollen in die Umweltmanagement- und Monitoringpläne der in der Region tätigen Vertragnehmer einfließen. Technisch gesehen ist es ratsam, standardisierte Bewertungsformate und -verfahren zu entwickeln.

Eine Überprüfung des REMP sollte periodisch, d.h. alle 5 oder 10 Jahre, stattfinden. Das Intervall sollte außerdem von der Zunahme der Nutzungsverträge in der Region abhängen sowie von Auslösern, die durch andere Umweltveränderungen gesetzt werden, wie z.B. neue Erkenntnisse über die Auswirkungen des Klimawandels, deutlich veränderte Nutzungsmuster durch andere Sektoren oder überarbeitete global gültige Umwelt- oder Nachhaltigkeitsziele.

[11] Ein aktuelles Beispiel für die extrem hohe Bedeutung des Erhalts von Ökosystemen und der Biodiversität für die Menschheit ist der jüngst aus genetischem Material von Fauna der hydrothermalen Quellen entwickelte Test zur Diagnose des Covid-19-Virus. https://www.whoi.edu/news-insights/content/finding-answers-in-the-ocean/

Zu diesem Zweck und zur Weiterentwicklung der Mechanismen der regionalen Zusammenarbeit wäre ein ständiges Gremium, welches wie oben vorgeschlagen für den gesamten REMP Prozess einschließlich der Überprüfung und Neujustierung zuständig ist, die beste Option.

6. Wissenschaft

Während das Überwachungsprogramm von der ISA und den Vertragnehmern finanziert werden muss, gegebenenfalls in Verbindung mit anderen internationalen Initiativen für globale Beobachtungsprogramme, wird die wissenschaftliche Meeresforschung wahrscheinlich entweder auf nationaler oder privater Basis finanziert werden. REMPs bieten der ISA eine großartige Gelegenheit, sich mit wissenschaftlichen Forschungseinrichtungen und -ministerien auf vorrangige Forschungsfragen in der Region zu einigen und entsprechende Forschungsprogramme im Einklang mit Art. 143 SRÜ aufzulegen.

Zu diesem Zweck könnte eine unabhängige wissenschaftliche Beratergruppe, die der ISA angegliedert ist, wirksamer sein als die übliche *ad-hoc*-Zusammenarbeit, außerdem wird die Transparenz erhöht. Diese Gruppe könnte zum Beispiel über die Notwendigkeit regionaler Bewertungen, über Forschungszusammen-arbeit und Finanzierungsmöglichkeiten für Forschung in systematischer und qualitätskontrollierter Weise beraten. Die staatliche Zusammenarbeit in der Forschung könnte ein wirksamer Mechanismus zur Beschaffung von Mitteln zur Unterstützung der Forschung sein, die für die Festlegung regionaler Umweltgrundlinien und für die Durchführung der Umweltüberwachung erforderlich ist.

7. Entwicklung von Kapazitäten

Der Aufbau von Fachkapazitäten für die Tiefseeforschung und das Management von bergbaubezogenen Fragen ist eine wichtige Aufgabe, und die REMPs sollten Möglichkeiten für Ausbildung, Austausch und Zusammenarbeit innerhalb und außerhalb der Region bieten. Die fruchtbarste Option könnte die Zusammenarbeit mit Akteuren in der Region sein, seien es regionale Wissenschafts-, Management- oder Regierungsorganisationen, mit Küstenstaaten und anderen Interessengruppen wie Schifffahrt, Fischerei oder NGOs.

Einbeziehung von Interessengruppen

Direkt oder indirekt an den Prozessen interessierte Akteure erwarten eine hohe Transparenz, sowie vielfältige Möglichkeiten für ein breites Engagement bei der Entwicklung regionaler Umweltmanagementpläne (International Seabed Authority, 2019b). Die Einbeziehung von Interessengruppen ist eines der Schlüsselprinzipien für die Anwendung eines ökosystemaren Ansatzes beim Management menschlicher Aktivitäten, und wird als kritischer Erfolgsfaktor neben dem politischen Willen und der Führung sowie der Transparenz der Prozesse angesehen. Sie ist grundlegend für den Wissenserwerb und ein Mittel zur Förderung des Verständnisses und der Akzeptanz von Politiken und Maßnahmen. Dies ist unerlässlich, um gesellschaftliche Akzeptanz (die "social licence to operate") zu erhalten. Auf der ganzen Welt haben nationale und regionale Initiativen zur Umsetzung ganzheitlicher regionaler Regierungssysteme für die Ozeane Fortschritte bei der Entwicklung verschiedener Lösungen gemacht, um zum bestmöglichen Zusammenspiel zwischen Planungsbehörde, Regierung, Gesetzgebung, Planungssystem und Interessengruppen zu gelangen. Aus diesen Erfahrungen kann die ISA eine Reihe von Lehren ziehen.

Stakeholder-Mapping und -Analyse ist ein wichtiger Prozess, um sicherzustellen, dass niemand ″zurückbleibt″ oder relevante Interaktionen nicht berücksichtigt werden. In einem transparenten, interaktiven Governance-Rahmen sollte der öffentliche Dialog früh im Prozess beginnen, solange alle Optionen offen sind, und der Beitrag der Teilnehmer gebührend berücksichtigt werden kann. Alle Planungsphasen erfordern unterschiedliche Ebenen der Interaktion mit Interessengruppen. Unter diesen Bedingungen kann die Beteiligung der Öffentlichkeit Vorteile bringen wie von Wiser (2001) zusammengefasst:

- eine erhöhte Legitimität und Erleichterung der öffentlichen Akzeptanz eines Vertragsregimes;
- eine verbesserte Qualität der Entscheidungsfindung durch mehr Informationen und Perspektiven, die den Entscheidungsträgern zur Verfügung stehen;
- eine verbesserte Umsetzung der Rechenschaftspflicht bei der Entscheidungsfindung durch öffentliche Kontrolle; und
- eine Unterstützung kleiner und weniger entwickelter Staaten beim Aufbau ihrer Fähigkeit, sich wirksam an dem Abkommen zu beteiligen.

Die Umsetzung eines Managementregimes, das darauf abzielt, die menschliche Nutzung auf einem nachhaltigen Niveau zu regulieren, ist keine einmalige Aktion und erfordert die Mitwirkung von Interessengruppen über einen langen Planungszyklus, insbesondere auch während der Beurteilungs- und Überprüfungsphasen. Die Rolle der Einbeziehung von Interessengruppen und der Öffentlichkeit sollte bei der Festlegung von Managementzielen und -maßnahmen besonders ausgeprägt sein und kann wesentlich dazu beitragen, dass das gesamte verfügbare Wissen auf den Tisch kommt. Vor allem zielt die Einbeziehung einer möglichst breiten Stakeholder-Gemeinschaft darauf ab, divergierende Ansichten zu verstehen und Strategien zu entwickeln, die diesen Unterschieden Rechnung tragen, um das gemeinsame Ziel zu erreichen, die Meeresressourcen für diese und auch für künftige Generationen zu verwalten.

Es gibt einige kritische Punkte in Bezug auf das derzeitige Verfahren, Interessengruppen in den REMP-Entwicklungsprozessen mit einzubeziehen:

- es gibt keine vereinbarte (und bekannte) Strategie für die Einbeziehung von Interessengruppen. Es besteht die Gefahr, dass das Fehlen eines Stakeholder-Mappings zu einem Ungleichgewicht der auf den Workshops vertretenen Stakeholder führt;
- die derzeit vorgesehene Methode der Beteiligung von Interessengruppen beschränkt sich auf die einmalige Teilnahme an regionsspezifischen technischen Workshops mit begrenzter Kapazität, deren Abschlussbericht nicht notwendigerweise die Diskussionen und Empfehlungen des Workshops widerspiegeln;
- weder ein übergreifendes Beratungsgremium für alle Regionen noch regionsspezifische Beratungsausschüsse sind vorgesehen - solche Mechanismen könnten für eine breitere Vertretung anderer Interessengruppen als wissenschaftliche Experten sorgen;
- es ist kein kontinuierlicher Arbeitsablauf vorgesehen, zu dem die Interessenvertreter Beiträge leisten könnten, eine Gelegenheit zum Kommentar ist bislang nicht festgeschrieben;
- die Rechte und Pflichten des REMP-Verwaltungsorgans und der Interessenvertreter müssen definiert werden, einschließlich des Anspruchs von Interessenvertretern auf Berücksichtigung von Kommentaren und Vorschlägen, einschließlich eines Reaktionsmechanismus wie in der Aarhus Konvention vorgesehen.

Um diese Schwächen zu überwinden, können ein systematischer, vielschichtiger Beratungsprozess und definierte Schritte für Interventionen der Interessengruppen entworfen werden. Dies kann zeitaufwändig sein und erhebliche Kapazitäten erfordern. Folgende Schritte bei der Ansprache von Stakeholdern sind empfohlen, bzw. Teil der SUP-Verfahren als Element des Regionalmanagements (siehe auch Kapitel 4.2.1)

- Kartierung von Stakeholdern und ihrer Interessen mit Hilfe einer Stakeholder-Analyse;
- Entwicklung einer Strategie für Zusammenarbeit, Kommunikation und Beteiligung, inkl. Rollen und Verantwortlichkeiten;
- Benachrichtigung der angrenzenden Küstenstaaten und Interessenvertreter über die Absicht, ein REMP zu entwickeln;

- Vereinbarung über den allgemeinen Zweck und die Ziele im Einklang mit den ISA-Leitlinien und/oder anderen Regeln;
- Einigung über die einzelnen Schritte des Prozesses und den Zeitplan.

Institutionelle Interessengruppen, zum Beispiel andere Verwaltungsbehörden, müssen auf andere Weise angesprochen werden. Insbesondere bei grenzüberschreitenden maritimen Raumplanungsprozessen, wie es bei den REMPs der Fall ist, ist die Einbeziehung der Interessenvertreter von besonderer Bedeutung, und zu den guten Praktiken gehören (modifiziert nach Kull *et al.*, 2019):

- der Ausbau bestehender Partnerschaften und grenzüberschreitender Kooperationsnetzwerke;
- die Entwicklung stärkerer partizipatorischer Prozesse und Instrumente, z.B. durch die Einrichtung eines Koordinierungsgremiums, das von allen relevanten Akteuren respektiert wird, regelmäßiger Dialog für kontinuierlichen Austausch;
- Verbesserung der Konvergenz zwischen politischen und gesetzlichen Regelungen;
- Entwicklung einer grenzüberschreitenden Daten- und Informationsbasis zur Erleichterung eines transparenten Datenaustauschs, einschließlich eines regelmäßigen Informationsaustauschs, zur Unterstützung umfassender grenzüberschreitender Kartierungsübungen;
- Festlegung klarer gemeinsamer Ziele bei gleichzeitiger Identifizierung möglicher Konfliktbereiche und Entwicklung langfristiger Lösungen für bestimmte Fragen.

Ständige institutionelle Mechanismen für eine verbesserte Konsultation und Zusammenarbeit, einschließlich eines wissenschaftspolitischen Beratungsmechanismus, können dazu beitragen, einen organisationsübergreifenden Austausch zu ermöglichen, um sicherzustellen, dass die biologische Vielfalt und die Ökosysteme der Meere durch die Maßnahmen eines Sektors oder einer regionalen Institution nicht geschädigt werden. Das REMP-Organisationsgremium könnte die Kommunikation und Integration der verschiedenen sektoralen Organisationen direkt gewährleisten, mit bestehenden regionalen Organisationen zusammenarbeiten oder, wo diese nicht vorhanden sind, als Plattform für sektorübergreifende Zusammenarbeit und Konfliktlösung dienen. Das gewünschte Ergebnis ist ein integriertes Umweltmanagement einer bestimmten Meeresregion unter geteilter Verantwortung. Allerdings sind zurzeit die Mechanismen einer substanziellen Zusammenarbeit zwischen zwischenstaatlichen Organisationen nicht sehr gut entwickelt und behindern oft ein integriertes Management. Ebenso wenig werden Möglichkeiten erkundet, die derzeit geplanten ISA REMP-Entwicklungen zu integrierten Ansätzen aufzuwerten, um die Erhaltung der Meeresumwelt auf Hoher See und im Gebiet zu ermöglichen.

Empfehlungen

Ziel dieser Studie war es, einen Standardansatz zu entwickeln, der für alle in Entwicklung befindlichen regionalen Umweltmanagementpläne der Internationalen Meeresbodenbehörde als Instrument für einen wirksamen Schutz der regionalen Meeresumwelt vor schädlichen Auswirkungen von Aktivitäten im "Gebiet" gilt. Wie weltweit und durch die ISA vereinbart, erfüllen die regionalen Managementpläne am besten ihre Aufgaben, wenn sie einen ökosystemaren Ansatz für das Management menschlicher Aktivitäten umsetzen, der sich in der Managementphilosophie, der Entscheidungsfindung, den Strategien, Verfahren und nicht zuletzt in einer transparenten und offenen Interaktion mit den Interessengruppen und der Öffentlichkeit widerspiegeln sollte.

REMPs sollten rechtsverbindlich sein und durch Regeln, Vorschriften und Verfahren der ISA sowie durch ISA-Standards wirksam werden. Mit anderen Worten, es sollte keine unverbindliche Empfehlung der LTC oder des Rates sein, wie der REMP der Clarion-Clipperton Zone von 2012. Ein REMP ist mehr als ein Planungsdokument und hat ein viel größeres Potenzial. Insbesondere sollte es die Entscheidungen der LTC und des Rates nicht nur informieren, sondern deren Entscheidungen auch anleiten. Wichtig ist, dass in Fällen, in denen ein Antrag auf Genehmigung eines Arbeitsplans die Ziele eines

REMP zu untergraben oder nicht mit ihnen vereinbar zu sein scheint, die Entscheidungsorgane der ISA sich auf den REMP stützen können, um eine Entscheidung gegen die Genehmigung eines Arbeitsplanes zu unterstützen.

REMPs haben das Potenzial, der ISA die Funktion einer ordnungsgemäßen Regulierungsbehörde zu ermöglichen. Insbesondere sind REMPs auf der richtigen räumlichen Skala angelegt, um ökologische Schwellenwerte für ″wirksamen Schutz″, ″schädliche Auswirkungen″ und ″gravierende Schäden″ sowie die entsprechenden Indikatoren für die Region festzulegen.

Die Entwicklung, Durchführung und Überprüfung der REMPs werden am besten von einem neu eingerichteten Umwelt- und Wissenschaftsgremium durchgeführt, welches für die Erfüllung der Umweltverpflichtungen der ISA verantwortlich ist und vom ISA-Sekretariat und einer Gruppe technischer Experten/Wissenschaftlicher Berater unterstützt wird. Wenn der politische Wille zur Einrichtung eines solchen ständigen Gremiums fehlt, sollten die verfahrenstechnischen Anforderungen für die Entwicklung und Überprüfung der REMPs von einem zu diesem Zweck gebildeten unabhängigen *ad-hoc*-Expertengremium geleitet werden.

Es muss sichergestellt werden, dass alle REMPs nicht nur in Bezug auf die Verfahren zur Entwicklung und Überprüfung, sondern auch in Bezug auf ihren Umfang und Inhalt die gleiche Behandlung erfahren. Die Verwendung einer vom Rat vorab vereinbarten Vorlage, der alle REMPs entsprechen müssen, ist von wesentlicher Bedeutung. Die wichtigsten Merkmale eines Standard-REMP, der diese Erwartungen vollständig erfüllt, sind in Tabelle 3, S. 140-144, zusammengefasst.

Summary

Regional environmental management planning is a tool of environmental governance - one that may successfully address the environmental problems created by the multitude of human uses, the fragmentation of responsibilities and the current lack of ambition and coordination of governance actions in particular with respect to waters beyond the limits of national jurisdiction. The International Seabed Authority, ISA, mandated by the UN Convention on the Law of the Sea (1982) to govern the Area with its mineral resources at the seafloor beyond national jurisdiction for the benefit of mankind has made first experiences with a regional view on environmental impacts potentially caused by one or more mining activities already in 2012, when after several years of preparations a regional management plan, REMP, for the Clarion-Clipperton Zone, CCZ, in the north equatorial Pacific was adopted. The region in focus is an abyssal plain at 4-5000 m depth which has globally the highest density of manganese nodules, and also of contracts with the ISA for mineral exploration. Up to 2012, exploration contracts covering large swaths of seafloor had been concluded without consideration of regional biodiversity protection in the case of commercial mining activities to start.

In the case of the Clarion-Clipperton Zone the so far only measure is the designation of a network of sites, so-called 'Areas of Particular Environmental Interest', APEIs, presently removed from exploration. Broadly, the placement of the APEIs is regionally representative, except for subregions with high nodule density. A couple of other measures had also been included in the plan, yet neither periodic regional environmental status reports, regional, subregional of other environmental baselines, consistency of contractor environmental baseline investigations, a strategic assessment of environmental pressures or an attempt to compile potentially useful environmental indicators and thresholds exist today.

Nonetheless, the instrument of regional environmental management plans, in particular if developed in a cooperative process with other stakeholders in the region through a kind of strategic environmental assessment process has great potential not only to deliver measures under ISA authority which ensure the longterm health of the ocean ecosystems, but also to promote regional action of other management authorities by e.g. offering a platform for communication and interaction.

In recent years, the number of exploration contracts of the ISA with State or private entities, sponsored by a contracting party to the UN Law of the Sea, has increased enormously, covering now all oceans, and the negotiations about the future legal framework for exploitation activities are underway. Among other factors, the expiration of the time-limited explorations creates additional pressure to proceed with developing the legal framework for commercial mining of minerals, at present manganese nodules from abyssal plains, seafloor massive sulphides from hydrothermal activity and cobalt-rich crust coating seamount flanks at mid-ocean depths.

The governance of the mineral resources and their possible exploitation includes a strong environmental protection mandate on the part of the ISA through provisions in the UN Convention on the Law of the Sea. In addition to the legal obligation of all States to individually and jointly protect the marine environment, the ISA and its member States are specifically obliged to take the necessary measures *'to ensure effective protection for the marine environment from harmful effects which may arise from such activities'.* This includes the adoption of rules, regulations and procedures to prevent, reduce and control pollution and other hazards, the prevention of intervention with the ecological balance and the ensurance of the protection and conservation of the natural resources of the Area, including the prevention of damage to the flora and fauna of the marine environment.

Building on the experiences with the first regional environmental management plan in the Clarion-Clipperton Zone in the Pacific, the development of similar REMPs in the different ocean basins where contracts exist emerged as one way to address the environmental protection question. REMPs have now been taken up as an element of the ISA Strategic Plan and, subsequently, the high-level action plan

adopted by the Assembly in 2019 (ISBA/25/A/15, annex II). The Strategic Plan indicates the intent to use the instrument of Regional Environmental Management Plans, REMPs to *'develop, implement and keep under review regional environmental assessments and management plans for all mineral provinces in the Area where exploration or exploitation is taking place to ensure sufficient*[12] *protection of the marine environment as required by, inter alia, article 145 and part XII of the Convention'* (Strategic Direction 3.2).

Subsequently, a '*Preliminary strategy for the development of regional environmental management plans for the Area'* (ISBA/24/C/3) was presented in which several specific regions were determined as priority areas for the development of REMPs. These regions are the Mid-Atlantic Ridge, the Indian Ocean triple junction ridge and nodule-bearing province, as well as the North-west Pacific and South Atlantic for seamounts.

The implementation of this strategy has started with the organization of two workshops, held in Qingdao, China, in May 2018 (relating to the design of regional environmental management plans for the cobalt crust region of the north-west Pacific, (International Seabed Authority, 2019c)) and in Szczecin, Poland, in June 2018 (relating to the design of regional environmental management plans for polymetallic sulphide deposits on mid-ocean ridges, (International Seabed Authority, 2019b)). In 2019, a subsequent workshop focussed on the northern Mid Atlantic Ridge region[13], where exploration contracts cover near to all of the ridge crest, including all known hydrothermal vent fields.[14] Another workshop assembled scientists to compile an updated regional environmental description of the Clarion-Clipperton Zone. Several REMP development workshops are planned for the near future - though currently delayed due to the COVID-19 pandemia (ISBA/26/LTC/2, summarising the REMP activities of the ISA since 2012). Despite the parallel developments in all oceans, so far there does not exist a standardised approach to REMPs adopted by the Council, neither in terms of

- Agreed purpose, overall goals and objectives, principles,
- Regulatory power of REMPs;
- Stakeholder engagement/participation and interaction with other management authorities in the region;
- Scope and procedure of the REMP;
- Nor with regards to the minimum requirements in the delivery of the management plan.

With the aim to contribute to the work of the International Seabed Authority in the development of REMPs, particularly in relation to promoting the adoption of a standardised approach, Germany (supported by IASS) and co-organizers the Netherlands and Pew Charitable Trusts hosted an international workshop *'Towards a standardised approach to Regional Environmental Management Plans in the Area'*, 11-13 November 2019, in Hamburg, Germany.[15] The three-day workshop was enriched by the contributions of 80 participants with governance, legal, science and administration background from all over the world. As a whole, the need for a standardised approach to REMPs by ISA and the suitability of developing a template setting out the minimum requirements to be delivered by the respective REMPs was strongly supported. The necessity for a procedure for the development, approval and review of REMPs was also supported, however, there was considerable debate as to the roles and responsibilities in the procedures. In particular the need for an independent REMP organising committee was not shared by everyone. Also, the question on the legal weight of REMPs was debated, but not resolved.

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[12] the wording in Article 145 UNCLOS is effective protection

[13] https://www.isa.org.jm/workshop/workshop-regional-environmental-management-plan-area-northern-mid-atlantic-ridge

[14] see map at https://www.isa.org.jm/contractors/exploration-areas

[15] Christiansen, S., Singh, P., 2020. Towards a standardised approach to Regional Environmental Management Plans in the Area. International Workshop 11 – 13 November 2019, Hamburg, Germany. Hosted by Germany and co-organised with the Netherlands and Pew Charitable Trusts. Workshop Report. p. 96.

Subsequently, two submissions were jointly made by Germany and the Netherlands, co-sponsored by Costa Rica to the Council meeting in February 2020. Document ISBA/26/C/6 focusses on the *'Procedure for the development, approval and review of regional environmental management plans'*, document ISBA/26/C/7 proposes a standardized approach to REMP development through formulating a template with minimum requirements. The Council decided to forward the submissions to the Legal and Technical Commission, LTC, for consideration. Both documents will be referred to where appropriate in the course of this report.

In parallel, the ISA Secretariat has proceeded with formulating its *'Guidance to facilitate the development of Regional Environmental Management Plans* (REMPs)',[16] an evolving document which seeks to clarify the roles and responsibilities of ISA organs, provide a background to the REMPs, discuss possible spatial planning approaches, identify some data sources and possible elements of future REMPs. The purpose is to inform participants of workshops proposed by the ISA in the preparation of the REMPs. Also, this document will be referenced were appropriate for comparison in this report.

However, the following summary focuses on the authors' proposals for the design of a standard concept for the establishment, administration and review of REMPs, their environmental objectives, content requirements and management approach.

The mandate of the ISA to develop REMPs and the legal potential of REMPs

The ISA has a clear mandate to develop REMPs in the Area. The obligation of the ISA to ensure the effective protection of the marine environment pursuant to Article 145 of UNCLOS requires the ISA to take all necessary measures for this purpose. In the build-up to the development of the Environmental Management Plan for the Clarion-Clipperton Zone, the mandate of the ISA in this respect was raised and debated. However, it was overwhelmingly agreed that the ISA has wide ranging powers to ensure the effective protection of the marine environment, and that developing region-specific environmental management plans and adopting related measures would fit squarely within this mandate. As such, the development of REMPs as one of the means to operationalize Article 145 is now settled.

As for the legal potential of REMPs, it is necessary to state at the outset that the Secretariat's Guidance document does not envisage REMPs to have any legally binding effect. Rather, it is seen as an instrument of guidance. However, REMPs have the potential to do much more. In order for it to be an effective instrument, REMPs should be given a legally binding status. This can be done, for instance, by according to REMPs a binding effect, through the rules, regulations and procedures of the ISA, as well as giving it effect through ISA Standards. The implications of giving a REMP such a status are wide ranging. It would, for example, allow the decision-making organs to rely on the REMP in determining whether or not to approve an application for a plan of work. In such a scenario, if the Legal and Technical Commission or the Council is of the view that approving a plan of work would undermine or contradict the objectives of a REMP, it would be fully justified to ground its decision on the REMP to not approve the application. Similarly, a REMP that possesses a binding nature can also obligate contractors to ensure that the Environmental Plans (in particular the Environmental Management and Monitoring Plan), which contractors are required to submit and regularly update, are in line with the objectives and the requirements of the applicable REMP. Moreover, imposing legal effect upon REMPs would send a strong message of the ISA's commitment to ensure the effective protection of the marine environment from harmful effects that may arise from the conduct of activities in the Area. In particular, it would ensure that the mineral resources of the Area are governed with great responsibility and with the interests of future generations in mind.

[16] https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/remp_guidance_.pdf (updated November 2019)

Overarching goals and guiding principles

An integral feature of REMPs is the overarching goals that govern the instrument. It reflects upon the importance of REMPs, underscores the rationale or basis upon which REMPs are founded upon and developed, and thereby sets the tone for the rest of the document. With respect to overarching goals, the following five are deemed as appropriate and necessary:

1. Protecting and preserving the marine environment, in particular, in order to:

   - Maintain biodiversity, connectivity, ecosystem structure, ecosystem service and resilience;
   - Preserve unique marine ecosystems;
   - Prevent species extinctions;
   - Prevent impacts on benthic and pelagic ecosystems, including on mid-water fish stocks;
   - Prevent exacerbation of vulnerable ecosystems that are under particular risk from projected climate change effects.

2. Applying precaution in management decisions corresponding to the level of knowledge gaps and risk, in particular by:

   - Using all available environmental data and information to inform management decisions;
   - Monitoring and assessing the state of the environment before, during and after any activities in the Area, after identifying and taking into account uncertainties;
   - Applying adaptive management.

3. Identifying and mitigating conflicts in different uses by avoiding overlap between contract areas, reserved areas, areas of particular environmental interest, marine protected areas and areas designated/used for other legitimate purposes (such as fisheries, submarine cables).

4. Promoting marine scientific research and capacity-building in the Area.

5. Promoting cooperation between States, contractors, observers and other stakeholders of the Authority, with particular regard to the interests and needs of developing States.

As for guiding principles that help steer the development and implementation of REMPs, the following eight are identified:

1. Value the Common heritage of mankind;

2. Ensure precautionary decision-making;

3. Apply the ecosystems approach to management;

4. Achieve transparency and accountability through transparent decision-making and public participation according to the Aarhus Convention;

5. Use of best available scientific and technical knowledge;

6. Use of relevant traditional knowledge from indigenous people and local communities;

7. Use of best environmental practices and best available technologies;

8. Enhance international cooperation.

Lessons learned from the Clarion-Clipperton Zone EMP

The environmental management plan for the Clarion-Clipperton Zone, CCZ EMP (International Seabed Authority, 2011), is a welcome first step towards a comprehensive management plan to safeguard the marine environment at regional scale. However, this primer so far lacks the core elements of an effective management plan, such as an environmental baseline which reflects also the high-resolution baselines of exploration contractors, monitoring and/or research programme as well as indicators and thresholds for determining the risk of harm and serious harm on various scales and consequent action by ISA and contractors. Oversight to ensure consistency of contractor environmental studies and data deliveries is required to enable regional integration of information. Activity-based measures and controls need to supplement the precautionary spatial measures. Thresholds and measures should be binding for ISA decision-making and/or contractors, respectively. The revision of the EMP should allow for adapted measures based on new knowledge gained. Overall, it seems that there is a lack of a body responsible for supervision and direction of the further development and operationalisation of the management plan.

Several specific actions have been identified in the CCZ EMP to be carried out by the ISA Secretariat or contractors, respectively. A review of progress in the implementation of these actions (Seascape Consultants ltd., 2014; ISBA/22/LTC/12, Section IV), and progress to date has shown that some of the actions take much more time than anticipated (e.g. database establishment) and others are not yet timely, as so far no exploitation is imminent (cumulative impact assessment, contractor environmental management plans).

However, some of the envisaged, but not completed actions would be of major importance for progress on the development of other ISA regional environmental management plans generally, and a regional environmental baseline in the Clarion-Clipperton Zone, specifically, such as

- The compilation of a first comprehensive environmental quality status report of the region based on knowledge and data from all available sources, including a gap analysis and an outlook for future changes under climate change scenarios;
- The design of a regional monitoring programme, supplementing the baseline studies of the individual contractors and enhancing the harmonisation of investigation methods and goals;
- The establishment of a regional inventory of stakeholders and of human activities in the region, including their potential environmental effects;
- Developing ideas as to how best to involve other competent mangement bodies, science and stakeholders, such as through a regional advisory body, external expert advice and consultation;
- Develop the institutional preconditions and processes to carry out a Strategic Environmental Assessment delivering the information on measures required to fulfil Art. 145;
- The setting up of expert groups to provide technical advice on e.g. cumulative effects assessment, setting of monitoring standards, overall assessment guidelines, identification of indicator organisms and mechanisms, as well as of knowledge gaps;
- The development of a regional reporting formate and transparency criteria, as well as a stakeholder engagement strategy.

No progress has been made to date also with regards to developing the Areas of Particular Environmental Interest, APEIs, into internationally accepted marine protected areas beyond national jurisdiction in a collaborative effort together with the Convention on Biological Diversity and the Food and Agriculture Organization of the United Nations (ISBA/22/LTC/12, Section IV, 11). This action could have set a precedent for a mechanism of cooperation among international bodies and ensured that the ISA APEI network contributes to the global conservation targets.

In addition, it should be considered to upgrade the current CCZ EMP to an effective management instrument by complementing the missing elements and ensuring that at least some elements limiting mining-induced environmental change will have a binding effect on ISA and contractors. Ideally, it would be developed to become a holistic instrument of environmental assessment and management for 'areas beyond the limits of national jurisdiction', the high seas and the Area, in conjunction with the ongoing negotiations under the United Nations for a new international agreement on the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction, ILBI/BBNJ.

The measures proposed above would carry the CCZ EMP a long way towards the standard type of REMP, as proposed later on in this study. *Vice versa*, the CCZ EMP is an important precursor for a more comprehensive regional governance in line with the ecosystem approach to management of human activities.

Options for establishing and maintaining REMPs in a standardised procedure

In order to ensure coherence and consistency, and provide uniform conditions for ISA contractors, it would be necessary to ensure that the development of all REMPs are subject to a standardized procedure. Streamlining the design and review processes of all REMPs would ensure that REMPs are adopted with greater reflection, wide participation, in a transparent manner, based on best available science and knowledge, and truly serve to ensure the effective protection of the marine environment. In order to achieve this, it would be necessary for a dedicated body to undertake this process of REMP development and review. At present, the practice appears to be guided by the ISA Secretariat, supporting the LTC, by setting up terms of references and workshops, in order to eventually support the LTC to make a recommendation to the Council. An alternative to this approach would be to create create a new subsidiary body (e.g. Environmental and Scientific Commission) to permanently oversee REMP development, implementation and review for each of the regions, or to require the LTC to do so on its own. Another potential option would be to constitute independent, *ad-hoc*, bodies of experts (between 4-6 persons) for each region, with the relevant expertise particularly for the applicable region, to take charge of this role that the Secretariat now performs. Several pathways seem to be possible, including for including for these ad-hoc bodies to comprise solely of LTC members or a mix between LTC members and public experts, as well as to directly appoint the members of these bodies (e.g. by the LTC or directly by the Council, based on nominations from Member States and other stakeholders). Once constituted, these independent bodies will conduct preliminary work, communicate with stakeholders and other interested entities, organize the work process and workshops and select participants, and finally prepare a first draft of the REMP. This draft should be prepared in conformity with a 'template' for REMPs, indicating the necessary contents for each REMPs, which has been agreed to beforehand. The said draft will then be open for further public review, before being forwarded to the LTC. The LTC will consider the draft and thereupon base its recommendation to the Council. The review of each REMP should also be subject to the same procedures, and it is suggested that the same *ad-hoc* independent bodies responsible for the design of the REMP also take charge of the review process.

Systematically developing the contents REMPs

The framework provided by the ecosystem approach and Strategic Environmental Assessment

Not only the CCZ EMP but also the draft exploitation regulations refer to the ecosystem approach to management as a means to *'provide for the effective protection of the marine environment from the harmful effects'* of mining-related activities during the exploitation of minerals in the Area.[17] The ecosystem approach to management, EAM, means a change in management philosophy from sectoral to

[17] International Seabed Authority, 2019. Draft Regulations on Exploitation of Mineral Resources in the Area. ISBA/LTC/25/WP.1. https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/isba_25_c_wp1-e.pdf

systems thinking, and from consideration of pressures only to consideration of effects in an ecosystem context. Also, the close participation of stakeholders during the process of developing management action is a crucial part. The inclusive nature of the ecosystem approach to management, and in particular the procedures of a strategic assessment (see below), shall provide all persons involved with a systems-view on the particular area/region, furthering the prior-to-action understanding for the overall extent of pressures and impacts, potential use conflicts, and the natural limits of the ecosystems. In practical terms, EAM set the terms for

- Achieving generic (in the case of ISA sectoral) planning decisions on regional level guided by longterm objectives which are ideally developed and agreed with stakeholders;
- Transparency and integration of stakeholder values;
- Assessment and mitigation of user conflicts;
- Integration, consideration and reconciliation of all relevant aspects of mining operations (economic, social and ecological)

with a view to ensure sustainability, maintain ecological health while recognizing the human needs and integrate economic factors, taking account of ecosystem complexity, ecosystem dynamics and appropriate temporal and spatial scales, recoverability, values of ecosystem goods and services and uncertainty.

Strategic Environmental Assessment, SEA, is one of the tools to put the ecosystem approach into practice. It is a proactive process which aims to anticipate the environmental impacts of particular plans, programmes and policies rather than react to the environmental effects of specific projects. Therefore, the SEA ideally investigates the policy/plan/programme together with stakeholders while it is still under development and can be adjusted. The elements and steps involved in a SEA process could be a helpful guidance for ISA to develop its REMPs. The individual regional management plans in the different ocean basins are plans which will stand in context with a global REMP programme, based on ISA´s global policy. The management plan for each region, REMP, will integrate the ISA project level under contractor responsibility, in a broader regional vision. SEA is an appropriate tool to assess cumulative effects from one or more sectors and increasingly gains importance for strategic priority setting and initialising a multi-stakeholder process. The opportunity provided by an approach which is based on the experiences with SEAs around the world is to inform the production of a management plan, in this case for a region, which enables the longterm, effective protection of the marine environment from harmful effects of this new industry in context with ongoing environmental change due to global warming and other human activities.

In a region, the ISA only has the authority to govern activities in relation to minerals mining in the Area, while the comprehensive approach of REMPs to regional management calls for harmonising at least regionally the conservation priorities, techniques and indicators and threshold levels with other regionally active governance or management authorities and adjacent coastal States. An additional line of collaboration and coherency needs to extend to the required harmonisation of a SEA-like process informing the development of a REMP, with that developed in the course of the ongoing negotiations under the United Nations for a new international agreement on the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction, ILBI/BBNJ.

The negotiations aim to complement and promote coherence with relevant legal instruments, frameworks, and bodies and the current draft negotiation text[18] foresees under Article 6.1 several mechanisms of cooperation, including *'through strengthening and enhancing cooperation with and among relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies and members thereof'*. Draft article 21 formulates the objective to achieve a coherent environmental

[18] available under https://www.un.org/bbnj/sites/www.un.org.bbnj/files/textual_proposals_compilation_article-by-article_-_15_april_2020.pdf

assessment framework of activities in areas beyond national jurisdiction, including Strategic Environmental Assessments and cumulative impacts. Some parties are in favour of binding other bodies such as the ISA to the minimum standards set by the new agreement. The future Scientific and Technical body could be instrumental to further coherence.

Developing the contents of the REMPs

In line with the above, the following compulsory steps are proposed which are instrumental to delivering the necessary elements and the bases of the measures determined in the respective regional environmental management plan (see further chapter 4 and Fig. 4, page 97):

1. Determine and/or establish a dedicated organ or body to take responsibility of the entire management cycle;
2. Procedural preparations for REMP development. This should consider the following elements:
    a. Organisation the planning process, including roadmap, the indication of roles and responsibilities for decision-making (see chapter 3), compulsory public consultation and independent review.
    b. Inventory of existing regulations and management authorities in the region at large;
    c. Stakeholder identification and notification, communication and participation strategy, clearing-house mechanism, stimulation of inter-organisational cooperation;
    d. Defining the geographical boundaries of the region considered in the plan.
3. Regional environmental report including an *à priori* assessment of mining-related impacts. This is the core document on which the decision-making with regards to mining-related measures and eventual consultations with other competent organisations on conflicts of interest will rely upon. Ideally, environmental, social and economic aspects should be considered with a view to find the most sustainable solution. A guidance document issued by ISA will be required. Broadly, the regional environmental report, supported by comprehensive mapping and spatial analysis, should comprise
    a. A description of the environmental status of the region based on best available knowledge (environmental baseline conditions);
    b. The regional vision and operational objectives jointly developed with stakeholders and based on an agreed set of indicators with appropriate metrics defining threshold values;
    c. An assessment of current and future threats to species/habitats/ecosystems in the region, including from future mining activities. This will require the following assessments to be made by the regulator:
        i. Cumulative impact assessment;
        ii. Sensitivity/vulnerability assessment of environmental, cultural and social values;
        iii. Risk assessment of mining-related activities;
        iv. Consideration of alternatives - *i.e.* the testing of different hypotheses on the future development of mining activities;
        v. Identification of potential conflict areas with other stakeholders;
        vi. Gap analysis and uncertainties.

4. Management measures to reach the REMP regional vision, goals and objectives that can be taken by ISA;
5. Monitoring, evaluation and periodic review of the adopted REMP;
6. Science programme;
7. Capacity development.

Full documentation and transparency are required during all stages of REMP development and review.

1. *Establish REMP body responsible for the REMP management cycle*

In order to make REMPs an effective instrument to ensure the effective protection of the marine environment from the effects of mining activities, the resulting measures have to be enforced and surveyed, changes of the environment monitored and assessed, and periodic reviews and adaptation of the plan have to be prepared. Therefore, both the data and knowledge collection, as well as its processing are necessarily a continuous exercise. This requires the installation of a permanent steering group in each region which is responsible for overseeing the implementation of measures, including a monitoring programme, with a view to control its effectiveness, and review and adaptation of the plan, whenever necessary. This group would also maintain the communication with science, and other stakeholders, including contractors and data providers.

Compared to the internal, ISA Secretariat/LTC/contractor-linked solutions (as indicated in the ISA Secretariats Guidance, 2019), an external steering group, supported by the ISA Secretariat, could provide for a broader and more transparent stakeholder engagement realised over the full management cycle. Its membership could for example include representatives from multiple groups, including scientific experts, and members of the ISA Secretariat. The terms of reference could include for example the commissioning of scientific studies, the organisation of workshops and the drafting of REMP documents for public consultation and review by the Commission (see chapter 3).

2. *Procedural preparations*

As a first step, useful also for informing stakeholders and the public about the upcoming REMP development, an information document giving a brief description of the purpose, the geographic area and the relevant ISA policies and regulations would be helpful. An overview of the relevant governance mechanisms, sectoral management bodies and eventually measures in the region could identify broadly the constituency to be notified of the REMP process.

Preferably in collaboration, or at least in consultation with contractors and stakeholders, a number of procedural steps have to be taken prior to starting to developing the contents of the REMP, eventually based on draft reports assembled either by the organising body or external experts. The decisions to be made include

- to agree on the regional boundaries (4.2.1.1)
- to determine the plan period and review mechanism (4.2.1.2)
- to establish a clearing house mechanism and a continuous documentation of all actions related to the development, implementation and review of the REMP (4.2.1.3);
- to publish a communication and participation strategy (4.2.1.4);
- to agree on public consultations (4.2.1.5
- to provide for independent review (4.2.1.6)
- to start considering a cooperation mechanism with other bodies 4.2.1.7).

3. *Regional environmental status report with à priori assessment of mining-related impacts*

A state-of-the-art regional environmental report provides the basis for decision-making on measures as to be laid down in the regional environmental management plan. The environmental report should be synthesised from all available sources and includes[19]

3.1. A context-setting introduction *(4.2.2.1)*

3.2. An **environmental description** based on a sound knowledge base *(4.2.2.2)*

- An environmental baseline description and evaluation of the state of the regional environment (e.g. in a Quality Status Report), including observed natural variability, interconnectedness with other regions, and vulnerabilities to impacts from human activities, as well as all environmental and cultural values;
- An inventory of past, present and planned human activities and their current regulation;
- Description of known environmental challenges and problems, if possible including an assessment of the probability, duration, frequency and reversibility of prevailing environmental impacts and threats from direct and indirect pressures, their magnitude and spatial extent, including cumulative and synergistic and likely transboundary effects, as well as the effects of global warming on the ocean ecosystems with a view to determine the likely significant effects on the environment, including on biodiversity, fauna, flora, water.
- Actual or potential use-conflicts - incl. among ISA contractors, with other legitimate users - and transboundary issues;
- The identification of gaps in knowledge and uncertainties.

3.2.1. The **regional vision, and operational objectives** (4.2.2.3), including appropriate indicators and thresholds. In the report, it has to be explained how those objectives and any environmental considerations have been taken into account during its preparation.

3.2.2. Environmental Assessment (incl. cumulative effects, sensitivity/vulnerability, risk) of the state-of-the-art regional information (4.2.2.4) and the expected environmental effects of mining-related activities from one or more commercial mines with a view to determine the

- Longterm trends in the development of ocean health indicators;
- Longterm trends in conservation status of critical species and habitats;
- Longterm trends in human activity level and potential conflict areas;
- The contribution of mining-related environmental effects;
- The likelihood of achieving the respective management and conservation goals.

A social and economic impact assessment would be of benefit, however has not been further considered here.

3.3. **Management measures** to reach the regional vision, goals and objectives under ISA authority (4.2.3). The spatial and non-spatial conservation measures shall prevent, reduce and as fully as possible offset any significant adverse effects on the environment, incl. potential sites of conservation interest according to global and sectoral measures and criteria;

3.4. Consideration of **alternative** actions (scale, intensity, frequency of action, technical conditions etc) and the no-action option; (4.2.2.5).

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[19] based on Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment. 2001/42/EC, Annex 1; Jones, D.O.B., Durden, J.M., Murphy, K., Gjerde, K.M., Gebicka, A., Colaço, A., Morato, T., Cuvelier, D., Billett, D.S.M., 2019. Existing environmental management approaches relevant to deep-sea mining. Marine Policy 103, 172-181; Billett, D.S.M., Jones, D.O.B., Weaver, P.P.E., 2019b. Improving Environmental Management Practices in Deep-Sea Mining. In: Sharma, R. (Ed.), Environmental Issues of Deep-Sea Mining. Impacts, Consequences and Policy Perspectives. Springer Nature Switzerland AG, Cham, Switzerland, pp. 403-446.

All of the above will become part of the final management plan, which then also includes the set of measures enacted, as well as the programmes for monitoring the regional environment (4.2.4) and contractor compliance, research to fill knowledge gaps (4.2.5) and capacity building (4.2.6).

Public **consultation** during the assessment of the plan or programme, as well as the consideration of „reasonable alternatives' are important components to enable the weighing of benefits and costs of new policies, programmes or plans. An appropriate ISA guidance on the preparation of an environmental report, based on a standard template for the contents (such as the template proposed in ISBA/26/C/7) is required and should be annexed to the exploitation regulations. It is also essential to agree a regional assessment framework for the assessment of impacts and risks which can then be provided to contractors for application to activities in their responsibility. Action arising from the environmental report includes the assessment of knowledge gaps and resulting uncertainties. This knowledge then serves to either develop programmes to fill the gaps in knowledge through research and/or monitoring, or to proceed towards agreeing on appropriate regional conservation and management objectives and targets and the related management measures.

4. Management measures to reach the regional vision, goals and objectives under ISA authority

Based on the environmental report (4.2.2) and considering the regional vision, goals and objectives set out, the REMP will determine the measures to be taken to ensure an effective protection of the marine environment from harmful effects of mining activities, taking into account other pressures. The processes and measures agreed will operationally control how to achieve the given goals and objectives, including through reducing the root-causes of environmental effects.

Under conditions of good knowledge, a systematic conservation planning process would be appropriate. Given the lack of knowledge on the deep sea, a first step to precautionary conservation could be ecological modelling of presumed environmental baseline conditions, including vertical and horizontal connectivity, food webs and temporal dynamics. A sound regional knowledge base is the precondition for (a) being able to evaluate any regional environmental degradation once mining has started; (b) being able to assess whether there may be a scale, duration, and intensity of environmental effects of mining related activities which will not lead to irreversible, large-scale degradation at local and regional scale; (c) determining the need for management intervention and direction.

This knowledge-dependence gives science a crucial role in advising the REMP process on the different repercussions of various management scenarios and to inform on what can be assumed to be a 'safe operating space' for human activities avoiding the risk of unsustainable interaction with the marine ecosystems. The 'safe operating space' as laid down in the REMP will have to be highly precautionary, as the numerous and long-lasting unknowns and uncertainties will make it impossible to fully assess the social, cultural, economic and environmental impacts until after commercial mining has begun. By that stage, impact mitigation will be difficult or ineffective. This underlines the importance of adapting the measures of the REMPs over time starting from utmost precaution, so that deep-sea bottom mining is introduced gradually and well controlled in its environmental impact as a new industry polluting the deep sea.

4.1. Regulatory control of contractor activities

Spatial protection may not be sufficient to prevent the loss of biodiversity locally and regionally. Measures to minimise emissions are an even more effective tool for minimising environmental damage. Such measures will be regulated globally through ISA Standards and Guidelines, as well as guidances on Best Environmental Practice and Best Available Technologies, however may need adaptation for regional or subregional purposes. Emissions control could include e.g. measures to minimise sediment plumes, to decrease weight/pressure on the seafloor, minimise toxic waste and discharge etc.

For this purpose, all mining-related activities have to be listed, specified and evaluated with respect to their effect on biota when in operation (this should be done in the hazard identification phase in the

risk assessment process). Alternatively, precautionary action could be taken. For example, contractors could be forced to limit the extent of disturbances from mining activities to the limits of their mine site in order to encourage the technical minimisation of e.g. mining plumes and pollution, as well as noise reduction and a minimalistic light scheme.

If detailed emission thresholds are planned based on the proven/suggested environmental change, then it will be necessary to first:

- Identify appropriate biotic and abiotic indicators with characteristics that can be measured in suitable periods of time;
- Identify provisional indicator threshold values for different levels of harm;
- Determine maximum allowable environmental impact overall - minimise cumulative environmental effects
- Determine maximum allowable environmental harm from minerals exploitation in the region
- Determine maximum allowable environmental harm from individual projects
- Determine maximum allowable level of operational impacts from e.g. dredging, drilling, volume of sediment discharge, plume seafloor coverage, *i.e.* Best Available Technology and Best Environmental Practice.

Based on the information above, as well as the results of the project Environmental Impact Assessment, EIA, the ISA can attach conditions to the approval of a plan of work for exploitation. A comparison of environmental performance of the equipment of different operators will be instructive in determining the Best Available Technology and Best Environmental Practice, and eventually stimulate improvements. Regulatory stringency, together with economic incentives may trigger innovation for least-invasive techniques.

4.2. Spatial management and spatial planning

An objective mapping of the regional environment together with ongoing and planned activities and their effects, and eventually a spatial planning exercise, will be required. The benefit of doing so could be the

- Increased transparency *vis à vis* stakeholders and the public;
- Mapping of sites of use conflicts and potential transboundary and cumulative impacts;
- Reconciliation of all potential uses and interactions;
- Recommendations on the ecologically optimum location of mine sites within contract areas;
- Eventually limiting the maximum number of mine sites.

Spatial management includes the collation of an inventory of existing spatial (and other) measures in the respective region, and the consideration of spatial designations serving different objectives in the development of the REMP:

4.2.1. Representative conservation action

Regional precautionary representative spatial protection is necessary as insurance against unexpected developments, and in view of the great uncertainties regarding environmental impacts. A broad-scale network of protected areas should be established, in line with the criteria set out for a representative network of marine protected areas by CBD (Secretariat of the Convention on Biological Diversity, 2009)and contributing to the envisaged 10% coverage with MPAs in all oceans until 2020[20]. In areas beyond national jurisdiction, currently no marine protected areas can be established and enforced

[20] the CBD targets are being updated.

with binding measures on contracting parties globally - in the high seas, because no legal mechanism exists, and in the Area, because ISA can only create no-mining areas as a sectoral measure. Nonetheless, the ISA has chosen to designate its own category of protected areas, Areas of Particular Environmental Interest, APEIs, in the Area as a proactive measure against the cumulative regional effects of mining activities.

To lay the ground for later MPA establishment, the CBD developed the concept of 'Ecologically and Biologically Significant Areas', EBSAs, which represent priority sites that qualify for protection according to a suite of criteria, including representativity. The currently negotiated ILBI/BBNJ agreement seeks to enhance biodiversity protection a.o. through MPA designation in areas beyond the limits of national jurisdiction, which could be based on some or all of the EBSAs. Coherence between measures in the high seas and in the Area is desirable.

Marine Protected Areas, MPAs, designated by other global or regional management organisations or conventions should be respected and incorporated in the REMP.

Contractors are contractually obliged to designate particular zones within their exploration contract area, and later the mine area, to monitor the impact of mining, an impact reference zone, IRZ and a preservation reference zone, PRZ. The criteria for PRZs include that it must act as a refuge for species and habitats in the mined/impact areas and as such can prevent biodiversity loss. Therefore, PRZs should be mapped as representative sites.

4.2.2. Spatial conservation of vulnerable, unique, rare and otherwise endangered species and habitats

The suite of representative sites should be complemented by priority sites, species and habitats for conservation, such as either already designated or as indicated according to the criteria of CBD, FAO and other organisations, including regional conventions. Measures could require the full setting-aside of such areas, or eventually require only temporal/seasonal restrictions. This could for example be the case if a certain species uses the ocean next to a mining site only temporarily, e.g. as nursery (see also ISBA/26/C/7, Annex, para 8.3).

Ideally, each exploration contractor would carry out a spatial analysis of its contract area and map the distribution of at least mesoscale benthic habitats and communities considering potential conservation areas acc. the criteria of FAO (2009) and CBD (Convention on Biological Diversity, 2010a). The relevant criteria are usefully set in context with the requirements of UNCLOS Articles 145 and 194(5) and 'examples of habitats/ecosystem features in the Area where these criteria may apply' in the ISA Secretariat´s REMP Guidance, Annex II (reproduced in Annex 1 of this study).

4.3. Addressing potential conflicts with other legitimate uses

Deep seabed mining will be a new activity in the ocean and will have to operate with 'due regard' (UNCLOS Part VII, Art. 87) for other activities, such as (tuna) fishing and science, cable laying and shipping, which are all guaranteed high seas freedoms, and *vice versa*. Potential conflicts can be in the form of direct competition for space, such as with shipping, cable-laying, fishing and research, but also restricted areas for conservation or indirectly through deterioration of environmental quality which impairs the opportunities of other users, e.g. fishing or prospecting for marine genetic resources, and could impact on, coastal communities as well.

Therefore, deep seabed mining of minerals in the Area does directly affect quite a range of stakeholders. In addition, the conflict with global societal goals such as the CBD Biodiversity targets and the 2030 Agenda has to be considered. Also, the objectives and instruments of the currently negotiated ILBI/BBNJ to enable the conservation of biodiversity in the high seas have to be included in the analysis with a view to avoiding conflicts. The mining-related destruction of critical habitats may also lead

to the loss of future opportunities for exploring and eventually exploiting so-called marine genetic resources in the Area. This is particularly relevant for organisms found at or close to hydrothermal vents, which often show a very high specialisation to the respective living conditions, which may become useful for developing human materials, tools and cure.[21]

The information to be provided includes the consideration of the conflict potential (who was involved? which actions taken?) and the solutions found, including eventual procedural arrangements with other international bodies (see also ISBA/C/26/7, Annex para 8.5).

5. Monitoring, evaluation and review of adopted REMP

The objective of a REMP-wide environmental monitoring programme is to keep track of environmental changes in the region, and to control the success of the management plan in view of these changes and the actual mining activities carried out. Such a regional standard monitoring programme should best be developed in cooperation with adjacent States and relevant regional or global organisations and be compatible with global scientific monitoring programmes. In particular the collaboration of contractors is required. The design of the monitoring programme, including spatial and temporal sampling coverage and methodologies, as well as the subsequent assessment framework and the supporting modelling and should be elaborated by a group of experts. Monitoring should start as soon as possible to gather the baselines and last so-to-say in definitively, as a recovery after any mining ends should also be documented. Over time, the details of the monitoring scheme will have to be adapted.

The evaluation of the information derived from the monitoring programme serves to assess the environmental performance of the REMP with respect to achieving the regional goals and objectives for biodiversity conservation for the entire planning area. The results should inform the Environmental Management and Monitoring Plans of contractors active within the region. Technically, it is advisable to develop standardised assessment formates and processes.

A review of the REMP should take place periodically, *i.e.* every 5 or 10 years. The interval should depend on the increase in exploitation contracts in the region, as well as triggers set by other environmental change, such as new knowledge on the effects of climate change, significantly changing use patterns by other sectors, or revised globally applicable environmental or sustainability targets.

For this purpose, and for further developing regional cooperation mechanisms, a permanent body responsible for following-up the issues of the region would be the best option.

6. Science

While the monitoring programme will have to be funded by ISA and contractors, eventually in conjunction with other international initiatives for global observing programmes, marine scientific research is likely to be funded either on a national or a private basis. REMPs offer a great opportunity for ISA to agree with scientific research institutions on priority research questions in the region and to facilitate corresponding research programmes in line with Art. 143 UNCLOS.

For this purpose, an independent scientific advisory group affiliated with the ISA could be more effective than the usual *ad hoc* cooperation and transparency will be increased. This group could for example advise on the need for regional assessments, on research cooperation and funding options for research in a systematic and quality-controlled way. State cooperation in research could be a powerful mechanism to raise funds to support the research necessary for establishing regional environmental baselines and for conducting environmental monitoring.

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[21] A recent example for the extremely high importance of preserving ecosystems and biodiversity for mankind was the test being used to diagnose the Covid-19 virus from marine genetic material derived from hydrothermal vents. https://www.whoi.edu/news-insights/content/finding-answers-in-the-ocean/

7. Capacity development

Capacity development for deep sea research and the management of mining-related issues is an important task and REMPs should deliver opportunities for education, exchange and cooperation within and beyond the region. The most fruitful option might be through cooperation with actors in the region, be it regional science, management or governance organisations, with coastal States and other stakeholders such as shipping, fishing, or NGOs.

Stakeholder engagement

Actors directly or indirectly interested in the processes expect a high degree of transparency and a wide range of opportunities for broad-based involvement in the development of regional environmental management plans (International Seabed Authority, 2019b). Stakeholder involvement is one of the key principles for the application of an ecosystem approach to the management of human activities, and is viewed as a critical success factor next to political will and leadership, and process transparency. It is considered fundamental for knowledge acquisition and a means to enhance the understanding and acceptance of policies and measures. This is essential to gain a 'social license to operate'. Around the world, national and regional initiatives to implement holistic regional ocean governance regimes have made progress towards developing various solutions to come to the best possible interplay between planning authority, government, legislation, planning system and stakeholders. There are a number of lessons to be learned by ISA from these experiences.

Stakeholder mapping and analysis is an important process to ensure that nobody is 'left behind' or relevant interactions are not taken into account. In a transparent, interactive governance framework, public dialogue should start early in the process, as long as all options are open and the contribution of participants can be duly taken into account. All planning phases require different levels of interaction with stakeholders. Under these conditions, public participation can bring benefits as summarised by Wiser (2001):

- Enhanced legitimacy and facilitation of public acceptance of a treaty regime;
- Improved quality of decision-making by increasing the information and perspectives available to decision makers;
- Enhanced accountability of decision-making through public scrutiny; and
- Assisting small and less-developed states in building their capacity to participate effectively in the agreement.

Implementing a management regime which aims to regulate human use to sustainable levels is not a one-off exercise and requires stakeholder input over a long planning cycle, including in particular the assessment and review phases. The role of stakeholder and public involvement should be particularly strong in determining management objectives and actions, and may be essential for providing all available knowledge to the table. Essentially, the involvement of as broad a stakeholder constituency as possible aims at understanding divergent views and developing strategies that accommodate such differences in order to achieve a common goal of stewarding marine resources for this and also for future generations.

There are some critical issues about the current engagement of stakeholders in the REMP development processes

- There is no agreed (and known) strategy for stakeholder engagement applied. There is a risk that the lack of stakeholder mapping leads to an imbalance of stakeholders represented at workshops;
- The currently envisaged method of stakeholder participation is limited to one-off region-specific technical workshops with limited capacity;

- Neither an overarching advisory panel for all regions, nor region-specific advisory committees are foreseen - such mechanisms could provide for a broader representation of stakeholder groups other than scientific experts;
- There is no continuous workstream foreseen to which stakeholders could provide input, commenting will only be possible on the draft REMP document;
- The rights and duties of the REMP managing organ and stakeholders need to be defined, including a response mechanism to stakeholder comments and suggestions.

To overcome these weaknesses, a systematic, multi-layered advisory process and defined steps for interventions from all stakeholders can be designed. This may be time-consuming and involving substantial capacities. The following steps in addressing stakeholders are recommended/part of SEA procedures as an element of regional management (see also chapter 4.2.1)

- Mapping stakeholders and their interests by use of a stakeholder analysis;
- Development of a strategy for cooperation, communication and participation, incl. roles and responsibilities;
- Notification of adjacent coastal states and stakeholders of the intent to develop a REMP;
- Agreement on overall purpose and objectives in line with ISA guidance/or other term;
- Agreement on steps in the process and time table.

Institutional stakeholders such as other management authorities have to be addressed in a different way. In particular in transboundary marine spatial planning processes, such as is the case for REMPs, stakeholder involvement is of particular importance, and good practices include (modified after Kull *et al.* (2019)

- Enhancement of existing partnerships and transboundary cooperation networks;
- Development of stronger participatory processes and tools, for example through the establishment of a coordination body which is respected by all relevant stakeholders, regular dialogue for continued exchange
- Enhancement of convergence between policy and legislative arrangements;
- Development of transboundary data and information base to facilitate transparent data sharing, including regular exchange of information, supporting comprehensive transboundary mapping exercises;
- Establishment of clear joint objectives while identifying possible areas of conflict and develop long-term solutions for particular issues.

Permanent institutional mechanisms for improved consultation and cooperation including a science-policy advisory meachanism can be instrumental to enabling an interorganisational exchange to ensure that marine biodiversity and ecosystems are not degraded by the actions of any one sector or regional institution. The REMP-organising body could ensure communication and integration of the different sectoral organisations directly, cooperate with existing regional frameworks, or where these do not exist, the REMP could serve as a platform for intersectoral cooperation and conflict resolution. The desired outcome is an integrated environmental management of a certain ocean region under shared responsibilities. However, mechanisms of substantial cooperation between intergovernmental organisations are not very well developed and often empede integrated management. Nor are the options explored to upgrade the currently planned ISA REMP developments to become integrated approaches to enable the conservation of the marine environment in the high seas and the Area.

Recommendations

The aim of this study was to develop a standard approach applicable to all of the Regional Environmental Management Plans under development as an instrument for the International Seabed Authority to provide for effective protection of the marine environment from harmful effects of activities in the Area. As agreed globally and by ISA, the regional management plans best operationalise an ecosystem approach to management of human activities, which should find its reflection in the management philosophy, decision-making, strategies, procedures and last-but-not-least in a transparent and open interaction with stakeholders and the public.

REMPs should be legally binding and should be made effective through ISA rules, regulations and procedures and through ISA standards. In other words, it should not be a non-binding recommendation of the LTC or Council, like the Clarion-Clipperton Zone REMP of 2012. A REMP is more than a planning document and has much greater potential. In particular, it should not only inform but also instruct the decisions of the LTC and the Council. More pertinently, in cases where an application for the approval of a plan of work appears to undermine or be inconsistent with the objectives of a REMP, the decision-making organs of the ISA can rely on the REMP to support a decision to not approve a plan of work.

REMPs have the potential to allow the ISA to function as a proper regulator. In particular, REMPs are a useful place to set environmental thresholds for 'effective protection', 'harmful effects' and 'serious harm', as well as the appropriate indicators, for the region.

The procedural requirements to develop and review REMPs is best carried out by a newly established Environmental and Scientific body that is responsible to carry out the environmental obligations of the ISA, supported by ISA Secretariat and a technical experts/scientific advisory group. If there is a lack of political will to establish such a permanent body, the procedural requirements for the development and review of REMPs should be led by an *ad-hoc* independent expert body that is put together for this purpose.

It is important to ensure that all REMPs receive the same treatment not only in terms of procedural requirements, but also in their scope and contents. The use of a Template that is pre-agreed by the Council, which all REMPs will be required to meet, is essential.

The most important features of a standard REMP which fully complies with these expectations are summarised in Table 3, p. 140-144.

1 Introduction

The status of the Area as a 'Common heritage of mankind' is not only a new construct in international law which provides for fair and equitable sharing of benefits, but also an obligation to care for the ocean, its ecosystems and the resources it provides to humankind now and in the future. The times of boundless exploitation have come to an end and must now be reduced to environmentally sustainable levels. However, current knowledge demonstrates that the world is not on track for achieving most of the 169 targets that comprise the 17 UN Sustainable Development Goals, SDGs; in many cases, such as for biodiversity loss and climate change, trends are not even moving into the right direction (Independent Group of Scientists appointed by the Secretary-General, 2019).

In order to achieve the universal transformation towards sustainable development in the next decade, as is the ambition of the 2030 Agenda (UN General Assembly, 2015), a profound and intentional departure from business-as-usual is required, resulting in decoupling the well-being of mankind and economic activity from resource use and environmental pressures and impacts (IRP, 2020). There is an urgent need for global resource governance and a 'Sustainable Development License to Operate', which operationalise the contribution of the extractive sector, including deep seabed mining, to achieving the transformative goals of the 2030 Agenda in the light of planetary boundaries (IRP, 2020) and in line with the commitments of parties to the Convention on Biological Diversity to *'Ensure that sectoral and cross-sectoral policies, plans and programmes, as well as legal and administrative measures and budgets established by our Governments, integrate in a structured and coherent manner actions for the conservation, sustainable use, management, and restoration of biological diversity and ecosystems'* (Convention on Biological Diversity, 2016)[22].

Deep seabed mining, once it begins, will operate in a space of great unknowns as regards the marine environment, and therefore brings with it a great risk of equipment failure and unexpected events due to the high-pressure environment and novel technical designs. Any approval of such operations *in situ* will thus have to be conditioned to err on the side of precaution. Due to the interconnectedness of the marine realm, human interventions may affect organisms over large distances in three dimensions and persist over as yet unknown timescales, compromising eventually ecosystem functions such as climate regulation and carbon sequestration, which are urgently needed to limit the effects of global warming. States agreed that *'the problems of ocean space are closely interrelated and need to be considered as a whole through an integrated, interdisciplinary and intersectoral approach'* (UNGA 2018 A/RES/73/124). They *'reiterated their deep concern at the serious adverse impacts on the marine environment and biodiversity, in particular on vulnerable marine ecosystems and their physical and biogenic structure, including coral reefs, cold water habitats, hydrothermal vents and seamounts, of certain human activities'*, and *'recognized the need for a more integrated and ecosystem-based approach to, further study of and the promotion of measures for enhanced cooperation, coordination and collaboration relating to the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction*.

The ISA Strategic Plan (International Seabed Authority, 2018a) places the development of the policy and regulatory framework for environmental management of ISA into this context and describes the inherent challenges (paras 13-14)[23]. Building on the experiences with a first regional environmental

[22] the CBD Aichi Biodiversity targets and the 2030 Agenda for sustainable development are closely linked. See UNEP/CBD/SBSTTA/19/INF/9

[23] para 14: " The challenge for the Authority is to adopt a policy and regulatory framework for environmental management that achieves the effective protection of the marine environment, under circumstances of considerable scientific, technical and commercial uncertainty. The framework should be adaptive, practical and technically feasible. It must satisfy the extensive marine environmental protection requirements of the Convention, as well as take into account relevant aspects of the Sustainable Development Goals and other international environmental targets, such as the Aichi Biodiversity Targets. The process for developing the framework and its implementation must be transparent and allow for stakeholder input. The development of regional environmental assessments and management plans, in particular, demands a collaborative and transparent approach to both the collection and the sharing of environmental data. The process must

management plan in the Clarion-Clipperton Zone in the Pacific, the strategic plan and, subsequently, the high-level action plan adopted by the Assembly in 2019 (ISBA/25/A/15, annex II) indicates the intent to use the instrument of Regional Environmental Management Plans, REMPs to *'develop, implement and keep under review regional environmental assessments and management plans for all mineral provinces in the Area where exploration or exploitation is taking place to ensure sufficient*[24] *protection of the marine environment as required by, inter alia, article 145 and part XII of the Convention'* (Strategic Direction 3.2). The most effective contribution of ISA to the global target to 'halt/at least halve the loss of biodiversity' (Convention on Biological Diversity, 2010b; European Commission, 2011; UN General Assembly, 2015) would be to preserve the Area, the Common Heritage to Mankind, in order to perpetuate the benefits to mankind from its intact ecosystems and processes, already stressed by the velocity of long-lasting climate change impacts (Bryndum-Buchholz *et al.*, 2019; Folkersen *et al.*, 2018; Kaikkonen *et al.*, 2018; Levin and Le Bris, 2015; Niner *et al.*, 2018; Sweetman *et al.*, 2017).

The fact that deep seabed mining will have harmful effects on the marine environment was clear to the makers of the UN Convention of the Law of the Sea (UNCLOS), although at the time the overall knowledge of deep sea ecosystems was far less than it is today. This is why Part XI of UNCLOS, which provides the legal framework for the exploitation of minerals in the Area, includes Article 145, requiring the international community, organised through the International Seabed Authority (ISA), to take the necessary measures *'to ensure effective protection for the marine environment from harmful effects which may arise from such activities'.* This includes the adoption of rules, regulations and procedures to prevent, reduce and control pollution and other hazards, the intervention with the ecological balance and the protection and conservation of the natural resources of the Area, including the prevention of damage to the flora and fauna of the marine environment.

The *'effective protection'* from harmful effects of mining is in UNCLOS not compromised by a need to find an 'optimum balance' with exploitation *'to attain the maximum current and future human welfare and when considering the equitable distribution of net benefits from DSM both intra-temporally (e.g., across potential beneficiaries) and inter- temporally (i.e., across current vs. future generations)* (Lodge *et al.*, 2019). Given the many unknowns of deep sea ecosystems, the unknowns of technical equipment and operation, and the possible cumulative or synergistic effects with other pressures, the envisaged 'optimum balance' is likely only a hypothetical pathway. Nonetheless, from a practical perspective, the design and implementation of an effective regional environmental management plan (REMPs), which enables a slow and stepwise permit process which allows to learn from experiences made and enables review and revision of earlier decisions, might be successful in limiting human impacts to such a degree that the marine environment is not irreversibly degraded in the long term. REMPs offer at least a good chance to act as precautionary and adaptive as possible.

In addition, Article 147 of UNCLOS calls for the carrying out activities in the Area with reasonable regard for other activities in the marine environment, and *vice versa.* This applies to the seafloor as well as the overlaying water column, which is legally known as the high seas (regulated in Part VII of UNCLOS). Although the ISA has the exclusive competence to regulate activities in the Area, the resulting pressures on ecosystems will adversely impact the biodiversity of the high seas and eventually come into conflict with other rights and interests guaranteed by the law of the sea. Coastal States have a particular interest in activities that take place beyond their national boundaries, in particular as regards eventual transboundary pollution or impact on fisheries (Singh and Pouponneau, 2018). In the absence of a globally coordinated exchange forum, a sectoral regional action such as a Regional Environmental Management Plan could provide a platform for exchange and coordination with the range of other actors in the region and enhance transparency over ISA activities (Ginzky *et al.*, 2020).

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ensure the fully integrated participation of developing States, not least in connection with international obligations to build technical capacity.

[24] the wording in Article 145 UNCLOS is effective protection

In parallel with the development of the ISA legal framework for exploitation and Regional Environmental Management Plans, negotiations on a new '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' (General Assembly resolution 72/249), hereafter named ILBI/BBNJ[25] are underway. Common sense dictates that the governance of the Area and the high seas should eventually complement each other for the benefit of ecosystem protection and conservation. It has been suggested that the development of the Regional Environmental Management Plans should pay due consideration to the work on high seas biodiversity conservation (International Seabed Authority, 2019c).

However, the overall success of a REMP in terms of environmental protection depends also on a stringent and systematic approach to developing and implementing all REMPs alike as an instrument for integrated management that operationalises an ecosystem approach to managing human activities. An overarching ISA environmental strategy for the Area, while elaborating the environment-related strategic directions indicated in the ISA Strategic Plan, could be instrumental to harmonising the general approach to ensuring environmental protection, accountability and regional cooperation across all oceans (Jaeckel, 2015, 2019). In the absence of such a global policy, a standardised format for each of the REMPs to be developed and established can help ensure the necessary *'uniform application of the highest standards of protection of the marine environment, the safe development of activities in the Area and protection of the common heritage of mankind'* (ITLOS, 2011), para. 159).

With the aim to contribute to the work of the International Seabed Authority in the development of REMPs, particularly in relation to promoting the adoption of a standardised approach, Germany (supported by IASS), and co-organizers the Netherlands and Pew Charitable Trusts, hosted an international workshop 'Towards a standardised approach to Regional Environmental Management Plans in the Area', 11-13 November 2019, in Hamburg, Germany[26]. The three-day workshop was enriched by the contributions of 80 participants with governance, legal, science and administration background from all over the world. As a whole, the need for a standardised approach to REMPs by ISA and the suitability of developing a template setting out the minimum requirements to be delivered by the respective REMPs was strongly supported. The necessity for an agreed procedure for the development, approval and review of REMPs was also supported, however, there was considerable debate as to the roles and responsibilities in the procedures. In particular, the need for an independent REMP organising committee was not shared by everyone. Also, the question on the legal weight of REMPs was debated, but not resolved.

Subsequently, two joint submissions were made by Germany and the Netherlands, co-sponsored by Costa Rica, to the Council meeting in February 2020. Document ISBA/26/C/6 focusses on the 'Procedure for the development, approval and review of regional environmental management plans', while document ISBA/26/C/7 proposes a standardized approach to content of REMPs through the formulation of a template with minimum requirements. The Council decided to forward the submissions to the LTC for consideration (ISBA/26/C/10).[27] Both documents will be referred to where appropriate in the course of this report.

In parallel, the ISA Secretariat has proceeded with formulating its 'Guidance to facilitate the development of Regional Environmental Management Plans (REMPs)',[28] a document which seeks to clarify the roles and responsibilities of ISA organs, provide a background to the REMPs, discuss possible spatial planning approaches, identify some data sources and possible elements of future REMPs. The purpose

[25] see https://www.un.org/bbnj/

[26] see footnote 15

[27] ISBA/26/C/10 Decision of the Council concerning a standardized approach for the development, approval and review of regional environmental management plans in the Area

[28] https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/remp_guidance_.pdf (updated November 2019)

is to inform participants of dedicated workshops convened for preparation of the REMPs. This document will also be referenced were appropriate for comparison in this report.

The following report will start off with a background chapter (chapter 2) which describes the context and purpose of REMPs, the ISA's mandate for spatial management, the current ISA legal and policy environment, and discusses options for the degree of legal weight that REMPs could potentially impose e.g. the ISA exploitation permit procedure. Also in chapter 2 is a subsection on lessons learned from the first ever regional management plan, as adopted in 2012 by the ISA Council, for the Clarion-Clipperton Zone in the northeast Pacific. Chapter 3 is dedicated to presenting options for establishing REMPs via a standardised procedure. Chapter 4 elaborates on one method of a practical standardised approach to developing the contents of the management plan, in this case a format inspired by a strategic environmental assessment operationalising an ecosystem approach to the management of human activities. Chapter 5 picks up on the important role of stakeholder engagement in creating a broad legitimacy for the respective REMPs. A concluding chapter provides some recommendations on critical success criteria for REMPs to be effective in ensuring effective protection for the marine environment from harmful effects which may arise from mining-related activities in the Area.

2 Background

2.1 Regional Environmental Management Plans as a tool to ensure the effective protection of the marine environment

Regional Environmental Management Plans ('REMPs'), established by the International Seabed Authority, can be considered essential tools to ensure that processes are in place to facilitate the effective protection of the marine environment, in line with Article 145 UNCLOS. REMPs serve to collect and review region-specific information that feeds into the decision-making processes for exploration or exploitation activities in the relevant areas, and enables the development of measures and procedures for implementation and review. For these purposes, environmental objectives have to be agreed which take account of the state and capacities of the respective environment. Well-designed REMPs address cumulative and synergistic effects, as well as potential conflicts between different human activities occurring in the same region, and provide for long-term planning reliability and a level playing field for contractors, in particular when shifting from exploration to exploitation.[29] Table 1 below illustrates the importance of REMPs:

Table 1: The added value of regional environmental management plans for delivering the regional environmental mandate of ISA.

Without REMPs	With REMPs
▪ Only site-specific considerations. ▪ Decision on application made by relying solely on information submitted by the sole contractor in question and not with particular attention to other sources. ▪ Does not value special region-specific features. ▪ Cumulative impacts are overlooked. ▪ 'Carrying capacity' of the region not ascertainable. ▪ Adaptive management is restricted to the 'smaller picture'. ▪ Restricts ability to attribute harm to a particular activity or activities since limited information available on surroundings of mining site. ▪ Contractor accountability mainly confined to mining site (answerable only to harm cause by operation to the site).	▪ Region-specific considerations. ▪ Decision on application made by relying also on information available in REMP, which includes a collation of information from many sources. ▪ Values special region-specific characteristics and features. ▪ Cumulative impacts are a cornerstone. ▪ Attempts to ascertain 'carrying capacity' of the region. ▪ Adaptive management is central and based on the 'bigger picture'. ▪ Increases ability to attribute harm to a particular activity or activities (mining or otherwise) in the region since information is available. ▪ Increases the scope of contractor accountability (answerable to harm caused by operation beyond mining site, *i.e.* to the region).

Further, while REMPs are essentially instruments that facilitate decision-making within the ISA (as it provides the foundation for informed decision-making), it also manifests a much more fundamental purpose – which is to provide an impression of the currently available information for the region and imparts knowledge. This allows for the identification of vulnerable habitats that require protection, 'hotspot locations` that also require protection, areas that are under use by other users (e.g. submarine

[29] from Proposal for a template with minimum requirements for regional environmental management plans: a proposal for a standardized approach. Submitted by the delegations of Germany and the Netherlands, with co-sponsorship by Costa RicaISBA/26/C/7

cables and pipelines, fishing grounds, shipping routes, etc.), and subjects any decision to permit activities in the Area to the 'bigger picture' (*i.e.* cumulative impacts). Having REMPs in place is not only essential to control mining activities that take place at the present moment, it is also pertinent to ensure that other uses of the marine environment are aware of activities in the Area. Moreover, REMPs could also be seen as a message to future generations, underscoring the efforts taken today to ensure that the rights and interests of future generations are not comprised by activities undertaken at present in line with UN General Assembly Resolution A/68/322.[30]

The objectives of REMPs are multifold. Given that REMPs place cumulative impacts and carrying capacity at the cornerstone of management, thereby shifting the focus away from any one particular mining site, REMPs seek to set the parameters under which region-specific activities in the Area are to take place. Through the collation of environmental baseline data for the region, it actually allows the regulator to ascertain which areas that clearly should not be mined, which areas that should be avoided, and which areas that may be considered for mining. It is common knowledge that the conduct of activities in the Area will inevitably cause significant levels of harm to the marine environment (Heffernan, 2019; Miller *et al.*, 2018). REMPs allow the determination of region-based thresholds, based on the assessment of the region's carrying capacity, such as levels of harm from mining activities which does not lead to long-term, irreplaceable degradation of the ecosystems of the respective region. The objective here is to strengthen their resilience, and take action for their restoration, to achieve healthy and productive oceans, in line with UN Sustainable Development Goal 14.2.

A major practical challenge are the time- and spatial scales of data and information required to come to qualified conclusions on the effects of human disturbances. Deep-sea ecosystems are typically slow and difficult to observe in time and space, major functionalities being unknown (Washburn *et al.*, 2019). On the other hand, disturbance may be large scale and long-lasting (Jones *et al.*, 2017). This then requires a fine-tuned observing system, long observation periods supplemented by process experimentation (Gollner *et al.*, 2017), precautionary action and adaptive governance (International Seabed Authority, 2017; Jaeckel, 2016, 2017a, b, 2019).

As such, REMPs implement the ecosystem approach to management, and contribute in translating the precautionary approach into practice. To this end, governance and management objectives have to be set to maintain ecosystem health (Tunnicliffe *et al.*, 2018), striving for minimized harm as opposed to avoiding serious harm (Levin *et al.*, 2016). Therefore, an effective REMP will be able to define parameters in which the conditions of the marine environment in the region are at *'healthy levels'*, and not focusing on avoiding serious harm (or in other words, 'unhealthy levels'). It provides for the foundation to maintaining the status of health for the region that allows for the sustenance of its productivity. By focusing on the 'bigger picture', REMPs should initiate an iterative process for the design of measurable indicators that mining activities are subjected to and will be assessed against, as well as identifying areas in need of protection from the effects of mining-related activities.

In comparison to the above aspirational purpose of REMPs (seen in context with the mandate given to ISA through Article 145 specifically, and to ISA member States generally through Part XII of UNCLOS), the envisaged objectives stated in the ISA Secretariat Guidance document is more modest (see box below). In that view, REMPs only serve to *'support informed decision-making that balances resource development with the protection of marine environment at regional scale'* and provide ISA with a mechanism to identify representative areas for appropriate levels of protection while helping to meet internationally agreed goals and targets:

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[30] UNGA A/68/322, p. 5/8: "decisions made by present generations that materially affect the allocation of burdens and benefits between present and future generations should be arrived at in open, reasoned processes and not by means of closed or indirect systems of decision-making".

Box: REMP Guidance ISA Secr. July 2019, p. 5

What are the objectives of developing REMPs?

- to provide the relevant organs of the ISA, as well as contractors and their sponsoring States, with proactive environmental management measures and tools, including area-based management tools, to support informed decision-making that balances resource development with the protection of marine environment at regional scale;
- to provide the ISA with a clear and consistent mechanism to identify particular areas thought to be representative of the full range of habitats, biodiversity and ecosystem structures and functions within the relevant management area and/or sites in need for protection to preserve ecological balance of the marine environment in the Area;
- to provide those areas with appropriate levels of protection;
- to help the ISA to meet internationally agreed goals and targets (e.g. Sustainable Development Goals and Aichi Biodiversity Targets).

The ambition expressed in the proposed template for REMPs[31] goes far beyond that: it calls on REMPs to ensure effective protection in line with Article 145, guided by overarching goals, objectives and principles, with measures, including but not limited to area-based management tools, which take account of cumulative and synergistic effects, and which serve to manage potential conflicts between different human activities occurring in the same region.

This requires a comprehensive governance framework which enables the regulator to take precautionary management decisions based on a good knowledge of the regional ecosystems as well as all the pressures and impacts exerted on the environment. REMPs can be an outcome of a strategic or regional environmental (and social) assessment of the collective environmental effects and risks to be expected as a consequence of new laws, policies, programmes or plans (2003; Abaza *et al.*, 2004; OECD-DAC, 2006)(see further chapter 4.1). The aim is to ensure that the effects of individual and multiple activities enabled under the new framework will not undermine the achievement of pre-agreed overarching and conservation goals and objectives or impair ecosystem services (Atkins *et al.*, 2011). Such assessments should aim to be cross-sectoral, however in practice are often applied for sectoral purposes, such as for new offshore licensing rounds (example USA, Canada, UK, Ireland, Namibia).

In the context of ISA exploration and the upcoming exploitation legislation, the measures determined in the REMPs based on integrated assessment and regional planning, are applicable only to activities in the Area as defined by UNCLOS (ITLOS, 2011, para 159). Should there be more than one type of resources in the region, and activities ongoing or planned for more than one resource, a REMP should cover the likely effects of both activities. Any other sectoral measures are in the responsibility of the respective management bodies or subject to State action. The currently negotiated ILBI/BBNJ Agreement[32] may in the future provide for a framework for inter-sectoral regional cooperation for the benefit of biodiversity conservation.

Nonetheless, the ISA management actions have to be seen in context with the wider regional ocean governance order to ensure that regional management plans serve to effectively protect the marine environment (Art. 145 and 194 UNCLOS). As inherent in UNCLOS, REMPs should also provide a platform for collaboration with scientific bodies, other competent organisations and other stakeholders.

[31] see footnote 29, Annex, para 1.

[32] see footnote 25

Bridging the different interests are the internationally agreed targets for the conservation of biodiversity (Aichii targets[33]) and the UN Sustainable Development Goals,[34] which ISA must also aim to contribute towards. With the Area and its mineral resources being the common heritage of mankind, the task is also to give equal weight to the needs of future generations as well as those not well represented in the negotiations. As such, transparency and collaboration with stakeholders and other international organisations are essential self-commitments to be reflected in the vision, goals and objectives of any REMP.

The strategic aim of an integrated assessment and resulting regional planning is therefore to contribute to a high level of transparency and a high level of protection of the marine environment by

a) 'Ensuring that environmental, including health, considerations are taken thoroughly into account in the development of plans and programmes;

b) Contributing to the consideration of environmental, including health, concerns in the preparation of policies and legislation;

c) Establishing clear, transparent and effective procedures for strategic environmental assessment;

d) Providing for public participation in strategic environmental assessment; and

e) Integrating by these means environmental, including health, concerns into measures and instruments designed to further sustainable development' (Article 1, ESPOO SEA Protocol 2003).

The procedures implementing the above objectives will entail the preparation of an environmental report including the consideration of uncertainties, gaps and alternatives; a prior assessment of the likely environmental impacts of future [mining] activities, a transparent and inclusive public participation mechanism; consultation with other authorities; decision-making concerning the performance of the regulations with respect to the ISA's environmental obligations ('effective protection'); and, after approval, monitoring, review and communication of the results to the public and other authorities (see further section 4).

A successful REMP delivering sustainable environmental management can be considered along the criteria established by Elliott (2011):

- Environmentally/ ecologically sustainable - the measures will ensure that the ecosystem features and functioning and the fundamental and final ecosystem services are safeguarded;
- Technologically feasible - the methods, techniques and equipment for ecosystem protection are available;
- Economically viable - a cost-benefit assessment of the environmental management indicates viability and sustainability
- Socially desirable/ tolerable - the environmental management measures are as required or at least are understood and tolerated by society as being required; that societal benefits are delivered;
- Legally permissible - there are regional, national or international agreements and/or statutes which will enable and/or force the management measures to be performed
- Administratively achievable - the statutory bodies such as governmental departments, environmental protection and conservation bodies are in place and functioning to enable successful and sustainable management;

[33] https://www.cbd.int/sp/targets/

[34] https://www.un.org/sustainabledevelopment/sustainable-development-goals/

- Politically expedient - the statutory bodies such as governmental departments, environmental protection and conservation bodies are in place and functioning to enable successful and sustainable management.

2.2 ISA state-of-the art policy and legal context for regional environmental management

Since 2014, the ISA Council sought to substantiate the ISA´s progress on REMPs by *'requesting* the Commission to consider, as appropriate, the submission by the Netherlands on environmental management plans and environmental impact assessments' (ISBA/20/C/13) and *'encouraging* the Secretariat and the Commission to continue their work, [...] on the implementation of the environmental management plan for the Clarion-Clipperton Zone and the Commission to consider developing environmental management plans in other international seabed area zones, in particular where there are currently exploration contracts, in line with the suggestion by the United Nations General Assembly in paragraph 51 of its resolution 68/70' (ISBA/20/C/31). The new management plans should build on the work done in connection with the Clarion-Clipperton Fracture Zone (ISBA/25/C/13).

At its 24th session, the Council was presented with a Secretary General's report on the 'Preliminary strategy for the development of regional environmental management plans for the Area' (ISBA/24/C/3). In this preliminary strategy, several specific regions were determined as priority areas for the development of REMPs. These regions are the Mid-Atlantic Ridge, the Indian Ocean triple junction ridge and nodule-bearing province, as well as the North-west Pacific and South Atlantic for seamounts. The Council took note of this report and agreed with the determination of the priority areas (see ISBA/24/C/8, paragraph 9). The Council at its 25th session was presented with a Secretary General's report on the 'Implementation of the Authority's strategy for the development of regional environmental management plans for the Area' (ISBA/25/C/13), including a draft programme of work, which the Council took note of (see ISBA/25/C/7, paragraph 7). The Council also considered it essential that the plans be developed in a transparent manner, using a coordinated approach, under the auspices of the Authority, in the light of its jurisdiction under the Convention and the 1994 Agreement (see ISBA/24/C/8).

The implementation of this strategy has started with the organization of two workshops, held in Qingdao, China, in May 2018 (relating to the design of regional environmental management plans for the cobalt crust region of the north-west Pacific, (International Seabed Authority, 2019c)) and in Szczecin, Poland, in June 2018 (relating to the design of regional environmental management plans for polymetallic sulphide deposits on mid-ocean ridges, (International Seabed Authority, 2019b)). In 2019, a subsequent workshop focused on the northern Mid Atlantic Ridge region[35], where exploration contracts cover near to all of the ridge crest, including all known hydrothermal vent fields.[36] Another workshop assembled scientists to compile an updated regional environmental description of the Clarion-Clipperton Zone.[37] Several REMP development workshops are planned for the near future - though currently delayed due to the COVID19 pandemic (ISBA/26/LTC/2, summarising the REMP activities of the ISA since 2012). Despite the parallel developments in all oceans, so far there does not exist a standardised approach to REMPs adopted by the Council, neither in terms of

- Agreed purpose, overall goals and objectives, principles,
- Regulatory power of REMPs;
- Stakeholder engagement/participation and interaction with other management authorities in the region;

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[35] https://www.isa.org.jm/workshop/workshop-regional-environmental-management-plan-area-northern-mid-atlantic-ridge

[36] see map at https://www.isa.org.jm/contractors/exploration-areas

[37] https://www.isa.org.jm/event/deep-ccz-biodiversity-synthesis-workshop

- Scope and procedure of the REMP;
- Nor with regards to the minimum quality requirements in the delivery of the management plan.

At present, the ISA Secretariat, supporting the Legal and Technical Commission (LTC), is steering the REMP development, which is envisioned to follow a two-step process, as briefly outlined in the ISA Secretariat´s REMP Guidance document:[38] The LTC is responsible for preparing draft REMPs (see section VI for indicative elements of REMPs) and making recommendations to the Council for approval. In support of the LTC, two types of workshops are organised, one workshop focusing on scientific synthesis and description of the region, and a second one focusing on identifying specific management measures and implementation framework (Guidance 2019, p. 9-10). In a post-workshop process, the draft REMP documents will be compiled and made available for peer-review of stakeholders. There are indications that the effectiveness of measures shall be subject of review, however, the process is not included. The participation in these workshops has been directed through an application process and dedicated selection criteria. The document indicates that dialogue with all stakeholders will be sought throughout the REMP development phase.

Box: The main elements in the REMP Guidance, ISA Secr. July 2019

Convening power:

- It is the ISA Secretariat, supporting the Legal and Technical Commission, that organises and steers all REMP planning processes;
- In some regions, e.g. Pacific Triangle, the concerned contractors co-chair of the development of the REMP, together with the Secretary-General, supported by a steering committee representing the contractors in the region and the ISA - no independent management body was established. A first workshop on the Pacific Triangle took place in 2018 (International Seabed Authority, 2019c), a second has taken place as a virtual meeting in October 2020. It is unclear to what extent other stakeholders have been addressed and involved.
- In the case of the northern Mid Atlantic Ridge, MAR, the Secretariat, supported by some LTC members direct the development of the regional management plan. The related activities benefit of the EU-financed efforts of a large group of scientists who compiled a data report and so-called 'Environmental Assessment report' of the region, an excellent broad-scale description of the Mid Atlantic ridge, based almost exclusively on scientific publications. A first workshop focusing on SMS deposit areas on the MAR and criteria for developing REMPs took place in 2018 (International Seabed Authority, 2019b). In November 2019, a second workshop convened scientists to review the scientific information on the marine environment, the current exploration activities and *(iv) to describe potential areas that could be vulnerable to exploitation of mineral resources in the Area and would require enhanced management measures, and (v) to describe potential areas in the Area that could be reserved from exploitation in order to achieve effective protection of the marine environment, including through the designation of areas of particular environmental interests (APEIs).*[39] During a third workshop, to take place in June 2020[40] policy makers will recommend the environmental cornerstones for the REMP on the Mid-Atlantic Ridge south of Iceland (plus a small area to the north which is an OSPAR MPA).

[38] see footnote [28]

[39] Report of the workshop on the regional environmental management plan for the Area of the northern mid-Atlantic ridge. 25-29 November 2019, Évora, Portugal. Report available on website: https://www.isa.org.jm/workshop/workshop-regional-environmental-management-plan-area-northern-mid-atlantic-ridge. Unfortunately, the report does not fully reflect the scientific advice given during the workshop, in particular in relation to the design and location of a network of APEIs.

[40] Now a virtual meeting in November 2020

Stakeholder engagement

- It is not known, whether and to what extent stakeholder mapping and active communication is done (see further chapter 5.3). So far, the Secretariat uses the ISA website to post workshop announcements, participation criteria and relevant documents. The ISA Invites applications for participation and calls for data, however, responses are not made public.

Systematic conservation planning:

- In 2019, upon invitation of the ISA Secretariat, an *ad hoc* Advisory Committee elaborated a workplan on REMP development 2019-2020 (Billett *et al.*, 2019a). However, neither were the recommendations from this group reflected in any of the ISA Secretariat´s documents on REMP development, nor has the paper been published. In essence, the group advised to first develop and publish overarching goals, objectives and principles for REMP development, implement a standardized and systematic procedure, create the organisational preconditions for oversight on all REMPs under development globally to ensure consistency, and to establish Regional Environmental Committees, supported by the ISA Secretariat, to be responsible for the development of the individual regional plans.
- The REMP development as currently planned by the ISA Secretariat is a relatively quick one-off process. It only covers the establishment of a REMP, comparable to the CCZ REMP, but no follow-up action or adjustment based on new information or a changed state of the environment.
- The design currently does not include a regional monitoring and assessment component, nor does it foresee any restriction on contractor activities other than setting standards in line with good industry practice.

To overcome the limitations of the present REMP approach, and ahead of the drafting of the ISA Secretariats´ REMP Guidance document, Germany (supported by IASS) and co-organizers the Netherlands and Pew Charitable Trusts prepared and hosted an international workshop 'Towards a standardised approach to Regional Environmental Management Plans in the Area', 11-13 November 2019, in Hamburg, Germany.[41] The 80 participants with governance, legal, science and administration background from all over the world generally supported the need for a standardised approach to REMPs by ISA. The generation of a template setting out the minimum requirements to be delivered by the respective REMPs viewed as a helpful measure. The necessity for a procedure for the development, approval and review of REMPs was also supported, however, there was considerable debate as to the roles and responsibilities in the procedures. In particular the need for an independent REMP organising committee was not shared by everyone. Also, the question on the legal weight of REMPs was debated, but not resolved.

Subsequently, two submissions were jointly made by Germany and the Netherlands, co-sponsored by Costa Rica to the Council meeting in February 2020. Document ISBA/26/C/6 focusses on the *'Procedure for the development, approval and review of regional environmental management plans'*, document ISBA/26/C/7 proposes a standardized approach to REMP development through formulating a template with minimum requirements. The Council decided to forward the submissions to the LTC for consideration. Both documents and the ISA Sec guidance will be referred to where appropriate in the course of this report.

[41] Christiansen, S., Singh, P., 2020. Towards a standardised approach to Regional Environmental Management Plans in the Area. International Workshop 11 – 13 November 2019, Hamburg, Germany. Hosted by Germany and co-organised with the Netherlands and Pew Charitable Trusts. Workshop Report. p. 96

2.3 The mandate: ISA's competence to adopt REMPs

It is important to start by acknowledging that the UNCLOS does not specifically instruct the ISA to adopt REMPs. In the context of Part XI of UNCLOS, the term 'region' is used only to refer to representation from geographic regions at the ISA, and not with respect to the marine environment. UNCLOS, however, obligates the ISA to adopt 'necessary measures […] with respect to activities in the Area to ensure effective protection for the marine environment from harmful effects which may arise from such activities'. Article 145 also singles out the need to 'prevent, reduce and control pollution and other hazards to the marine environment […] that have the potential to interfere with the ecological balance of the marine environment', as well as to 'protect and conserve the natural resources of the Area, preventing damaged to the flora and fauna of the marine environment'. Article 17(2)(f) of Annex III to UNCLOS likewise prescribes the need for rules, regulations and procedures to secure effective protection of the marine environment from harmful effects. Furthermore, there are relevant provisions from Part XII of the UNCLOS that also lend support, for instance, that necessary measures shall include 'those necessary to protect rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered specific and other forms of marine life' (article 194(5) of UNCLOS).

Hence, the establishment of REMPs fits squarely within the ambit of 'necessary measures'. In any event, the ISA and its member States have already firmly acknowledged the importance of REMPs and committed to have it in place before any exploitation activities commence. There is even one existing precedent of a REMP, which is the CCZ EMP (see chapter 2.6), and this reinforces the practice of REMP development. In this regard, the ISA accepts and has already assumed the responsibility to design, adopt, implement and review REMPs. As such, arguing that the ISA does not have the authority to establish REMPs, or to backtrack (or regress) on the need to first adopt REMPs for a particular region before permitting any exploitation therein, is no longer possible.

2.4 The 'weight' of REMPs: Legal implications

While it is now trite that the ISA is obligated to establish REMPs in regions of mining interest before any exploitation activity commences therein, the 'weight' of such an instrument remains an open question. Although there is some common ground in accepting that the REMP is an instrument to facilitate decision-making, or in other words, an instrument that must be considered by decision-makers, the actual legal consequences which it implicates is a matter of debate. On the one hand, it can be seen as an instrument to guide the decision-making process, whereas on the other hand, it can be treated as an instrument that controls or governs the decision-making. Indeed, this matter was debated during the Hamburg Workshop in November 2019, with a majority view being that a binding REMP would be more effective, although no clear conclusions were reached on the extent of such binding weightage. This gives rise to the open question: do REMPs merely guide the ISA decision-making process, or do they instruct the ISA decision-making process?

2.4.1 The weight of REMPs

The main assertion in favour of the former (that REMPs merely guide decision-making) is that the word 'plan' in Regional Environmental Management Plan in itself gives rise to a non-binding connotation. Following this logic, a plan will always remain as an idea or abstraction with guiding features, and functions as one of several means to an end. One response to that is that it is patently clear that appropriate terminology can be used to make a 'plan' legally binding, e.g. 'This plan shall be legally-binding'. It is useful to note here that at the domestic level, it is typical for city, town, urban and country planning laws to have binding effect on the administration and its decision-making processes. Another response to that is that while some parts of the instrument can be aspirational, certain aspects of the plan can be made mandatory, e.g. 'An area under consideration for approval must be at least [xxx distance] from an existing area', or 'Applications that fall under the following coordinates shall not be considered'. In this sense, while the instrument is generally of a policy nature to set aspirational and

overarching objectives and targets, there can be numerous positive and obligatory provisions in REMPs that connote binding implications. A third response is that legal presumptions could be used in REMPs, stating something to the effect that: 'Once [xx percentage] of the region area covered under the REMP is subject to exploitation contracts, the awarding of future exploitation contracts shall be postponed.' Accordingly, when, where and how to make certain requirements within a REMP as compulsory and binding depends on the will of the member States, and not the title of the instrument itself.

It follows that REMPs do have the potential to carry significant, binding weight. It is, therefore, perhaps fitting to describe REMPs as a hybrid instrument with legal implications that steer, facilitate and instruct decision-making at the ISA. In this sense, it may be more appropriate to characterize REMPs as instrument to 'instruct' or 'direct' decision-making rather than to 'guide' decision-making (*i.e.* an instrument of 'instruction' or 'direction', as opposed to 'guidance'). All organs of the ISA are required to give full effect to REMPs in carrying their decision-making functions, thereby providing legal certainty and predictability to the regime, and ensuring a level-playing field by subjecting all prospective and existing contractors in the region to the same level of scrutiny.

2.4.2 The legal implications of REMPs

Having discussed the relationship between REMPs and the decision-making organs of the ISA, it is now necessary to consider the implications that REMPs might have on individual contractors. Here, it is pertinent to point out that while REMPs will function to steer and instruct decision-making processes at the ISA in a direct manner, it will only have indirect implications on contractors. Substantive requirements that shall apply to contractors must be inserted in the Rules of the Authority and the Standards and Guidelines developed thereunder. In this regard, the present Draft Regulations can require contractors to prepare their applications in accordance with the requirements under the applicable REMP, or risk the chance of having it disapproved. This includes, but is not limited to, fulfilling certain requirements that the applicable REMP may require with respect to the preparation of the Mining Workplan, as well as the Environmental Plans (to wit, the Environmental Impact Statement, the Environmental Management and Monitoring Plan, and the Closure Plan) that accompany the application. Prospective contractors shall be put on notice that an application that does not correspond or resonate with key components in the application REMP will not be approved.

Further, during the subsistence (and upon closure) of their contracts, contractors shall be required by the Regulations to ensure that their mining operations are in conformity with, and do not contradict or undermine, the objectives, measures and thresholds set by the applicable REMP. This link is specifically with respect to the annual reports that contractors are required to submit to the Authority, as well as the related monitoring and reporting obligations. In addition, Standards and Guidelines can also be utilized as a means to give effect to REMPs. Through this mechanism, objectives, measures and thresholds that are determined under REMPs can be transposed into actions and deliverables that contractors must meet.

In the event it becomes apparent during the subsistence of the contract that the mining operation is not in conformity with the applicable REMP, or contradicts or undermines its objectives, measures and thresholds, the contractor shall be bound to engage with the Authority in order to make the necessary adjustments to the mining operation. This requirement must be inserted in the contract, and expressly identified as a fundamental term of the contract. While the exact means that are to be adopted can be determined by the contractor and the Authority through consultation and mutual agreement, the Authority shall always retain the power to require certain measures, e.g. reduction in the mining operations, in order to ensure that the resulting environmental harm is minimized. The Authority also has the clear power to suspend mining operations, as well as to issue emergency orders in the case of 'serious harm'. However, as mentioned, tackling 'serious harm' should not be the goal of REMPs; rather, REMPs should pursue the maintaining of a desired level of healthy status of the marine environment. The Authority should be empowered to pursue this aim and not settle for avoiding 'serious harm'.

2.5 Overarching goals and guiding principles

As noted earlier, the purpose of a REMP is essentially to provide region-specific information, measures and procedures to ensure effective protection of the marine environment in accordance with Article 145 of UNCLOS. For REMPs to be uniform and effective, it is first necessary for them to share some overarching goals and be steered by several guiding principles.

2.5.1 Overarching goals

An important aspect of a REMP is the ambition to manage deep seabed mining activities transparently towards pre-agreed environmental quality objectives (this could e.g. be the avoidance of significant adverse impacts *sensu* FAO, 2009, or towards 'Good Environmental Status' in EU waters, Directive 2008/56/EC) which requires the setting of precautionary impact thresholds. Therefore, in a region, it has to be decided how to break down the high level global goals into measurable and achievable regional objectives and targets, describing the steps required to fulfil the goals. A periodic review of the REMP will then measure management success in relation to these preferably SMART[42] targets and objectives.

So far, the ISA has not yet formulated overarching strategic quality goals going beyond the general wording of Article 145 UNCLOS. The Strategic Plan (ISBA/24/A/10)[43], which could have been a good opportunity for setting such global management goals (Jaeckel, 2019) provides only for 'strategic directions' which are indicating procedural actions. Of relevance is the mission statement for rehearsing the common heritage of mankind status of the Area, for developing the resources of the Area for the benefit of mankind as whole and for putting environmental conservation in its global context:

> *'ensuring the effective protection of the marine environment in accordance with sound principles of conservation and contributing to agreed international objectives and principles, including the Sustainable Development Goals'.*

Rather than setting out an action for determining the strategic environmental, social and economic guardrails for commercial deep seabed mining, the Strategic Plan promises that ISA will develop and maintain a comprehensive regulatory mechanism for exploitation that incorporates as yet undefined

- effective protection of the marine environment and of human health and safety,
- equitable sharing of financial and other economic benefits from activities in the Area and that
- fully integrated participation of developing States through the exchange of knowledge and best practices consistent with the principle that the Area and its resources are the common heritage of mankind (ISBA/24/A/10, §7 and elsewhere).

It becomes visible here that the challenge of ISA is to find an appropriate balance between its ambition to develop (*i.e.* recover minerals to generate benefits) the resource and the legal obligation to ensure the *'effective protection for the marine environment from harmful effects which that may arise from such activities in the Area'*, as stated in UNCLOS and the 1994 Agreement. To secure the latter, the 1994 Agreement (annex, sect. 1 (5) (g))) rules that *'rules, regulations and procedures (RRP) designed to a) prevent, reduce and control pollution and other hazards to the marine environment having the potential to interfere with the ecological balance of the marine environment' and b) protect and conserve the natural resources of the Area, and prevent damage to the flora and fauna of the marine environment have to*

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[42] SMART means: Specific-Measurable-Achievable-Relevant-Time-bound. See e.g. ICES, 2005. Guidance on the application of the ecosystem approach to management of human activities in the European marine environment. ICES Cooperative Research Report 273, Copenhagen, pp. 1-28.

[43] ISBA/24/A/10 Decision of the Assembly of the International Seabed Authority relating to the strategic plan of the Authority for the period 2019–2023. Annex

be adopted prior to the approval of the first plan of work for exploitation'. These RRP should also include the adoption of overarching environmental quality goals, which could set the framework for determining operational objectives in the regions developing regional environmental management plans.

It is exactly this balance between human use of the ocean and the need for its preservation and conservation, in other words, the quest for sustainable human use, that is addressed by the ecosystem approach to management of human activities (see also 2.4.2). The ecosystem approach implements a management philosophy based on systems rather than sectoral thinking, and from consideration of pressures only to consideration of effects in an ecosystem context. Effectively, environmental concerns shall be integrated, evaluated with social and economic considerations, and lead to sustainability-led decision-making (Abaza *et al.*, 2004; OECD-DAC, 2006; Sadler and Verheem, 1996). This philosophy has been expressed e.g. by the European Directive establishing a framework for maritime spatial planning (2014/89/EU, as Recital 14) as:

*'ensuring that the collective pressure of all activities is kept within levels compatible with the achievement of **good environmental status** and that the capacity of marine ecosystems to respond to human-induced changes is not compromised, while contributing to the sustainable use of marine goods and services by present and future generations'.*

In context of the developments of ISA REMPs this would read to

*'ensure that the collective pressure of all activities is kept within levels compatible with the achievement **of the goals and objectives of the REMP** and that the capacity of marine ecosystems to respond to human-induced changes is not compromised, while contributing to the sustainable use of marine goods and services by present and future generations'.*

Another major challenge for the Authority is the prevailing considerable scientific, technical and commercial uncertainty which requires a high level of precaution in the adoption of a policy and regulatory framework for environmental management. This also needs to be reflected in the operational objectives for the region.

(Tunnicliffe *et al.*, 2018) have provided a first comprehensive discussion of relevant strategic goals and objectives, and (Christiansen *et al.*, 2019b) elaborated a set of high level strategic goals on the basis of the legal setting of the Area and the international conservation policy commitments of States parties to UNCLOS. Importantly, the submission made by Germany, the Netherlands and Costa Rica to ISA of a template for a standardised approach to REMPs (ISBA/26/C/7) includes the formulation of overarching goals as a basis for developing regional objectives for the respective REMPs.

Box: Overarching goals（ISBA/26/C/7, Annex, §2)

The regional environmental management plans include assessment, management and monitoring measures, aimed at facilitating seabed mining activities as well as:

[1] Protecting and preserving the marine environment, in particular, in order to:

- ► Maintain biodiversity, connectivity, ecosystem structure, ecosystem service and resilience
- ► Preserve unique marine ecosystems
- ► Prevent species extinctions
- ► Prevent impacts on benthic and pelagic ecosystems, including on mid-water fish stocks
- ► Prevent exacerbation of vulnerable ecosystems that are under particular risk from projected climate change effects.

[2] Applying precaution in management decisions corresponding to the level of knowledge gap and risk, in particular by:

- ► Using all available environmental data to inform management decisions
- ► Monitoring and assessing the state of the environment before, during and after any activities in the Area Identifying and taking into account uncertainties

- Applying adaptive management.

[3] Identifying and mitigating conflicts in different uses by avoiding overlap between contract areas, reserved areas, areas of particular environmental interest, marine protected areas and areas designated for other legitimate uses (such as fisheries, submarine cables)

[4] Promoting marine scientific research and capacity-building in the Area

[5] Promoting cooperation between States, contractors and other stakeholders of the Authority, with particular regard to the interests and needs of developing States.

These goals, once adopted by the ISA, would set the framework for all regional environmental management plans, which individually formulate their longterm vision and operational objectives in accordance with the regional necessities.

As evident in Overarching Goal [1] (see box above), the protection and preservation of the marine environment is the central pillar of REMPs. Under this goal, the REMP seeks to ensure the maintenance of biodiversity, connectivity, ecosystem structure, ecosystem service and resilience. It also aspires to preserve unique marine ecosystems and prevent species extinction. In addition, the REMP is also constructed to prevent or reduce impact on benthic and pelagic ecosystems, including mid-water fish stocks, as well as to prevent or reduce exacerbation of vulnerable ecosystems that are under particular risk from projected climate change effects.

While the above overarching goal [1] could be understood as all inclusive, the example of specific objectives given in (Tunnicliffe *et al.*, 2018) highlights that in practice, such overarching strategic goals need more specification to be a meaningful basis for developing regional operational objectives (see further chapter 4.2.2), such as:

- Protect ecosystems from contamination by pollutants generated during any phase of the mining process;
- Maintain the ability of populations to replace themselves, including ensuring population connectivity and the preservation of suitable habitat;
- Prevent the degradation of ecosystem functions (e.g. the long-term natural productivity of habitats, elemental cycling, trophic re- lationships);
- Prevent significant loss of genetic diversity, species richness, habitat or community types, and structural complexity on a long-term basis;
- Sustain ecosystem services (e.g. carbon sequestration) recognizing that many are yet to be discovered; and
- Maintain resilience to prevent regime shift, and to support recovery from cumulative impacts, including mining, that can affect source populations and communities, connectivity corridors, life-history patterns and species distributions.

Overarching Goal [2] is premised on the precautionary approach and its application to management decisions. In particular, the application of precaution ought to correspond with the level of knowledge and risk that is being dealt with. Knowledge is a precondition for decision-making, and accordingly all environmental data must be used to inform management decisions. In cases of knowledge gaps, necessary actions and measures shall be taken with a view to err on the side of caution. Another pivotal consideration is the necessity for assessment and monitoring the state of environment before, during and after the conduct of any form of activities in the Area. The application of precaution entails identifying and taking into account uncertainties and risks, as well as fully adopting an adaptive management strategy

The identification and mitigation of use conflicts with respect to activities in the Area and other uses of the marine environment is covered under Overarching Goal [3]. Given that the Area shall be used for peaceful purposes, and that other legitimate uses are recognized by UNCLOS, a REMP has the potential

to serve as a useful tool to avoid use conflicts. Apart from ensuring that there is no overlap between contract areas, reserved areas and areas of particular environmental interests, it serves as a platform to identify other forms of marine protected areas or of environmental and social importance, as well as areas designated for other legitimate uses (e.g. fisheries or laying of submarine cables and pipelines).

Overarching Goal [4] is the promotion of marine scientific research and capacity building. In this regard, REMPs can be particularly useful instruments to galvanize efforts to improve scientific understanding of the deep sea especially in areas that have not been previously explored by a contractor or scientific expedition. They can also help to promote capacity building by demonstrating the needs of a particular region as well as the adjacent coastal states.

Finally, Overarching Goal [5], which is on the promotion of cooperation between States, contractors and other stakeholders of the Authority, binds together all the earlier overarching goals through cooperation. It is clear that the ISA is not able to function in isolation, and thus, a REMP is a neatly situated platform that allows the Authority, its member States, contractors and other stakeholders to come together to ensure that all legitimate rights and interests in the region are aptly addressed.

2.5.2 Guiding principles for developing REMPs

To supplement the overarching goals stated above, all REMPs are subjected to the following guiding principles:[44]

[1] Value the Common heritage of mankind;

[2] Ensure precautionary decision-making;

[3] Manage human activities in line with the principles of an ecosystem approach;

[4] Achieve transparency and accountability through transparent decision-making and public participation acc. to the Aarhus Convention;

[5] Use of best available scientific and technical knowledge;

[6] Use of relevant traditional knowledge of indigenous peoples and local communities;

[7] Use of best environmental practices and best available technologies;

[8] Enhance international cooperation.

Guiding Principle [1] is the common heritage of mankind, which is the epitome of the deep seabed mining regime. In the context of REMPs, a REMP would give effect to the common heritage of mankind principle by ensuring that the rights and interests of future generations are not compromised by the conduct of activities in the Area by the present generation. REMPs provide an opportunity to ensure the conservation of resources, for example, the restriction of contract areas and their sizes in a particular regional area. By determining the carrying capacity of a region, it also assists in ascertaining whether mining operations are actually conducted for the benefit of mankind as a whole.

Similar to Overarching Goal [2], REMPs are guided by the precautionary approach as seen in Guiding Principle [2]. It allows for management decisions to be taken with circumspection, and in commensuration with the level of knowledge (or rather, knowledge gaps), as well as to ensure that regulatory decisions are always taken to be 'on the safe side'.

The use of an integrated ecosystem-based management system for the whole region is reflected in Guiding Principle [3]. It is clear that regions typically compromise of different, unique ecosystems, and

[44] The following principles have been generally extracted from the existing CCZ REMP, the submission of the Netherlands entitled 'The environmental management plan in the regulatory framework for mineral exploitation in the Area' (ISBA/20/C/13), the ISA Strategic Plan and High Level Action Plan, as well as the present form of the Draft Exploitation Regulations.

that unique ecosystems do exists in various parts within a particular region. REMPs allow for the identification of these ecosystems and a better understanding of how they are connected to one another, as will be explored later in Chapter 4.1.

Accountability is particularly important in the Area, given that humanity as a whole is the resource owner. As such, it is reflected as Guiding Principle [4]. Through transparent decision-making processes and wide participation of all relevant stakeholders and interested parties, REMPs lend support to enhancing the legitimacy of the work of the ISA.

Guiding Principles [5], [6] and [7] are about the use of knowledge, be it best available scientific evidence, traditional and local knowledge, or best environmental practices and technologies. REMPs provide a platform for all existing knowledge to come together, as well as an avenue for new knowledge to be continuously generated and put into use. Finally, Guiding Principle [8] seeks to promote international cooperation within the REMP set-up. As with the Overarching Goal [5], REMPs provide a convenient forum to foster cooperation and collaboration between the ISA and its member states, sponsoring states, contractors, adjacent coastal states, other stakeholders (including other uses of the marine environment), and the international scientific community and civil society.

REMPs should also adhere to the governance principles for an ecosystem approach to management [3] established by the Convention on Biological Diversity (Convention on Biological Diversity, 2004, 2007; Secretariat of the Convention on Biological Diversity, 2004), see box below:

Box: Governance principles of the ecosystem approach to management (Convention on Biological Diversity, 2004, 2007; Secretariat of the Convention on Biological Diversity, 2004)

Principle 1: ***The objectives of management*** *of land, water and living resources* ***are a matter of societal choice***. To reflect the diversity of human societies, all interested stakeholders should be involved in making the choices.

Principle 2: ***Management should be decentralized to the lowest appropriate level***. This means to give particular weight in decision-making to those stakeholder communities most concerned by the consequences of these decisions. Nested decision-making, sharing of information and expertise and good communication will prevent fragmentation. Accountabilities of all actors are part of good goverance.

Principle 3: ***Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems***. This will require good collaboration with adjacent coastal states and other management authorities. *'Environmental impact assessment (EIAs), including strategic environmental assessments (SEAs) should be carried out for developments that may have substantial environmental impacts taking into account all the components of biological diversity. These assessments should adequately consider the potential offsite impacts. The results of these assessments, which can also include social impact assessment, should subsequently acted upon. When identifying existing and potential risks or threats to ecosystem, different scales need to be considered'* (Principle 3.3). The ESPOO Convention (1991) and the Protocol on Strategic Environment Assessment (2003) informs on the advance notification obligations to neighbouring States. The Principle also requires to *'establish and/or maintain national and regional, where applicable, feedback mechanisms to monitor the effects of management practices across ecosystems'*.

Principle 4: ***Recognizing potential gains from management,*** *there is usually a need to understand and manage the ecosystem in an economic context*. Any such ecosystem-management programme should: (a) Reduce those market distortions that adversely affect biological diversity; (b) Align incentives to promote biodiversity conservation and sustainable use; (c) Internalize costs and benefits in the given ecosystem to the extent feasible.

Principle 5: ***Conservation of ecosystem structure and functioning****, in order to maintain ecosystem services, should be a priority target of the ecosystem approach*.

Principle 6: ***Ecosystems must be managed within the limits of their functioning.*** Environmental assessments and monitoring to establish ecosystem responses to disturbance, and adaptive management towards precautionary management goals will help reduce uncertainties.

Principle 7: ***The ecosystem approach should be undertaken at the appropriate spatial and temporal scales***. To analyse and understand the temporal and spatial scales at which ecosystem processes operate, and the effect of management actions on these processes and the delivery of ecosystem goods and services, enhanced capacity and appropriate design of assessment and monitoring is required. Regional collaboration is essential.

Principle 8: Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, ***objectives for ecosystem management should be set for the long term***. Adaptive management processes should include the development of long-term visions, plans and goals that address inter-generational equity, while taking into account immediate and critical needs (e.g., hunger, poverty, shelter). This requires stability of institutions, legal and policy frameworks, monitoring programs, and extension and awareness-raising programs.

Principle 9: Management must recognize that ***change is inevitable***.

Principle 10: ***The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity***. Manage areas and landscapes in a way that optimises delivery of ecosystem goods and services to meet human requirements, conservation management and environmental quality (10.5).

Principle 11: ***The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices***. This includes sharing of information with stakeholders and actors and that assumptions behind proposed management decisions should be made explicit based on the best available expertise, explicitly regard scenarios of future change and include the knowledge and views of stakeholders (11.1 and 2). Good management depends upon continuous improvement of the information base.

Principle 12: ***The ecosystem approach should involve all relevant sectors of society and scientific disciplines.*** Procedures and mechanisms should be established to ensure effective participation of all relevant stakeholders and actors during the consultation processes, decision making on management goals and actions, and, where appropriate, in implementing the ecosystem approach (12.3). An effective implementation may require involving multidisciplinary professional and scientific expertise (12.4)**.** When assessing the costs and benefits of conserving, maintaining, using and restoring ecosystems, the interests of all relevant sectors should be taken into account for equitable sharing of the benefits (12.5).

2.5.3 Conclusion

The ISA´s commitment to regulating future mining activities in the context of an ecosystem approach to management sets the frame for any REMP, starting with the way the planning process is organised, transparency and stakeholder engagement along its way, the comprehensive collection and application of knowledge to design measures, and the planning for constant feedback mechanisms to ensure truly precautionary decision-making on permissible activity levels. It also highlights that the primary purpose of REMPs is to conserve ecosystem structure and functioning, in order to maintain ecosystem services, recognising that human well-being and economic success in the long term depend on functional, well-preserved ocean ecosystems.

In that sense, it is imperative not to regard deep seabed mining as an isolated activity, but to see its environmental and economic impacts in context with the vulnerability of the ecosystems directly and indirectly affected, with other human activities and their environmental impacts, as well as impacts on adjacent coastal states and land-based economies. Environmental impacts from deep seabed mining will affect the biota and ecosystems of the seafloor and the column and therefore belong to the UN high seas regime. It goes without saying, that ISA, when developing its regional environmental management

plans should coordinate with efforts under the currently negotiated ILBI/BBNJ agreement to preserve the biological diversity of the high seas.

2.6 Lessons learned from the Clarion-Clipperton Zone Environmental Management Plan

2.6.1 The situation in 2010 when the Plan was designed

Until the adoption of the Environmental Management Plan, EMP, for the Clarion-Clipperton-Zone, CCZ, in 2012 (International Seabed Authority, 2011)the number of contracts for the exploration of manganese nodule fields in the CCZ awarded by the International Seabed Authority, ISA, had risen to twelve (see Figure 1; Figure 2 illustrates the situation in 2018 for comparison). The long term relatively slow increase in interest saw a major push after 2008 when some of the metal market prices seemed to indicate a longer term rise (Sharma, 2019). It meant that a presumably steadily rising number of entities would explore with a view to later exploit seabed minerals side by side in the prime nodule region of the eastern central Pacific, tentatively delimited by the Clarion and the Clipperton Fracture Zones to the north and south, and the Mexican and Hawaiian EEZs to the east and west. Exploration contracts are concluded for 15 years and cover initially 150000 km^2, of which 75000 km^2 can be developed, and the other half is given back to the ISA as a reserved area for development through the Enterprise or a developing country (see further (Lodge *et al.*, 2014). Although the duration of several exploration contracts has been prolonged by five years until 2021 or later, the transition to exploitation seems imminent. Concerns have been raised by scientists with regards to the irreversibility of destruction from mining at the seafloor, the potential cumulative impacts and a lack of systematic approach to environmental management (Jaeckel, 2015, 2019; Mengerink *et al.*, 2014; Niner *et al.*, 2018; Van Dover, 2011; Van Dover *et al.*, 2017).

Permits for the Plans of Work linked to the exploration contracts were and are given based on formal criteria, including a prior impact assessment for the exploration work (International Seabed Authority, 2015a). All contracts are linked to environmental baseline investigations and reporting requirements. This procedure shall put the ISA in the position to collect over time the environmental information on the overall region from the investigations carried out by the contractors - based on the impossibility of the ISA to first finance and carry out independent scientific studies of the regional conditions prior to allocating suitable locations for exploration and exploitation. Therefore, the strategy that the ISA appears to pursue is to incrementally build the knowledge base, which in 2010 led to the conclusion that given the increasing number of contracts, the assessment of regional and cumulative environmental effects and precautionary measures to prevent significant adverse effects from exploitation to the whole region were required as a necessary proactive measure.

As reviewed by (Lodge, 2011), in 2007 a group of scientists, supported by funding from the Kaplan Foundation, launched a first proposal for designating a regionally representative network of nine marine protected areas in the Clarion-Clipperton Zone in order to protect the biodiversity and ecosystem structure and functioning of the region from the potential impacts of human activities. Meant to be a first step towards systematic conservation planning, this network was designed based on the best available scientific knowledge and generally accepted and widely applied principles for network design (Wedding *et al.*, 2013). Nine biogeographic subregions could be differentiated, and in each, a 400x400 km area was proposed as non-mineable reserve (including a surrounding buffer zone of 100 km) to ensure a representative conservation of ecosystems in the event of mining. The ecological representativity of the placement of these so-called 'Areas of particular environmental interest', APEIs, however suffered from the pre-existing exploration contract areas which led the APEIs to be located in regions with low nodule concentrations. Later investigations confirmed that the diversity and abundance of megabenthic organisms is tightly related to the abundance of nodules as a substrate (Vanreusel *et al.*, 2016).

2.6.2 The contents of the CCZ EMP

After review of the proposal by the Legal and Technical Commission, LTC in 2008 and 2009, a workshop in 2010 confirmed the need for complementing the exploration activities by environmental protection measures such as a representative network of APEIs.[45] The first draft ISA regional environmental management plan for the CCZ was designed during the workshop. Adopted by the ISA Council in 2012 (ISBA/18/C/22)[46] after minor changes by LTC for an initial period of three years, the EMP addresses among others the following issues (ISBA/LTC/17/7):

- The powers of the International Seabed Authority on the protection of the marine environment;
- The need for cooperation with other international organizations and processes related to the protection of the marine environment
- Guiding principles
- Definition of the region
- Description of mining operations, vulnerability and potential impacts
- Design concepts for spatial management;
- Vision, goals, strategic aims and operational as well as management objectives guiding the management of the region.

Effectively, the CCZ EMP commits to integrated ecosystem-based management and shall contribute to the achievements of the goals of the Plan of Implementations of the World Summit on Sustainable Development (WSSD, 2002), today the Sustainable Development Goals (UN General Assembly, 2015) (see IV 35. Goals of the EMP (b) and (d)). However, no permanent steering group or otherwise responsible body was designated for following-up on the operationalisation and further development of this management plan, or initiating any communication with stakeholders and the public.[47]

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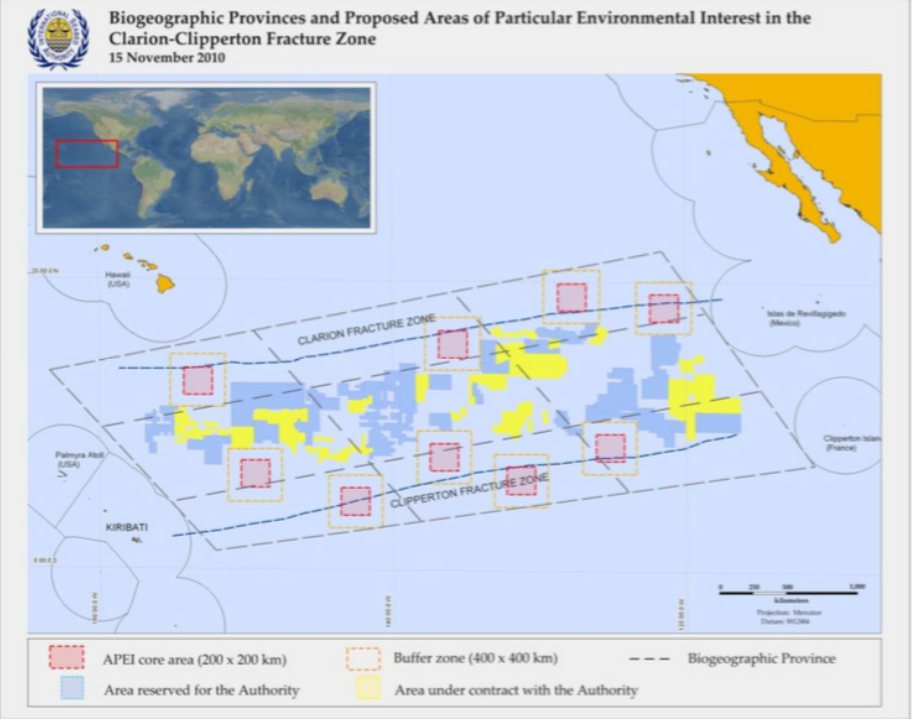
[45] https://www.isa.org.jm/international-workshop-establishment-regional-environmental-management-plan-clarion-clipperton-zone

[46] Lodge et al., 2014, p. 69: The environmental management plan was finally approved by the Council in July 2012 in a decision which not only recalled the provisions of Articles 145, 162 and 165 of UNCLOS, but also placed the environmental responsibilities of ISA in the context of ongoing discussions at the United Nations General Assembly in relation to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction. In particular, the decision recalled General Assembly resolution 63/111, of 12 February 2009, in which the General Assembly reaffirmed:

'the need for States, individually or through competent inter- national organizations, to urgently consider ways to integrate and improve, based on the best available scientific information and the precautionary approach and in accordance with the Convention and related agreements and instruments, the management of risks to the marine biodiversity of seamounts, cold water corals, hydro- thermal vents and certain other underwater features'.

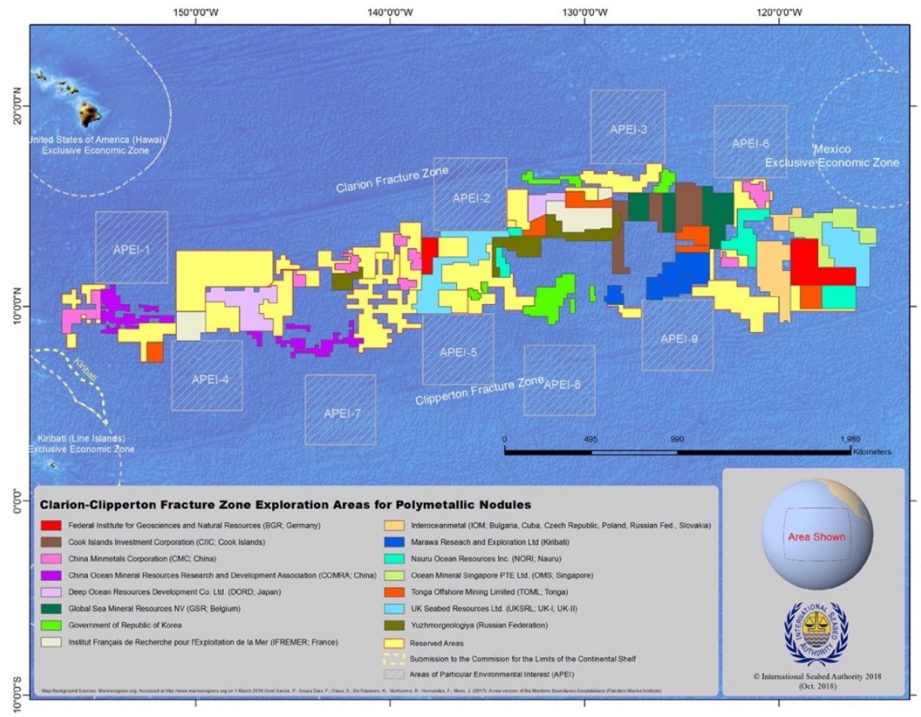
[47] The CCZ REMP was communicated via scientific publications and press releases.

Figure 1: ISA Exploration contract areas in the Clarion-Clipperton Zone in 2010. Location of the areas of particular environmental interest, indicating the nine biogeographic subregions, the core of each area of particular environmental interest and the buffer zones (ISBA/17/LTC/7, Figure II)



Source: https://www.isa.org.jm/authority/term-and-conditions-use-international-seabed-authority-website

Figure 2: ISA exploration contract areas in the Clarion-Clipperton Zone in 2018



Source: https://www.isa.org.jm/maps

The core part of the CCZ EMP is the recommendation for the designation of an initial network of nine Areas of Particular Environmental Interest, covering all identified nine biogeographic subregions of the CCZ (**Fehler! Verweisquelle konnte nicht gefunden werden.**). During its subsistence, these APEIs are unavailable to exploration and exploitation and act as a biodiversity reserve to allow for the recovery of mined areas while 'capturing the full range of habitat variability and biodiversity within each subregion' (ISBA/17/LTC/7). The following actions are recommended in the EMP (ISBA/18/C/22):

- Review of the suitability of the location, size and characteristics of APEIs at regular intervals starting from two years from adoption, including through review of contractor and other scientific data and external advice;
- Stimulation of region-wide ecological research, including in APEIs, and the setting up of a database of ongoing research by ISA;
- Stimulation of further dialogue with all stakeholders to ensure complementarity of the APEI network;
- Development of suitable mechanisms for monitoring the achievement of the conservation objectives for the area;
- Communication of the EMP and encouraging other intergovernmental organisations to adopt compatible measures in their competence to protect the APEIs;

Among the priority actions identified was the effort to bring together all available data produced by the contractors, standardise data provision and taxonomic identification as far as possible, produce guidelines for the designation of preservation and impact reference zones by contractors and a cumulative impact assessment to be carried out by the ISA secretariat. A periodically (for example, every 5 to 10 years) published environmental quality status report of the region, based on the data and information compiled from contractors and independent science will aim to inform the public on all relevant environmental matters in the Clarion-Clipperton Zone.

The implementation of the EMP was to proceed progressively, but the LTC is required to report on progress towards meeting the EMP implementation to the Council regularly every two to five years, for the first time in 2014. This first review was undertaken by an external consultancy, selected on the basis of a public tender and respective application by a review committee. A first follow-up workshop to review the implementation of the CCZ EMP had been planned for 2016, but so far has not materialised. In October 2019, a scientific workshop finally has reviewed the network of APEIs based on scientific knowledge and experiences gained since its designation[48].

2.6.3 Critical features of the EMP

In order to get a clearer picture on the intended deliveries of the Clarion-Clipperton EMP compared to its actual benefits, a critical consideration of elements of the EMP will be helpful.

2.6.3.1 Effect on ISA and contractors

Pursuant to Art. 145 and the obligation to ensure the effective protection of the marine environment from activities in the Area, applications for plans of work on exploration and future exploitation must be assessed in order to ascertain the extent of the potential environmental harm. To this end, the Commission will have to make a holistic and integrated assessment, taking account of existing human activities and related measures in place (ISBA/24/C/15), such as delivered by a regional environmental management assessment and plan.

[48] https://www.isa.org.jm/workshop/deep-ccz-biodiversity-synthesis-workshop

So far, the CCZ EMP is a policy instrument of the ISA (ISBA/25/C/4), adopted by the Council (ISBA/18/C/22) and adaptable through regular reviews by the Commission (Lodge, 2011). It is expected to act as a supportive framework in the decision-making processes of potential sponsoring States and of the ISA on whether to approve an exploitation application or not (ISBA/20/C/13). Overall, the EMP shall ensure also transparency and accountability with regards to environmental issues. Therefore, to be effective, at least parts of the EMP should have a binding force on the ISA and indirectly the contractors, e.g. through links to the future rules, regulations and procedures for exploitation.

The establishment of a regional environmental management plan is viewed by many stakeholders as a precondition to the granting of exploitation permits (ISBA/25/C/4), yet this can only be effective if control and assessment ensure that the longterm environmental objectives will be reached, including through adaptation of the plan and its measures.

Note:

- the CCZ EMP is a policy instrument with no binding force.

2.6.3.2 Boundaries of the region

The region of application of the CCZ EMP is defined as 'the area beyond national jurisdiction contained within a box approximately 0°-23°30'N x 115°W-160°W. The Zone is bounded to the north and south by the ENE-WNW trending Clarion and Clipperton Fracture Zones. Its area is approximately 4.5 x 10^6 square kilometers (km^2)' (ISBA/17/LTC/7). In this case, the fracture zones were used as natural, and the adjacent areas under national jurisdiction as legal boundaries. No other criteria were used.

Note:

- No criteria were discussed or agreed for how to determine the region of interest and its boundaries. The CCZ region was mostly determined with a view on the existing exploration areas, natural and legal boundaries, but irrespective of eventual ecological zonation. This was only applied for APEI designation. It has to be reviewed whether it will be necessary to subdivide a region like the CCZ in biogeographically defined management subregions.

2.6.3.3 Scope of the Plan

The CCZ EMP only addresses potential environmental change caused by activities related to the mining of polymetallic nodules in the region. Should any interest develop for the exploitation of another mineral resource, the EMP would not apply. This may be reasonable in the CCZ in the short term, however in other regions the occurrence of more than one mineral resource is more likely. An EMP could provide not only a platform for inter-stakeholder communication, but also for developing mechanisms in the case of conflicting interests from potential miners.

Note:

- The CCZ EMP only addresses nodule mining. In regions with several potentially exploitable mineral resources the EMP should cover all types of minerals to be an integrated ecosystem-based management tool.

2.6.3.4 Guiding principles

Principles, as precursors to rules, provide for the ethical framing to operationalise and integrate the diversity of instruments and institutions involved in addressing a multi-facetted problem - such as environmental management in areas beyond national jurisdiction (Houghton, 2014). The guiding principles of the CCZ EMP are (ISBA/17/LTC/7, Section C):

- The common heritage of mankind
- The precautionary approach
- Protection and preservation of the marine environment
- Prior environmental impact assessment
- Conservation and sustainable use of biodiversity
- Transparency and public participation acc. the Aarhus Convention.

This was the first document which expressed the principles which will guide the ISAs management of the Area. In 2018, a ISA Strategic Plan (2019-2023, International Seabed Authority, 2018a) was adopted which partially reflects the principles named in the CCZ EMP:

'(a) The Area and its resources are the Common Heritage of Mankind;

(b) Promote the orderly, safe and rational management of the resources of the Area for the benefit of mankind as a whole;

(c) Support the implementation of the international legal regime of the Area, including the Authority's rules, regulations and procedures;

(d) Promote the exchange of best practices among States and contractors;

(e) Ensure a better understanding and the effective protection of the marine environment;

(f) Promote harmonized approaches to the protection of the marine environment and its resources;

(g) Provide public access to environmental information;

(h) Ensure the use of best available scientific information in decision-making;

(i) Require the application of the precautionary approach as reflected in Principle 15 of the Rio Declaration, best available techniques and best environmental practices;

(j) Ensure transparency and accountability for results.'[49]

What is missing in both lists is the polluter-pays principle (Principle 16 of the Rio Declaration on Environment and Development of 1992) as an expression of the will to make the polluter bear the cost of environmental damage caused. The Strategic Plan only seeks to provide information to the public rather than to provide options for public participation, as named in the CCZ EMP. In line with (Elferink, 2012; Freestone, 2008) several other principles might be named:

- Institutional and procedural cooperation among all actors;
- Sustainable and equitable use (supplementing point (b) above);
- Responsibility of States as stewards of the global marine environment.

And given the current deterioration of the ocean ecosystems, the principle 'Protection and preservation of the marine environment' could better be replaced by 'Ensure the longterm integrity of ocean ecosystems through effective, precautionary management of activities in the Area.'

[49] This is a significant limitation of the scope of transparency and accountability: the Aarhus Convention requires that all of the process incl. decision-making are transparent, participatory and accountable.

A harmonisation with the principles of the '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 (draft text as of 25 June 2019)[50] could be considered. These include to (Art. 5)

- [(a) Apply an integrated approach [/principle];]
- (b) Apply an approach that builds ecosystem resilience to the adverse effects of climate change and ocean acidification and restores ecosystem integrity;
- (c) Act so as not to transfer, directly or indirectly, damage or hazards from one area to another or transform one type of pollution into another;
- (d) Endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should [, in principle,] bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment;
- [(e) Ensure accountability;]
- [(f) Be guided by the principle of non-regression;]
- [(g) Take into consideration flexibility, pertinence and effectiveness.]

in order 'to ensure the long-term conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction' (Art. 2).

Note:

- Some important principles are missing from the CCZ EMP, such as the Polluter-pays principle; Institutional and procedural cooperation among all actors; Sustainable and equitable use; Responsibility of States as stewards of the global marine environment.
- The principles named in the CCZ EMP differ in wording and to some extent also in contents from the principles of the ISA Strategic Plan and draft regulation 2 'Fundamental policies and principles'. This should be reconsidered when drafting the principles to which all future REMPs should adhere.
- The harmonisation with the principles and objective of the draft BBNJ agreement as well as a consistent interpretation and application will be instrumental to support the long-term conservation and sustainable use of biodiversity in areas beyond national jurisdiction.

2.6.3.5 Vision, goals and objectives

The CCZ EMP is the first and only example for setting out a regional, holistic approach to environmental management in a region of interest to seabed mining in the Area. This is so far the only example where ISA has agreed on a vision, goals, strategic aims and operational and management objectives for an entire region, contract areas and the areas of particular environmental interest, APEIs, which are exempt from mining.

Discussion of CCZ vision, goals and objectives (source: Christiansen *et al.* 2019)

The CCZ vision

The vision contains three elements (§32-34 of (International Seabed Authority, 2011)):

- Sustainable exploitation, while preserving representative and unique marine habitats and species

[50] https://www.un.org/bbnj/sites/www.un.org.bbnj/files/draft_text_a.conf_.232.2019.6_advanced_unedited_version.pdf

- Facilitate mining while a) minimize as far as practically possible the impact of seabed mining activities, and b) preserve and conserve marine biodiversity and ecosystem structure and function in the Clarion-Clipperton Zone
- A holistic approach to regional management, giving consideration to relevant global initiatives a new legislation.

It remains to be evaluated whether this wording is in line with the meaning of Article 145, which obliges ISA to take the necessary measures to '*ensure effective protection for the marine environment from harmful effects which may arise from*' activities in the Area. Questions arise from

- The wording 'sustainable exploitation': what should be sustainable and on what time scale?
- Preserving only representative and unique habitats and species: a license to deteriorating all other places?
- To facilitate mining as a first priority and not conditioned by being able to ensure effective protection.

Normally, conservation visions are framed to lay out the visionary goal which shall be achieved over a period of decades. The timeframe is missing here. And in this case, the development of a new activity is in the focus of the vision, rather than the achievement of a particular environmental state.

The CCZ goals

Also, the goals focus on the exploitation of seabed mineral resources (§35a). However §35 b makes a link to the goals and targets set out in the Plan of Implementation of the World Summit on Sustainable Development (WSSD, 2002), including

- To halt the loss of biodiversity;
- To establish ecosystem approaches to management
- To develop marine protected areas, including representative networks by 2012.

In line with that, the further goals relate among others to the management of the CCZ according to integrated ecosystem-based management, monitoring of effects of mining related tests, cooperative research. The preservation goals are

- To maintain regional biodiversity, ecosystem structure and function across the CCZ;
- Enable the preservation of representative and unique marine ecosystems.

It remains to be investigated whether the regional preservation of biodiversity equals a halt to the loss of biodiversity. According to science, biodiversity loss is inevitable, once commercial mining starts.

The strategic aims

Again, the first aim set out is to 'ensure environmentally responsible seabed mining' ... 'to enable effective protection of the marine environment from activities related to seabed mining' (§36 a). This somehow turns the logic upside down: as the goal and aim must be to ensure effective protection under Article 145. Therefore, mining activities have to be environmentally responsible. Interestingly, here for the first and only time the term 'natural resources of the Area' comes up (§36 e) as a subject for protection and conservation and for reduction of impact. This reduction of impact could be related to pressures other than from mining-related activities, however, this is outside the competence of ISA, yet within the competence of the member states.

The operational objectives

The operational objectives are set out separately for the entire region, the contract areas, and the APEIs. For the region, the objectives are to periodically update the environmental baseline data, to undertake

cumulative EIAs based on exploitation proposals, and to consider the environmental risks for technical developments. This leaves a number of questions:

- So far, no regional environmental baseline has been established that could be updated. When will that happen? (International Seabed Authority, 2016b) set the date of 2018, once the environmental database will be fully operational.
- Cumulative assessments based on exploitation proposals can only be done if ISA is able to extrapolate the potential impacts from commercial mining operations from e.g. the monitoring and assessment results of site-specific equipment and mining system testing during the exploration phase. So far there is no requirement for exploration contractors to carry out tests, or carry out monitoring and assessment in a standardised formate. The so far published draft exploitation regulation versions do not mention an obligate testing phase ahead of applying for an exploitation contract.
- Environmental risks are not only related to '*technological developments in mining technologies*', however if the environmental risks of all currently developed technologies would be systematically investigated, then this would aid greatly the development of 'best available techniques' and in conjunction with application, the 'best environmental practice', BEP.

For contract areas, the operational objectives seem to reflect what ISA can ensure the contractors to do: application of BEP, collection and dissemination of environmental data, guidelines for preservation and impact reference zones, and

- Develop plans to ensure responsible environmental management to enhance the recovery of habitats and faunal communities.

This is interesting, as the objective is not to implement environmentally responsible mining practices, as could be expected, but to enhance the recovery after mining.

Management objectives

Also, the management objectives of the CCZ EMP are set out separately for the region, the contract areas and the APEIs. Across the region, ISA wants to collate the information produced by contractors and other sources, consider cumulative impacts of mining and other human activities and exchange information on new and developing technologies and their environmental impacts (§40).

What is missing here is an environmental assessment of the collated information on a regional scale, including a cumulative impact assessment, resulting in a regional strategic plan which determines management direction based on the overall environmental objectives. The format of a strategic assessment is likely an appropriate tool.

Only one of the management objectives set out for the contract areas relates to environmental protection, namely

- Contractors are required to minimize potential impacts on established preservation zones, and the Authority should consider the potential for impact on established preservation zones in evaluating any application for a mining license (§41 d).

Remarkably, there is no wording on minimising environmental impacts overall, no mention of best available technique and best environmental practice to be developed under active contribution of the contractors, and applied to the region. ISA merely wants to exchange information, but seemingly does not strive to develop standards.

Several broader obligations could also apply to contractors, a.o.:

- To consider the contract area as a loan from mankind which should be safeguarded for future generations;
- To contribute to the achievement of the global targets agreed by the UN (UN General Assembly, 2015), the Convention on Biodiversity (Convention on Biological Diversity, 2012a) and the Paris Agreement (UN Framework Convention on Climate Change, 2015).
- To identify and protect marine protected areas, vulnerable marine ecosystems and/or other ecologically and biologically significant areas within their contract areas according to the criteria of other international and adjacent national agreements and legislation;
- To identify and protect potential marine genetic resources or habitats for such resources;
- To identify and minimise conflicts with the use or protection of natural resources (MGR, fisheries) - so far only 'reasonable regard to other activities' (DR 26) is required;
- To optimise the 'consumption' of minerals, *i.e.* to minimise environmental damage.

Summary

None of the management objectives translates the vision, goals and strategic aims in relation to the preservation of the marine environment into management objectives for ISA and the contractors. This is likely due to the *et al.* and rather unsystematic process in which the EMP was created in 2010, but should be addressed in the future revision of the management plan.

In terms of structure, none of the goals, aims and objectives of the CCZ EMP are SMART: To formulate clear and achievable targets, each one should be:

- **S**pecific (simple, sensible, significant);
- **M**easurable (meaningful, motivating);
- **A**chievable (agreed, attainable);
- **R**elevant (reasonable, realistic and resourced, results-based); and
- **T**ime bound (time-based, time limited, time/cost limited, timely, time-sensitive).

Also, there is no clear hierarchy: The goals should support the achievement of the overall vision. Goals either determine a generic action or an outcome which shall be achieved, and are set out for the longer term. Objectives identify specific action supporting the attainment of a specific goal and should be measureable and tangible in the mid to short term. The review period of an EMP and the time horizon for objectives should coincide. This should be redressed in any review of the CCZ EMP and in the drafting of any new regional environmental management plan.

In the whole document, neither the contractors nor the ISA actions shall aim at an 'effective protection of the marine environment from harmful effects' arising from mining-related activities in the Area. There is also just one cross-reference to the goals of the WSSD at the level of the goals, however the potential contribution of the CCZ EMP to the achievement of the WSSD targets may in the end be limited to the designation of the Areas of Particular Environmental Interest, APEIs, as sectoral closures, as biodiversity loss will likely not be possible to be prevented. This is cynical, in view of the large-scale deterioration of the marine environment to be expected from mining.

2.6.3.6 Regional data availability

One of the main issues that was discussed during the 2010 workshop was the public availability of data on a regional scale. Multiple reasons were identified:

- No regional overview of all available scientific environmental and oceanographic information exists to date on which to build a regional quality status report as an assessment basis which could be updated periodically

- The (environmental section of the) annual reports delivered by the contractors to ISA are not made public. Alternatively, contractors could be requested to compile and review annually an environmental baseline report for their contract area which is to be made public.
- There is no obligation to publish environmental studies carried out in exploration areas
- Not all available data may be delivered to protect investments
- As far as available, data from different contractors cannot be compared as there is no standardised approach to taxonomic identification and nomenclature;
- Contractors have no obligation to investigate environmental baselines outside their contract areas, e.g. in APEIs.

To address the first issue, the ISA Secretariat commissioned the development of a database for environmental data and environmentally relevant documents. The database was finally presented to ISA delegates in July 2019.[51] However, as of July 2020, crucial information is missing from the data base or not available.

In order to improve the harmonisation of taxonomic identification by contractors and science, three ISA workshops were held focusing on benthic mega-, macro- and meiofauna in 2013-2015,[52] another workshop planned for fall 2020.[53]

As of 2020, still no ISA regional environmental assessment or even data report for the Clarion-Clipperton Zone exists and it is unclear in how far the comparability of the environmental baseline studies of contractors has progressed. Should this problem not be solved prior to the first application for exploitation, a fair and accountable prior assessment of plans of work as well as cumulative impact assessments will be impossible.

Note:

- The lack of regional data availability and comparability is still a major impediment to developing a transparent and reliable environmental baseline for the CCZ region.
- There is no structured approach to determine gaps or to develop scientific programmes in the region, although recent research has provided some very important new information on the ecosystems potentially affected by mining.

2.6.3.7 Cooperation with other competent bodies

Subsequent to the adoption of the CCZ EMP, the ISA Secretariat has expanded its cooperation with a number of competent bodies and stakeholder organisations. It concluded an agreement of cooperation with the International Hydrographic Organization (2016), the International Maritime Organisation (2016), and Memoranda of Understanding with the International Cable Protection Committee (2009), OSPAR (2011), the South Pacific Community (2015), the Intergovernmental Oceanographic Commission of UNESCO, and World Maritime University (2019).

The agreements set the framework for inter-organisational cooperation, e.g. with respect to data delivery and practical cooperation. One practical cooperation exists on the initiative of the International Cable Protection Committee, ICPC, addressing potential conflicts between already existing long-range cables in some nodule exploration areas in the CCZ. Two workshops in 2015 and 2018 have explored practical options for the Implementation of the 'Due Regard' and 'Reasonable Regard' obligations under UNCLOS (International Seabed Authority, 2015b, 2019a).

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[51] https://data.isa.org.jm/isa/map/

[52] https://www.isa.org.jm/workshops

[53] https://www.isa.org.jm/event/workshop-deep-sea-taxonomic-standardization-strategic-approaches-collaboration

The assessment of cumulative environmental stresses and impacts is one field where cooperation with all stakeholders in a region is essential. Two others are potential resource-use conflicts and different aims for the protection of the environment (Jaeckel, 2015). It remains to be elaborated, whether other competent bodies would like to get involved in ISA REMP development, and how their activities and environmental effects could possibly be integrated into a holistic assessment of regional pressures and impacts. The legal and practical challenges inherent with such cooperation are discussed in (Matz-Lück and Fuchs, 2014). On the other hand, (Ardron *et al.*, 2014; Wright and Rochette, 2019) show the necessities for and opportunities of putting the current sectoral activities in an 'overarching framework to ensure structure, consistency and coherence' (Tladi, 2011, quoted in Wright and Rochette, 2019).

Note:

- So far, no experience exists as to the mechanisms which would facilitate practical cooperation among independent international management bodies for mutual benefit under the auspices of ISA;
- Cooperation is also required within the scope of the negotiations for a ILBI/BBNJ which requires States Parties to cooperate for the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, including through strengthening and enhancing cooperation among existing relevant legal instruments and frameworks and relevant global, regional and sectoral bodies in the achievement of the objective of this Agreement (Art. 6).
- The environmental regime of the Area and of the high seas should be harmonised by way of institutional cooperation.

2.6.3.8 APEI network and adjacency to exploration areas

Together with the Preservation Reference Zones, PRZ[54], to be set aside by the contract holders within their contract area, networks of 'Areas of Particular Environmental Interest', APEIs (an ISA term for areas which are set aside by the ISA from contracting for exploration and exploitation for a certain time until renewal) are considered to be a precautionary measure to protect the biodiversity of the Clarion-Clipperton Zone from the expected cumulating widespread and long term effects of mining (Wedding *et al.*, 2013).

Ideally, these APEIs are representative of the full range of biodiversity and shall ensure the maintaining of sustainable, intact and healthy marine populations in the planning region (Wedding *et al.*, 2013 ; Wedding *et al.*, 2015). For this purpose, the allocation of mining-free areas would have to take place ideally prior to concluding the first contracts for exploration.

In the case of the CCZ, the APEI network had to be situated after the majority of contracts were concluded - and in spite of severe deficits in scientific knowledge, as exploration and other investigations had concentrated on those parts of the CCZ were the densest nodule cover was likely. The APEI network in the CCZ turned out to be not representative of the overall biodiversity (Vanreusel *et al.*, 2016). The designation of two further APEIs was recommended (ISBA/22/LTC/12, Section VI, 19). As mentioned above, in October 2019, a scientific update and revisit of the APEI network in the CCZ has taken place.[55]

The APEI network shall cover a representative proportion of the biodiversity in the overall CCZ. While this in itself is a highly ambitious undertaking given the knowledge gaps, this is also subject to scale:

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[54] International Seabed Authority, 2018. Design of IRZs and PRZs in deep-sea mining contract areas. Briefing paper 02/2018. Kingston, Jamaica, pp. 1-8.

[55] https://www.isa.org.jm/event/deep-ccz-biodiversity-synthesis-workshop

the higher the resolution of scientific mapping, the higher is the diversity of habitats and species discovered, even in this relatively unlimited ecological space. Therefore, future reviews will have to consider the knowledge gains, ideally based on a predictive habitat map of contractor areas and the region as a whole.

To be more comprehensive, the coverage of the APEI network should be broadened to include also designated and potential 'Ecologically and biologically significant areas', EBSAs, created according to the criteria of the Convention on Biodiversity, CBD, habitats and species which are to be protected from the impacts of deepwater fishing, acc. to the criteria of (FAO, 2009) for 'Vulnerable marine ecosystems', VMEs, and other designations for the protection and conservation of marine biodiversity. The criteria include uniqueness, rarity, sensitivity and vulnerability of habitats, species and ecosystems to the effects of human activities (list of measures in ISBA/24/C/15). Such areas should be explicitly disapproved for exploitation based on Article 162(2)(x) in order to prevent serious harm (see discussion in Jaeckel, 2015).

Note:

- The designation of a network of APEIs subsequent to concluding exploration contracts for major parts of a region will likely lead to a distribution of sites which cannot represent the overall biodiversity of the region. This requires an adaptive scheme of optimising the placement of APEIs over time, in particular once a more realistic idea of the extent of mining effects will be known;
- Prior to engaging in contracts for exploitation, all possible means to designate a network of representative and autark mining-free areas have to be taken. This could include the consideration of relinquished areas and appropriate parts of the former exploration areas;
- It needs to be investigated whether such a network of APEIs will be successful to ensure the prevention of loss of biodiversity, including ecosystem functions and services once mining will start. Despite all associated uncertainty as to the biological variables, prior modelling of potential mining effects and the possible effectiveness of APEIs is crucial to designing further measures as part of the regional EMP;
- The suite of representative sites should be complemented by priority sites, species and habitats for conservation, such as indicated by the criteria of CBD, FAO and other organisations, including regional conventions.

2.6.3.9 PRZ/IRZ selection and designation

Exploration contractors of the ISA are obliged to designate Preservation (Control) Reference Zones, PRZ, and Impact Reference Zones, IRZ, in their exploration areas at the latest when they conduct an *in situ* test of mining equipment or systems (ISBA/25/LTC/6; Part C, 38(o)). Despite the proposals for clear objectives and detailed guidance on how to designate these zones provided by a workshop in 2017 (International Seabed Authority, 2018b), the related recently updated LTC guidance for contractors (International Seabed Authority, 2020) does not specify the selection criteria, methods to be used or size and other qualities apart from the similarity of species inventory between impact reference zone (*i.e.* mining area) with preservation reference zone. The PRZ shall serve to describe the long term natural background situation in the contract area/the testing area against which any environmental changes caused by the mining tests as measured in the IRZ can be identified and assessed (Billett *et al.*, 2019b; Jones *et al.*, 2018). As such, PRZ shall remain free of mining-related changes, however, as a monitoring tool they cannot be counted as APEIs. And due to the distance of APEIs from contract areas, PRZ cannot be located in APEIs or APEIs cannot replace the designation of PRZ (Lodge, 2011). Some of the contractors, however, aleady voiced concern over permanent PRZ designations, as this would limit their options to locate mine sites within a given area, e.g. the exploration area.

Note:

- PRZ are a contractor management tool to demonstrate to ISA the effects of mining-related activities;
- PRZ will likely not suffice the same design criteria as APEIs as regards size and independence of habitats and communities from external exchange;
- Compulsory design criteria are urgently needed to ensure comparability among contractors, sufficiency with regards to effectiveness and statistical robustness;
- Compulsory monitoring standards need to be established.

2.6.3.10 Stakeholder engagement and transparency

The CCZ EMP was elaborated in an *ad hoc* manner during a workshop in 2010. The 33 participants to this workshop were invited by the ISA Secretariat and comprised LTC members, contractors, legal and scientific experts, member States, IUCN and OSPAR representatives.[56] The proposed plan was later modified by the LTC and adopted by the Council without further consultation of regional stakeholders. The EMP itself has never been published as a document for public download but kept as a LTC document up for periodic review. However, several publications discussed and reported of the adoption of the CCZ EMP (Jaeckel, 2015; Lodge *et al.*, 2014; Lodge, 2011).

The only phase that was relatively transparent (to scientists) was the scientific work towards developing a network of later-called APEIs in the Clarion-Clipperton Zone. The scientific proposals appeared as ISA Secretariat documents for LTC on the website. However, a systematic communication with the public and science communities did not take place.

Since 2010, little progress can be noted in the ISA´s approach to scientific research and advice. One of the priority tasks of ISA is to promote and encourage research in the Area, and to coordinate and disseminate the results in particular prior to the start of the exploitation phase (UNCLOS Art. 143(2) and Implementing Agreement). However, instead of pursuing such active approach to research, ISA takes advantage of externally initiated and funded projects (EU Atlantic REMP Project, Deep Clarion-Clipperton Zone (CCZ) Project, University of Hawaii) or relies on exploration contractors, in particular for developing REMPs in the Pacific, Indian and South Atlantic Ocean. Due to a lack of regional baselines (see above) and gap analyses, an invitation-only strategy of involvement of science and a lack of science advisory channels and in fact definition of its role, the influence of independent research on the development of REMPs remains intransparent and not systematic. One of the effects is that well-funded, exploration-driven research programmes are prioritised over an effective participation of developing states and the development of cooperation programmes.

[56] the WWF observer attended upon request.

Note:

- There was no transparent and accountable process of stakeholder engagement when developing the CCZ EMP;
- A stakeholder engagement strategy, including the establishment of stakeholder inventories, determination of communication routes and type of interaction is still missing;
- A strategy enabling science to provide systematic and contractor-independent advice, as well as an active research strategy are missing.

2.6.3.11 Operationalisation of the ecosystem approach to management

Does the CCZ EMP effectively implement the principles of an EAM? The CCZ-REMP does in fact comprise explicit elements related to the application of ecosystem approaches as a way for management. For example, in Section IV, a goal of the REMP is to manage the CCZ consistent with the principles of an ecosystem approach to management and to contribute to the targets of the Plan of Implementation of the World Summit on Sustainable Development. Yet, the vision adopted *'to facilitate mining while minimizing as far as practically possible the impact of seabed mining activities, and preserving and conserving marine biodiversity and ecosystem structure and function in the Clarion-Clipperton Zone'* breaches the foundation of the ecosystem approach which is to permit activities only to such an extent as the expected effects do not cause long-lasting and irreversible ecosystem change.

Neither elements nor principles for operationalising the ecosystem approach are mentioned. Therefore, neither contractors nor regulators have an explicit guidance as to how to implement management decisions within this framework, which has among its priority principles:

- The conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach;
- Ecosystems must be managed within the limits of their functioning;
- The ecosystem approach should be undertaken at the appropriate spatial and temporal scales;
- Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term;
- Management must recognize that change is inevitable;
- The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity (Secretariat of the Convention on Biological Diversity, 2004, see further in chapter 4.1).

Overall, the CCZ EMP was not created with these principles in mind: the boundaries of the region were set pragmatically and do not follow ecological units (see chapter 4.2.1.1). The few elements of the management framework (e.g. cumulative effects assessment, APEIs) remain strictly sectoral, and ecosystem functions and services do not appear as criterion or value. The CCZ REMP does not fulfil the most basic requirement of the ecosystem approach to management: uncertainties and gaps in knowledge are not actively addressed. Not even a summary report of the regional environment exists and neither scientific nor (the undisclosed) contractor investigations provide a sufficient baseline knowledge on the region to be used for assessing any natural or man-made changes. A lack of information generally and on potential cumulative impacts in particular may also compromise the establishment of an efficient monitoring and assessment program by the LTC. According to the CCZ EMP, 4(c) the LTC is responsible for making *'recommendations to the Council regarding the establishment of a monitoring programme to observe, measure, evaluate and analyse, by recognized scientific methods, on a regular basis, the risks or effects of pollution of the marine environment resulting from activities in the Area'*. Neither transparency of data, information and decision-making, nor full stakeholder participation in the elaboration of measures are practically implemented.

Nonetheless, the only operational management instrument of the CCZ REMP, a network of nine Areas of Particular Environmental Interest (APEIs) currently exempt from exploration, and created with the aim to provide biodiversity reserves for populations under threat from mining activities, can be considered to be an attempt to fall in line with an ecosystem approach, using the tool of spatial planning. The locations of these APEIs are, however, currently not fully representative of the region[57], as the locations of existing exploration contract areas took priority over representativeness.

2.6.3.12 Making the CCZ EMP an effective management instrument

So far, the CCZ EMP lacks the elements to make it an effective management tool. No regional, subregional or other environmental baseline exists against which to assess change from multiple sources, including climate change. So far, no attempts have been made to draft the structure of a regional monitoring programme, for example in collaboration with other regional actors, to analyse and evaluate the risks of serious harm. In particular, no thresholds for determining the risk of serious harm to all or specific components of the ecosystems in the region, subregion or parts of it are defined, nor are any actions as a consequence of such a risk being determined. In particular, guidelines for the application of the precautionary approach are needed.

Despite the revision clause of 5 years, the plan is not really adaptive except for adjusting the location of APEI network. APEIs, however, need to be in place and monitored long term to be operational. Additional measures supplementing the APEI network do not exist but should be included in any new EMP based on the new scientific environmental knowledge gained.

Note:

- The CCZ EMP lacks an environmental baseline[58], monitoring and/or research programme and thresholds for determining the risk of serious harm on various scales and consequent action by ISA and contractors;
- Oversight to ensure consistency of contractor environmental studies and data deliveries is required to enable regional integration of information.
- Activity-based measures and controls need to supplement the precautionary spatial measures
- The revision of the EMP should allow for adapted measures based on new knowledge gained;
- Thresholds and measures must be binding for ISA decision-making and/or contractors, respectively.

2.6.4 Lessons learned and action required

In summary, the CCZ EMP is a welcome first step towards a comprehensive management plan to safeguard the marine environment at regional scale. However, this primer so far lacks the core elements of an effective management plan, such as an environmental baseline, monitoring and/or research programme as well as indicators and thresholds for determining the risk of serious harm on various scales and consequent action by ISA and contractors. Oversight to ensure consistency of contractor environmental studies and data deliveries is required to enable regional integration of information. Activity-based measures and controls need to supplement the precautionary spatial measures. Thresholds and measures should be binding for ISA decision-making and/or contractors, respectively. The revision of

[57] see recent assessment a reported from Deep CCZ Biodiversity Synthesis Workshop, Friday Harbor, 1-4 October 2019: available at https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/deep_ccz_biodiversity_synthesis_workshop_report_-_final.pdf

[58] but see unpublished review delivered as background report at CCZ workshop 2019. Short version see https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/background.pdf

the EMP should allow for adapted measures based on new knowledge gained. Overall, it seems that there is a lack of a body responsible for supervision and direction of the further development and operationalisation of the management plan.

Several specific actions have been identified in the CCZ EMP to be carried out by the ISA Secretariat or contractors, respectively. A review of progress in the implementation of these actions (Seascape Consultants ltd., 2014; ISBA/22/LTC/12, Section IV), and progress to date has shown that some of the actions take much more time than anticipated (e.g. database establishment) and others are not yet timely, as so far no exploitation is imminent (cumulative impact assessment, contractor environmental management plans).

However, some of the envisaged, but not completed actions would have been of major importance for progress on the development of a regional environmental baseline in the Clarion-Clipperton Zone, such as

- The compilation of a first comprehensive environmental quality status report of the region based on knowledge and data from all available sources, including a gap analysis and an outlook for future changes under climate change scenarios;
- The design of a regional monitoring programme, supplementing the baseline studies of the individual contractors and enhancing the harmonisation of investigation methods and goals;
- The establishment of a regional inventory of stakeholders and of human activities in the region, including potential environmental effects;
- Developing ideas as to how best to involve other competent management bodies, science and stakeholders, such as through a regional advisory body, external expert advice and consultation;
- The development of the institutional preconditions and processes to carry out a Strategic Environmental Assessment delivering the information on measures required to fulfil Art. 145;
- The setting up of expert groups to provide technical advice on e.g. cumulative effects assessment, setting of monitoring standards, overall assessment guidelines, identification of indicator organisms and mechanisms, as well as of knowledge gaps;
- The development of a regional reporting format and transparency criteria, as well as a stakeholder engagement strategy.

No progress has been made to date also with regards to developing the areas of particular environmental interest into internationally accepted marine protected areas beyond national jurisdiction in a collaborative effort together with the Convention on Biological Diversity and the Food and Agriculture Organization of the United Nations (ISBA/22/LTC/12, Section IV, 11). This action could have set a precedent for a mechanism of cooperation among international bodies and ensured that the ISA APEI network contributes to the global conservation targets.

In addition, it should be considered to upgrade the current CCZ EMP to an effective management instrument by complementing the missing elements and ensuring that at least some elements limiting mining-induced environmental change will have a binding effect on ISA and contractors. Ideally, it would be developed to become a holistic instrument of environmental assessment and management for 'areas beyond the limits of national jurisdiction', the high seas and the Area.

3 Options for establishing and maintaining REMPs in a standardised procedure

While the respective REMPs are expected to be unique and different from each other (to some extent), taking into account the region-specific needs, there are numerous reasons, however, why each REMP should undergo a similar process. First, there is a need to ensure a level-playing field in the Area. Thus, while there is a need for special consideration to region-specific needs, all REMPs shall be subjected to the same level of attention and scrutiny. This is particularly the case with respect to the treatment of similar resources in different regions. Second, the level of transparency and opportunities for stakeholder participation should be the same for all REMPs, and it should be highly transparent and widely inclusive. While the exact constellation of stakeholders may differ from region to region, however, the general characteristics of such stakeholders (e.g. scientists, civil society, interested states, and representation from adjacent coastal states) shall be preserved. This ensures good governance, legitimacy and accountability. Third, there is a need to ensure that REMPs are based on best available scientific and other information. This includes the need to ensure that all REMPs are subjected to regular updates and synced to reflect new developments in scientific knowledge. This allows for necessary measures to be taken based on an appropriate assessment scheme. Finally, a standardized approach allows for consistency and comparability across all REMPs. In this regard, the use of a standardized 'Template' that would apply to all REMPs is particularly useful and necessary. The scientific and technical contents of a REMP would be discussed in the chapter 4.

There appears to be four stages in REMP development that require streamlining: the roles in the design process, adoption, implementation and review.

3.1 Design

As a starting point, the process to identify the need for the development of REMPs should commence with the LTC and the Council. In fact, this already seems to be the practice with the Council having identified priority areas (ISBA/25/C/13). Other organs of the ISA (the Assembly or Secretariat), as well as Sponsoring States (existing or prospective) and Observer members, may bring to the attention of the Council the need for a particular REMP development.

Once the Council has determined the need for a specific REMP to be developed, the Council has several potential options:

[1] Task a newly established subsidiary organ (e.g. the 'Environment and Scientific Committee (ESC)') to take charge of the REMP development process

[2] Task the Legal and Technical Commission (LTC) to take charge of the REMP development process

[3] Directly establish a REMP *ad-hoc* expert group to take charge of the REMP development process

Option [1] presupposes the necessity of establishing a dedicated subsidiary organ for all environmental and scientific matters (*i.e.* not just REMP related). UNCLOS provides the foundation for the creation of additional subsidiary organs on a needs-based basis.[59] Such a committee could work in conjunction with the LTC (e.g. a dedicated sub-set of the LTC) or in parallel with it. The functions and mandates of a new subsidiary organ need to be clearly defined and be in conformity with the framework of UNCLOS and the 1994 Implementation Agreement, so as to not contradict existing structures or arrangements. Under Option [1], once the ESC (or a similar newly-created subsidiary organ) has been tasked by the Council to develop the REMP, the following two options arise: [a] that the ESC establishes a dedicated

[59] See Article 158(3) of UNCLOS; see also Section I to the Annex of the 1994 Implementation Agreement.

ad-hoc expert group to take charge of the REMP development process; or [b] that the ESC itself takes charge of the REMP development process. Option [1b] may not be optimal, given that the ESC should comprise of approximately 15 individuals[60] with broad environmental and scientific expertise, whereas under Option [1a], a dedicated *ad-hoc* expert committee would allow for wide-range candidates (*i.e.* non-ESC members) to be considered – particularly those with region-specific expertise in the region under consideration for a REMP development process. If Option [1a] is pursued, Member States should be permitted to make nominations of qualified experts with region-specific expertise. An optimal number for the *ad-hoc* expert group is approximately 4-6 persons, acting in their individual capacity, with qualifications in especially the following fields: oceanology, marine biology, marine geology, and spatial planning. As far as possible, there should be no more than two or three members of the ESC/LTC in the *ad-hoc* expert group. It is important to note here that as the REMP is expected to be based on the best available science, other interest groups such as contractors or NGOs representatives should not be nominated as members of the *ad-hoc* expert group. The rationale for this is that the REMP design is strictly based on science and expert knowledge, with the assurance that all stakeholders (including adjacent coastal states, academic groups, civil society and industry) will be actively consulted and engaged at a later stage once the *ad-hoc* expert group is formed.

Under Option [2], a new dedicated subsidiary organ such as the ESC is assumed to be non-existent. Under this scenario, once it is tasked by the Council to take charge of the REMP development for a particular region, the LTC will face the same two options as above: [a] that the LTC establishes a dedicated *ad-hoc* expert group to take charge of the REMP development process; or [b] that the LTC itself takes charge of the REMP development process. Similar to the above, Option [2b] is not ideal with the LTC's current composition of 30 members, with only a small percentage of members having expertise other than law and geology. As such, Option [2a] should be given more consideration, with nominations of qualified experts with region-specific expertise being accepted from Member States to form a core group of 4-6 persons as the *ad-hoc* expert group.

Pursuant to Option [3], the Council directly establishes the *ad-hoc* expert group, upon receiving nominations from Member States, to take charge of the REMP development process. The same requirements as above apply, *i.e.* 4-6 persons acting in their individual capacity, with a background in oceanology, marine biology, marine geology and spatial planning, and possessing region-specific expertise. Likewise, there should be no more than two or three members of the LTC in the *ad-hoc* expert group.

Considering the above options, it would appear that there is no political will at the moment to establish a new subsidiary organ on environmental and scientific matters. As such, Option [1] appears to be beyond reach. Moving on to Option [2] and specifically, between Options [2a] and [2b], the former is preferred, given that a dedicated *ad-hoc* expert group would function more efficiently and effectively, as opposed to the LTC as a whole. However, given that the LTC already has a heavy workload, Option [3] seems to be the most attractive one. As will be explained below, however, even if Option [3] is chosen, the LTC will still remain as the organ that makes the recommendation to Council – in accordance with the structures and arrangements under UNCLOS.

Once the *ad-hoc* expert group has been formed, be it under Option [2a] or Option [3], and has accepted its terms of reference, it shall commence work on the design of the REMP. Members of the *ad-hoc* expert group shall meet as many times as necessary, remotely or in person, and carry out all steps required for developing a draft REMP. After the completion of preparatory works and steps, an overview of its preliminary findings should be presented to and discussed with scientific experts, potential contractors and regional stakeholders, in particular adjacent coastal States, through a specialized workshop. Building on an overall agreed description of the environmental situation for the region, a stakeholder-inclusive process shall agree on a regional environmental vision, objectives and targets. This sets the background for a second workshop, which should focus on setting the management direction

[60] This number is premised on Article 163(2) of UNCLOS, but may be increased if deemed necessary.

for the resulting environmental management plan. All proposed associated measures need intensive consultation with all stakeholders both in writing and in workshop-style.

As soon as the above process has been completed, the *ad-hoc* expert group shall prepare the first draft of the REMP and provide it for open consultation. The *ad-hoc* expert group shall then promptly prepare a comprehensive report, detailing the comments that it has received and the appropriate responses, and prepare a revised draft of the REMP if necessary. The revised draft of the REMP, alongside the comprehensive report, shall then be transmitted to the LTC. The LTC shall consider the draft REMP and the report prepared by the *ad-hoc* expert group, with a view to make a recommendation to the Council. In its recommendation, the LTC shall provide reasons behind its recommendation, and in particular explain the parts where it differs from the views of the *ad-hoc* expert group, if any. Alternatively, it is also possible for the LTC to receive the first draft of the REMP from the *ad-hoc* expert group and to provide it for open consultation itself. However, it would be best to allow the dedicated *ad-hoc* expert group to consider comments made on the draft it had prepared first, as this group is the creator of the document.

It is important to note that the Secretariat, being the administrative organ of the ISA, shall assist the *ad-hoc* expert group in facilitating its work throughout the process where necessary. The Secretariat shall also actively participate in the substance of the work (e.g. attend workshops, provide data, and contribute valuable input such as the performance of other REMPs and measures proven successful that have already adopted) of the expert group once it is established. While the Secretariat may make recommendations of suitable experts for the *ad-hoc* expert group based on its experience from previous occasions, it shall not take charge of the process of appointing members to the expert group.

3.2 Adoption

Upon receiving the recommendations from the LTC, the Council shall take up the matter at its next session. Upon deliberation, as provided under the UNCLOS and the 1994 Implementing Agreement, all efforts shall be undertaken to ensure that the REMP is adopted by consensus. If all efforts to do so are unsuccessful, the Council could either proceed to vote, or to defer the matter to facilitate further negotiations and deliberations. In the case of a vote, this being a matter of substance, a decision 'shall be taken by a two-thirds majority of members present and voting, provided that such decisions are not opposed by a majority in any one of the chambers' as prescribed in Section III of the Annex to the 1994 Implementing Agreement. Of course, the Council may elect to send the matter back to the *ad-hoc* expert group or the LTC, as the case may be, for reconsideration (and possibly even to require the convening of a third workshop), if it deems this to be necessary.

3.3 Implementation

Implementation of REMPs can be approached in a multitude of ways, in particular through the Exploitation Regulations, Standards and Guidelines, as well as other rules, regulations and procedures of the ISA. The first two mediums are already the subjects of consideration at present. One alternative approach to give effect to the implementation of REMPs that is perhaps worthy of contemplation is to do so through a separate set of regulations, specifically dedicated to REMPs. Under this approach, while REMPs will continue to be referenced in the Exploitation Regulations, the main 'enabling' instrument will occur outside the Exploitation Regulations. This will give a stronger impression to REMPs, and enable it to cover other activities in the Area, such as prospecting and exploration. Moreover, as the matters in the Exploitation Regulations are more on the operative aspect (*i.e.* moving towards exploitation and actual exploitation), it might be more appropriate to address an important topic like REMPs outside of the Exploitation Regulations. Thus, there may be some added value if REMPs were given dedicated treatment. Further, a REMP should also include performance metrics (e.g. indicators) in which the scientific and technical criteria set out in the REMP can be assessed against. The *ad-hoc* expert

group can be tasked to periodically oversee the performance of REMPs during its operation and make any report to the LTC, if necessary.

3.4 Review

Each REMP should be subjected to a uniform review procedure, e.g. every 5 years. The body responsible for developing the REMP should be established permanently and be responsible for collecting new information until the next review of the REMP, including the assessment and review process. The review includes in substance an updated baseline description of the region, an updated environmental impact and risk assessment in view of the REMPs´ goals and objectives, and eventually a revision of the measures agreed in the previous plan (see also chapter 4.2.4). This material, together with an identification of the key matters shall be published for public consideration, and inputs from this process will be compiled. The matter will then be taken up at a workshop to ascertain the performance of the REMP, identify shortcomings, and determine measures for improvement, based on the public consultation. If necessary, a second workshop can be held to follow up on this. The *ad-hoc* expert group shall then prepare a report and a draft review of the REMP, and forward this to the LTC. The LTC will then consider the said report and draft review, and make its recommendations to the Council. In its recommendation, the LTC shall provide justifications for its recommendation, in particular explaining the parts where it differs from the views of the *ad-hoc* expert group (if any). The Council shall consider the said recommendation and adopt the draft review following the same process as the initial REMP was adopted.

Other than the periodic review, there should also be certain events that could trigger an early review. This includes the issuance of an emergency order that relates to a site within the region, request by another organ of the ISA, submission of substantial new environmental knowledge or data for the region, the occurrence of any major environmental change in or affecting the region (e.g., a natural or anthropogenic disaster); the relinquishment of areas previously under contract within the region, as well as the submission of a new application for a plan of work for exploitation in the region involving a new resource category in the relevant area. In any case, it is the Council that decides if an early review is necessary.

Finally, the *ad-hoc* expert group should, with the assistance of the Secretariat, monitor any developments with respect to the particular region, such as the publication of any new scientific literature, as well as environmental data submitted by contractors in their annual reports. In this regard, *ad-hoc* expert groups should also prepare annual reports, and this should feature in the Secretary-General's annual report. The periodic review under Article 154 of UNCLOS should cover this in the review process and report on its performance.

3.5 Financing

Clearly, the work of the *ad-hoc* expert group and other organs such as the LTC will require extensive funding. In particular, the need for the *ad-hoc* expert group members to meet regularly at the initial stage, as well as the organization of workshops and engagement with stakeholders, require financing. In this regard, the ISA shall actively make calls for contribution and issue invitations for collaborations with existing projects or potential funders (e.g. European Commission, other international scientific organizations). A voluntary trust fund could also be set up for this purpose, whereby Member States, observers, contractors and other stakeholders can make contributions. As several REMP-related workshops have been held in the past, the options highlighted here does not seem to impose a much higher financial burden than current practices.

4 Systematically developing the contents REMPs

4.1 Introduction

4.1.1 REMPs and the ecosystem approach to management

Regional environmental management plans, REMPs, are ISA instruments to operationalise its mandate to provide for effective protection of the marine environment from harmful effects caused by mining-related activities. Effectively, REMPs shall apply the ecosystem approach to management, EAM, in the regions defined (see chapter 2.5). ISA acts as regulator, planning and management authority.

EAM has been recognized and advocated by many global organizations (Convention on Biological Diversity, 2004, 2012a; FAO, 2003; UN General Assembly, 2006; WSSD, 2002), and regionally progressed for example in the European Union based on science advice and extensive stakeholder consultation (EU MSFD2008b; ICES, 2005). More recently the number of countries applying the ecosystem approach has been recognized as an indicator for target 14.2 of Sustainable Development Goal 14, to *'sustainably manage and protect marine and coastal ecosystems'* (UN General Assembly, 2019).

The high levels of uncertainty associated to mining minerals in the Area have led the ISA to commit to implementing a precautionary approach and an ecosystem approach, e.g. in the mining code under development and in its management instruments, such as Regional Environmental Management Plans (REMPs). More specifically, the ecosystem approach was given as a management goal to be reached by the CCZ-EMP (International Seabed Authority, 2011), and as a means to *'Provide for the effective protection of the Marine Environment from the harmful effects'* during exploitation.[61]

Although globally approved as the concept of choice to advance the sustainability of human activities in the ocean and overall, as committed to under the 2030 Agenda, the ecosystem approach itself is not clearly defined, and lacks a standard way of implementation (Langlet and Rayfuse, 2018; Tallis *et al.*, 2010). The ecosystem approach embraces several types of approaches, guidelines, principles, methodologies and frameworks that can be combined to pursue management objectives (Long *et al.*, 2015). It can be applied to several contexts (Arkema *et al.*, 2006; Tallis *et al.*, 2010) and care should be taken in order to not generalize its application and jeopardize its practice (Long *et al.*, 2015).

The most important overall thought is the necessary change in management philosophy, as indicated already in the Malawi Principles (1998),[62] from sectoral to systems thinking, and from consideration of pressures only to consideration of effects in an ecosystem context. The inclusive nature of the ecosystem approach to management, and in particular the procedures of a strategic assessment, shall provide all persons involved with a systems view on the particular area/region, furthering the prior-to-action understanding for the overall extent of pressures and impacts, potential use conflicts, and the natural limits of the ecosystems. In practical terms, EAM set the terms for

- Achieving generic (in the case of ISA sectoral) planning decisions on regional level guided by long term objectives, which are ideally developed and agreed with stakeholders;
- Transparency and integration of stakeholder values;
- Assessment and mitigation of user conflicts;
- Integration, consideration and reconciliation of all relevant aspects of mining operations (economic, social and ecological)

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[61] International Seabed Authority, 2019. Draft Regulations on Exploitation of Mineral Resources in the Area. ISBA/LTC/25/WP.1. https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/isba_25_c_wp1-e.pdf

[62] In a Workshop on the Ecosystem Approach (Lilongwe, Malawi, 26-28 January 1998), whose report was presented at the Fourth Meeting of the Conference of the Parties to the Convention on Biological Diversity (Bratislava, Slovakia, 4-15 May 1998, UNEP/CBD/ COP/4/Inf.9), twelve principles/characteristics of the ecosystem approach to biodiversity management were identified, later adopted by CBD COP in 2004 (see 2.4.2).

with a view to ensure sustainability, maintain ecological health while recognizing the human needs and integrate economic factors, taking account of ecosystem complexity, ecosystem dynamics and appropriate temporal and spatial scales, recoverability, values of ecosystem goods and services and uncertainty (Arkema *et al.*, 2006).

At the heart of the ecosystem approach to management is the recognition of uncertainties in the knowledge on which decision-making is based. This should result in decisions which err on the side of precaution, and a management system which is adaptable to new knowledge and experience. Therefore, good governance would establish REMPs which are organised in comprehensive management cycles based on the principles referred to in section 2.5.2 and the following governance characteristics:

- Management action aims at long term environmental sustainability;
- All prevailing impacts on the environment are considered together and assessed with respect to environmental goals to be reached, *i.e.* thresholds not to be passed;
- Preventive action (SEA, EIA, precautionary thresholds) reduces the likelihood of unacceptable environmental harm;
- Uncertain management outcomes are addressed by adaptive management, in cases of non-irreversible harm;
- The cost of environmental harm rests with the polluter;
- All of the stakeholder constituency is addressed and included;
- Transparency and participation of stakeholders ensure accountability;
- Decisions are taken based on best available scientific and other knowledge;
- All approved operations employ [certified] Best Environmental Practices and Best Available Techniques.

Cormier (2019) distinguishes the ecosystem approach a) to governance, acting through policy making, b) to management, through protection and conservation objectives, and c) the operational ecosystem approach which delivers the operational control of activities and therefore the effective outcome of the governance regime. All three are important in context with developing REMPs.

4.1.2 The role of Strategic Environmental Assessment

Strategic assessment (SEA) is one of the main procedures applied for systematically assessing and seeking to avoid/reduce/mitigate the potential environmental (social and economic) consequences of proposed or planned actions on the level of policies, programmes and plans. The second main objective of SEA is to seek stakeholder participation and therefore a social license. Other than EIAs, SEA is a proactive process which aims to anticipate the environmental impacts of particular plans, programmes and policies rather than react to the likely environmental effects of specific projects. Therefore, the SEA investigates ideally the policy/plan/programme together with stakeholders while it is still under development and can be adjusted.

One of the main international legal instruments on SEA is the Protocol to the Espoo Convention (Kiev Protocol, 2003) which defines SEA as

'the evaluation of the likely environmental, including health, effects, which comprises the determination of the scope of an environmental report and its preparation, the carrying- out of public participation and consultations, and the taking into account of the environmental report and the results of the public participation and consultations in a plan or programme' (Article 2.6).

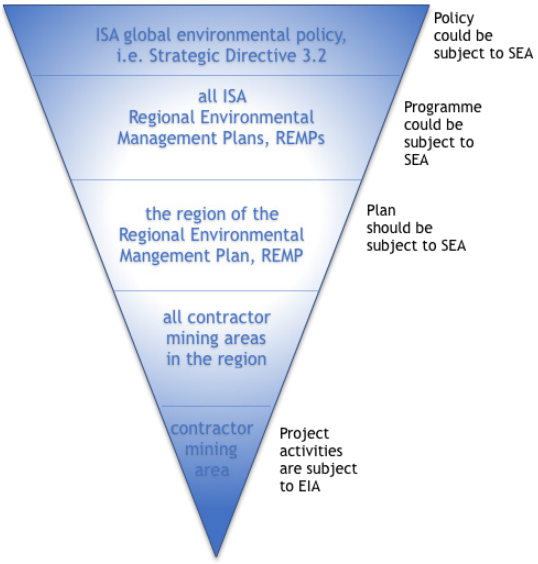
Consequently, the Protocol distinguishes several stages from screening of the need for SEA, to making arrangements for consultation and decision-making on relevant information to be included in the environmental report during scoping, to the contents of the environmental reports as in its Article 7 and Annex IV. Public information, consultations and transparent response, as well as consultations with national and neighbour State authorities have a high weight. Decision-making shall take due account of

- The conclusions of the environmental report;
- The measures to prevent, reduce or mitigate the adverse effects identified in the environmental report; and
- The comments received in accordance with articles 8 to 10 (the consultations).

Unforeseen adverse effects shall be recognised through a monitoring scheme, the results of which shall be published.

Although the Espoo Convention and its SEA Protocol are only binding on its member States and the listed activities do not refer to deep seabed mining, nonetheless the structure and intent could be a helpful guidance for ISA to develop its REMPs. The individual regional management plans in the different ocean basins are plans which stand in context with a REMP programme worldwide, based on ISA´s global policy (see also **Fehler! Verweisquelle konnte nicht gefunden werden.**): The REMP aims at a management level which includes the individual ISA project level under contractor responsibility, and integrates the whole of the contractor level in a broader regional vision. ISA therefore acknowledges that the multitude of exploration contracts may lead to a multitude of exploitation sites within one region, which is likely to cause significant adverse effects on the local and regional environment. SEA is an appropriate tool to assess cumulative effects from one or more sectors and increasingly gains importance for strategic priority setting and initialising a multi-stakeholder process (Loayza, 2012).

Figure 3: The hierarchy from global policy making through to regional management plans to local project activities as envisaged by ISA. Policies and plans should be subject to Strategic Assessments, setting the framework Environmental Impact assessments and permit procedures.



Source: own illustration, IASS

Therefore, the objective of a SEA goes far beyond the approach described by the ISA Secretariat in its REMP guidance (International Seabed Authority Secretariat, 2019) which foresees a once-only *á priori* description of the broad environmental status in the region, supplemented by a couple of non-strategic precautionary spatial protection measures, as is the case in the Clarion-Clipperton Zone in the north-equatorial Pacific (International Seabed Authority, 2011, see chapter 2.5). At present, the approach of ISA even lacks the assessment of environmental status at all, due to lack of overall goals and objectives,

risk analysis, ecosystem indicators and thresholds. Neither has this been developed for the Clarion-Clipperton Zone over time, nor has it been carried out for the second most advanced region, the northern Mid Atlantic Ridge. Here, a collection of publications and maps from the wider region (Data Report) as well as a scientific description exists (termed regional environmental assessment report).[63] However, detailed descriptions of the environmental conditions at the exploration contract areas are missing and an existing scientific proposal for an approach to a representative, high-level representative network of 'Areas of Particular Environmental Interest, APEIs' did not result in such a network being recommended to the upcoming second (management) workshop ahead of an LTC recommendation on measures[64]. This situation is unsatisfactory and seems to be steered away from an impartial assessment of environmental harm arising from activities in the Area.

The opportunity provided by an approach which is based on the experiences with SEAs around the world is to inform the production of a management plan, in this case for a region, which enables the long term and effective protection of the marine environment from harmful effects of this new industry in context with ongoing environmental change due to global warming and other human activities. The plan needs to be operational with regards to meeting its goals and objectives over decades, no matter how many mining operations and other pressures exist in parallel. As such a SEA-type approach will enable strategic decisions to be made in cooperation with stakeholders prior to and after license applications and permits, but be subject to iterative reduction of uncertainties and adaptation of targets and measures over time.

4.1.3 A need for coherence

As the ISA only has the authority to govern activities in relation to minerals mining in the Area, the comprehensive approach of REMPs to regional management calls for harmonising at least regionally the conservation priorities, techniques and indicators and threshold levels with other regional governance or management authorities and adjacent coastal States. Adjacent waters are also likely to belong to a Large Marine Ecosystem, LME, and states sharing such LME may be in the process of a 'Transboundary Diognostic Analysis, TDA', a strategic process for analysing the available scientific information on transboundary concerns with the aim of agreeing on a LME-wide Strategic Action Plan under the Global Environment Facility operational strategy. Such transboundary assessment of concerns is also relevant with respect to activities in the Area and the high seas, where the GEF is also engaged in fostering sustainable management of fisheries resources and biodiversity conservation in areas beyond national jurisdictions.

An additional line of collaboration and coherency needs to extend to the required harmonisation of a SEA-like process informing the development of a REMP, with that developed in the course of the ongoing negotiations under the United Nations for a new international agreement on the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction, ILBI/BBNJ. The negotiations aim to complement and promote coherence with relevant legal instruments, frameworks, and bodies. The current draft negotiation text[65] foresees under Article 6.1 several mechanisms of cooperation, including *'through strengthening and enhancing cooperation with and among relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies and members thereof'*. Draft article 21 formulates the objective to achieve a coherent environmental assessment framework of activities in areas beyond national jurisdiction, including Strategic Environmental Assessments and cumulative impacts. Some parties are in favour of binding other bodies such as the ISA to the minimum standards set by the new agreement. A possible future Scientific and Technical body

[63] see under background documents at https://www.isa.org.jm/workshop/workshop-regional-environmental-management-plan-area-northern-mid-atlantic-ridge#BckDocs

[64] see Workshop Report at https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/evora_workshop.pdf

[65] available under https://www.un.org/bbnj/sites/www.un.org.bbnj/files/textual_proposals_compilation_article-by-article_-_15_april_2020.pdf

could be instrumental to further coherence and consistency. Unfortunately, ISA and other management authorities so far insist on their exclusive competences.[66]

SEAs under national authorities (as would be the case also under the SEA Protocol to the Espoo Convention) have the power to set the framework for project EIA approval and could trigger due diligence requirements in areas beyond national jurisdiction (Craig and Gu, 2019). In the context of ABNJ, it is considered that *'generating and sharing environmental data is especially important, since a lack of baseline data, or where it exists, its unharmonized format, and access to such data presents unique challenges* (Craig and Gu, 2019 referring to Inniss *et al.* 2016, footnote 8). Likewise, these assessments offer opportunities to provide a level playing field for project EIAs, potentially reducing the time and cost of data collection, and by an earlier identification of key issues of concern.

The future 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 is likely to comprise a list of thresholds and criteria for EIAs (Article 24), provisions for cumulative and transboundary impacts (Articles 25 and 26), areas prioritised for protection, such as EBSAs (Article 27), a list of activities that will require EIAs/SEAs (Article 29) and a list of necessary actions to be completed in the course of an EIA (Articles 30-41) - Strategic environmental assessments are here considered as one form of EIAs (Article 28).

These actions are very instructive to developing the approach to REMPs and are drafted as follows (Table 2). The elements and phases of the EIA/SEA process under the ILBI/BBNJ in general reflect the various available guidance on how to conduct a strategic impact assessment (*i.e.* (Kiev Protocol, 2003; Abaza *et al.*, 2004; Convention on Biological Diversity, 2012b).

Table 2: Actions forseen in the draft ILBI/BBNJ negotiation text (April 2020)[67] with respect to Environmental Impact Assessments and Strategic Assessments

Article	Action	Explanation	REMP context
30	Screening	This is to ascertain the need for a EIA/SEA -	Not necessary in the case of deep seabed mining
31	Scoping	This is to determine the scope of the EIA/SEA based on established procedures	Would be useful to ensure common understanding of REMP development process; the scoping phase could be used to set up the overall REMP process.
32	Impact Assessment and evaluation	EIAs can be carried out individually or jointly by States with jurisdiction over the activity assessed. A pool of experts under the Scientific and Technical Body to be established may advise.	ISA has the authority to determine the level of threat, ecological goals and thresholds and acceptability of pressures. There is currently no independent scientific and technical advisory body.

[66] A/CONF.232/2020/3; see further text proposals of State Parties and observers at https://www.isa.org.jm/bbnj, in particular http://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/isa-and-imo-4-3_pm.pdf

[67] see footnote 66

Article	Action	Explanation	REMP context
33	Mitigation, prevention and management of potential adverse effects	Procedures need to be established, including on alternatives	So far, there are no mechanisms or procedures foreseen to evaluate on a precautionary basis adverse effects on the environment, or consider and determine mitigation and prevention measures.
34	Public notification and consultation	Early notification of stakeholders and effective participation mechanisms are needed	ISA informs on Workshops on its website, participation is restricted by a list of criteria and intransparent admittance. No stakeholder mapping or other notification of wider stakeholder constituency known. Role of stakeholders unclear. Stages in REMP development and management not determined.
35	Preparation and content of environmental impact assessment reports	The minimum information and guidance on structure of an EIA report is given	So far, no standard formate for regional environmental reports. Case northern Mid Atlantic Ridge: Data report and environment description, no assessment of sectoral or cumulative threats, no consideration of existing conservation priorities.
36	Publication of [assessment] reports	Reports shall be published and communicated	REMP environmental reports are on the ISA website, comments were taken from prior workshop participants. Post-workshop draft REMP documents will be made available for peer-review prior to ISA consideration*
37	[Consideration and review of [assessment] reports]	Review by the Scientific and Technical Body	no independent scientific and technical body exists, only two out of 30 LTC members are qualified for review of environment assessment report.

Article	Action	Explanation	REMP context
38	Decision-making	The respective state is responsible for decision-making after review of the Scientific and Technical Body. [2. No decision allowing the planned activity under the jurisdiction or control of a State Party to proceed shall be made where the environmental impact assessment indicates that the planned activity under the jurisdiction or control of a State Party would have severe adverse impacts on the environment.]	ISA has the authority to decide. As currently forseen, LTC will review the REMP documents and recommend to the Council a regional management plan.
39	Monitoring	The effects of authorized activities shall be monitored in accordance with the conditions set out in the approval of the activity	Caveat: Environmental baseline is needed ISA intends to develop scientifically and statistically robust monitoring programmes**. This will rely on contractor´s work.
40	Reporting	Monitoring results shall be [periodically] reported and reviewed	not determined
41	Review	The review shall establish whether there are unforseen effects of the authorised activity. Eventually guidelines on the nature and severity of environmental impacts will be developed.	not determined

* (International Seabed Authority Secretariat, 2019)

** ISA Strategic Plan, Strategic Direction 3.4 (Develop scientifically and statistically robust monitoring programmes and methodologies to assess the potential risk for activities in the Area to interfere with the ecological balance of the marine environment) and 3.5 (Develop appropriate regulations, procedures, monitoring programmes and methodologies to prevent, reduce and control pollution and other hazards to the marine environment, as well as interference with the ecological balance of the marine environment, prevent damage to the flora and fauna of the marine environment and implement the relevant requirements relating to the protection of the marine environment as contained in Part XII of the Convention.

4.1.4 How to develop the elements of a REMP

Taking the above, it is proposed to structure the development and management cycle of REMPs initiated through ISA in the following steps which will deliver the essential elements of the plan (see also **Fehler! Verweisquelle konnte nicht gefunden werden.**):

1. Establishment of a REMP-specific body responsible for the management cycle (see chapter 3);
2. Procedural preparations of developing a regional environmental management plan. This will result in the following elements of the REMP:
    a. Organisation of and roadmap for the planning process, including roles and responsibilities for decision-making (see chapter 3), and compulsory public consultation and independent review.
    b. Inventory of existing regulations and management authorities in the region at large;

   c. Stakeholder identification and notification, communication and participation strategy, clearing-house mechanism, consideration of inter-organisational cooperation mechanism;

   d. Boundaries of the region.

3. Regional environmental report with *à priori* assessment of mining-related impacts. This is the core document on which the decision-making with regards to mining-related measures and eventual consultations with other competent organisations on conflicts of interest will rely upon. Ideally, environmental, social and economic aspects are considered with a view to find the most sustainable solution. A guidance document issued by ISA will be required. Broadly, the environmental report comprises

   a. A description of the environmental status of the region based on best available knowledge;

   b. The regional vision and operational objectives, as jointly developed with stakeholders;

   c. An assessment of current and future threats to species/habitats/ecosystems in the region, including from future mining activities. This will require the following assessments to be made by the regulator:

      i. Cumulative impact assessment;

      ii. Sensitivity/vulnerability assessment of environmental, cultural and social values;

      iii. Risk assessment from mining-related activities;

      iv. Consideration of alternatives - *i.e.* the testing of different hypotheses on the future development of mining activities;

      v. Gap analysis and uncertainties.

4. Management measures to reach the REMP regional vision, goals and objectives that can be taken by ISA;

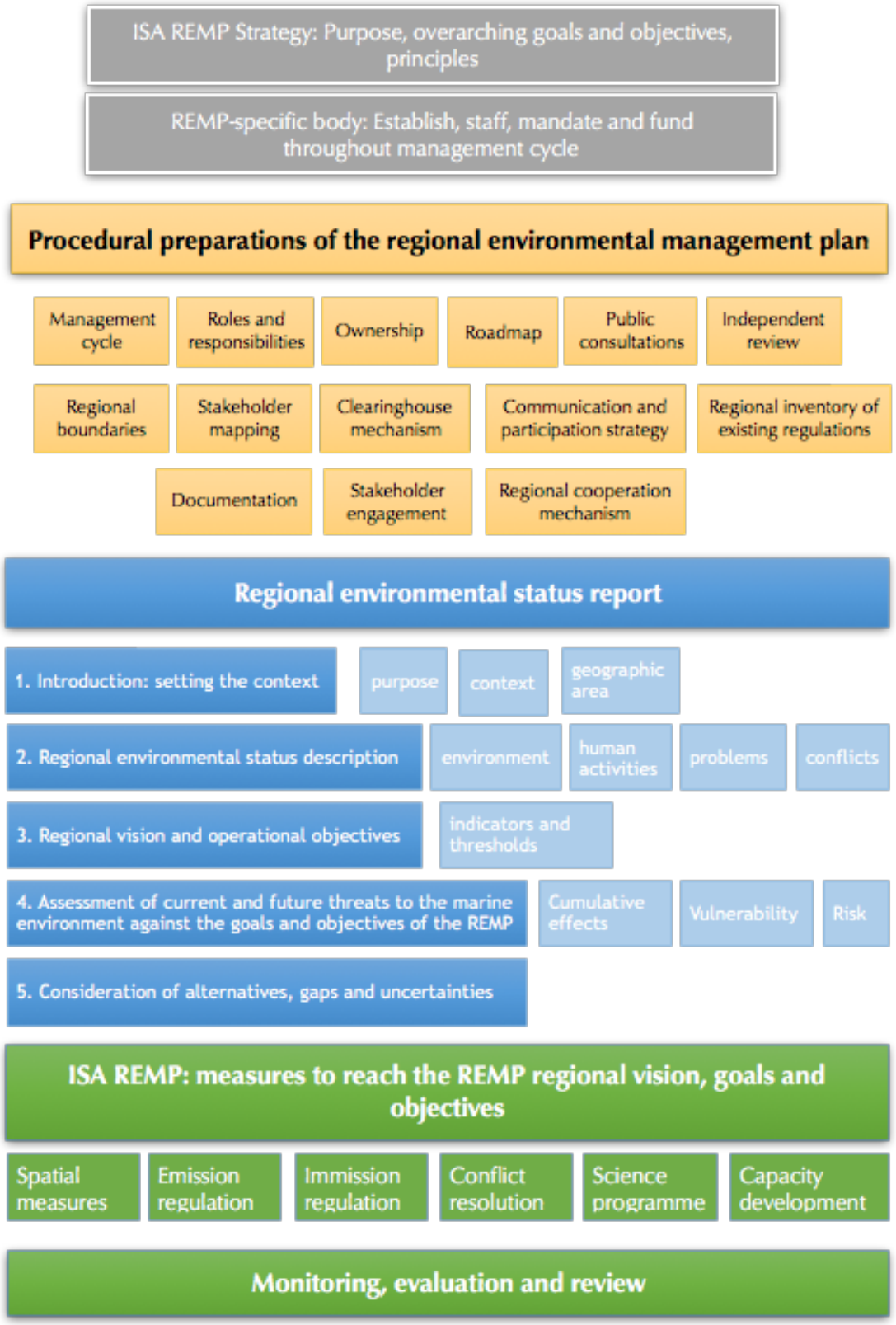
5. Monitoring, evaluation and periodic review of the adopted REMP.

For each regional environmental management plan ISA should document all actions and their results as well as decisions taken along this structure. From practice under the European SEA Directive (2001) it has been recommended to keep separate records on the plan development and the assessment processes (Government of Ireland, 2004). A complete record, in particular including all questions raised and answers given during public consultations was recommended to assist with summarising how environmental considerations were taken account of in the adoption of the final plan. A high-quality documentation will also be instrumental in the periodic review for effective iteration and improvement of the delivery of the measures.

All REMPs need to be public in all their stages of development. The purpose is to provide for a consistent REMP development process in the different ocean basins, to enhance transparency and accountability, optimise measures in view of longterm ecological sustainabiliy, and to create a 'level playing field' for eventual exploitation contractors.

The following chapters will introduce and explain the elements considered compulsory for a well-developed REMP (Figure 4).

Figure 1: Schematic presentation of the proposed standardised approach to and elements of an effective Regional Environmental Management Plan, REMP, under the auspices of the International Seabed Authority as proposed in this study.



Source: own illustration, IASS

4.2 The elements of the REMP

4.2.1 Procedural preparations of the regional environmental management plan

The development and implementation of regional environmental management plans in the Area requires several practical steps, based on the legal foundations as described in chapter 2. As soon as the body responsible for the REMP development process, incl. its funding, has been established (see chapter 3), this body has to start organising the planning process including a tentative roadmap, the timing of public consultations, as well as the initiation of stakeholder mapping and analysis, ownership, roles and responsibilities (see chapter 5). Most importantly, the overall management cycle has to be designed of which the plan development will be a first step.

As a next step, useful also for informing stakeholders and the public about the upcoming REMP development, an information document comprising a brief description of the purpose, the geographic area and the relevant ISA policies and regulations will be helpful. An overview of the relevant governance mechanisms, sectoral management bodies and eventually measures in the region could identify broadly the constituency to be notified of the REMP process.

Preferably in collaboration, or at least in consultation with contractors and stakeholders, a number of further procedural steps have to be taken prior to starting to developing the contents of the REMP, eventually based on draft reports assembled either by the organising body or external experts. The decisions to be made include

- to agree on the regional boundaries (4.2.1.1)
- to determine the plan period and review mechanism (4.2.1.2)
- to establish a clearing house mechanism and a continuous documentation of all actions related to the development, implementation and review of the REMP (4.2.1.3);
- to publish a communication and participation strategy (4.2.1.4);
- to agree on public consultations (4.2.1.5
- to provide for independent review (4.2.1.6)
- to start considering a cooperation mechanism with other bodies 4.2.1.7).

In order to make REMPs an effective instrument to ensure the effective protection of the marine environment from the effects of mining activities, the resulting measures have to be enforced and surveyed, changes of the environment monitored and assessed, and periodic reviews and adaptation of the plan have to be prepared. Therefore, both the data and knowledge collection, as well as its processing are necessarily a continuous exercise. This requires the installation of a permanent steering group in each region which is responsible for overseeing the implementation of measures, including a monitoring programme, with a view to control its effectiveness, and of course review and adaptation of the plan. This group would also maintain the communication with science, other stakeholders, contractors and data providers.

Compared to internal, ISA Secretariat/contractor-linked solutions (see chapter 2.2.), an external steering group, supported by the ISA Secretariat, could provide for a broader and more transparent stakeholder engagement realised over the full management cycle.[68] Its membership could for example include stakeholder representatives, scientific experts, ISA secretariat. The terms of reference could include for example the commissioning of scientific studies, the organisation of workshops and the drafting of REMP documents for public consultation and review by the Commission (see chapter 3).

[68] But this independent expert body will depend on the transparency of environmental data and information from contractors. This is currently not the case, and in the case of the Mid Atlantic Ridge, the respective data reports and environmental assessment (which is only a description) entirely depends on published scientific studies.

4.2.1.1 Determine the region of application

Regional management makes sense for the ISA where more than one exploration contract exists or is likely to exist in the Area. A REMP shall ensure that the cumulative or synergistic impacts of the possible exploitation-related activities of several contractors, together with other human uses will not cause harm to the marine environment. Therefore, the region of application has to cover the potential areas for exploration/exploitation as well as the surroundings based on assumed connectivity via ocean currents and animal migration.

While ideally, a region should be defined as an ecological unit as required for an ecosystem approach to management (Rice *et al.*, 2011), in practice, the definition of boundaries occurs most of the time as a mix of ecological/biogeographic and practical criteria. This is also what was done in the context of delimiting the CCZ region. However, doing so in the Atlantic or Indian Ocean in relation to the seafloor massive sulphide license areas is more challenging, as it depends to a large extent on the dimension of the impact areas of SMS mining[69]. Surface or deep currents may advect mining plumes along or perpendicular to the ridges and even reach national or coastal waters. The region should in principle also cover the migratory habitat of key species.

The joint submission made by Germany, the Netherlands and Costa Rica of a template for a standardised approach to REMPs (ISBA/26/C/7) includes the following criteria for determining the region of application, requesting geo-referenced data and maps of the

- Mineral resources of the specific regional environmental management plan region;
- Benthic and pelagic biogeographic areas in the specific regional environmental management plan region (with reference to International Seabed Authority guidelines on how to define boundaries of ocean regions, where available), and taking into account cross-boundary biogeographic and oceanographic areas;
- Maritime boundaries (e.g., exclusive economic zones);
- International Seabed Authority contract areas, reserved areas and relinquished areas.

This is broadly in line with the Guidance established by the ISA Secretariat (2019, see box below). However, both approaches do not prioritise criteria or guide the selection of the boundaries of the region. In particular, the determination of key species or processes relevant to assess the quality status of the marine environment in the region is essential for deciding about the outer boundaries of the region.

The biogeographic areas consideration would benefit of taking into account the proposed biogeography of the deep seafloor of (McClain and Hardy, 2010; Watling *et al.*, 2013), pelagic considerations (Levin *et al.*, 2017; Longhurst, 1998; O'Leary and Roberts, 2018; Sutton *et al.*, 2017; Wedding *et al.*, 2016), the high seas seascapes mapped by (Harris and Whiteway, 2009) as well as adjacent regions, such as Large Marine Ecosystems[70] and coastal bioregions (Spalding *et al.*, 2007). Considerations should also include ocean circulation patterns and the functional habitats of seabirds and pelagic megafauna such as sea turtles, whales and tuna species with migratory routes crossing at least ocean basins (Dunn *et al.*, 2019)[71]. In addition, the far-field effect of for example mining plumes though so far unknown, may even reach coastal waters as suggested by first modelling studies (Popova *et al.*, 2019).

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[69] In the case of a mid-ocean ridge like the northern mid Atlantic ridge where all known active hydrothermal vent sites are subject to exploration contracts, the regional plan area would have to include the mid Atlantic Ridge and its typical features (i.a. vent fields, rift valley, sedimentary and rocky outcrops, seamounts and more), all of the water column and the horizontal range of migratory species for not creating "deathtraps" in a migratory corridor. To make sure that pollution from mining does not reach coastal states´ waters, the plan area should reach out to the national boundaries.

[70] see e.g. http://www.lmehub.net/#

[71] https://mico.eco/about/species/, https://www.marinemammalhabitat.org/, see also Hays, G.C., et al., 2019. Translating Marine Animal Tracking Data into Conservation Policy and Management. Trends Ecol Evol.

Although cumulative impact assessment is envisaged, the location of other human activities, such as fishing areas or shipping lanes, are not yet considered in the list of criteria. An important issue for each region is to analyse eventual transboundary issues. Adjacent coastal States with EEZ or extended continental shelf boundaries bordering the region have to be informed and involved and interlinkages with high seas freedoms and the ongoing ILBI/BBNJ preparations need to be checked.

Box: REMP Guidance ISA Secr. July 2019, p. 20-21

How do we define the geographic scope of REMP?

Defining the scope or spatial extent of REMPs is a fundamental step in the REMP development process. Defining the appropriate spatial extent of a REMP region is closely linked to the first three criteria required to implement APEIs for a region: (1) large area of similar habitat coverage; (2) self- sustaining populations and (3) a broad range of habitats (see table 1 above). The spatial extent can generally be defined taking into account mineral provinces in the Area where exploration or exploitation is taking place as well as biogeographic regions. Because the regions need to be defined specifically to set the geographic extent for REMP, criteria to define the extent will be relative to the type of area under planning, including the following considerations:

Geophysical features

- The definition of a REMP region through geophysical features will differ between types of geological regions. So, the regional scope may be defined with different types of geophysical features of areas located on the seafloor in abyssal plains, versus oceanic spreading ridges or clusters of seamounts. Analysis of bathymetric trends, geomorphological features and sediment structures can help to identify general inflection points or sharp changes that can be used to help define limits between broad geophysical regions. In other cases, the transition between geophysical features may be gradual and mid-points between features may need to be estimated. Regional areas may be defined as a contiguous area or gradient (e.g. a spreading ridge region) or may need to include clusters of discontiguous areas (e.g. clusters of separate seamount areas).

Biogeographic Areas

- The definition of a REMP regional scope may also be defined by the biogeographic ranges of characteristic species. This approach requires the development of habitat or abundance models derived from species occurrence data. Analysis of species communities through ordination approaches or other techniques (e.g. non-metric multidimensional scaling) may be used to assess emergent species groupings. The identification of representative archetypical species (*i.e.* umbrella species) or species functional types may be used to infer general grouping to a regional context. In general, both geophysical and biogeographic information and approaches will be considered in the development of the REMPs.

4.2.1.2 Determine the plan period and review mechanism

Once adopted, the REMP should be implemented for a limited period, e.g. 5 years before it undergoes a review process. In the course of the plan period, new data and information are being assembled from scientific research, the regional monitoring programme, the annual information provided by ISA contractors, and other sources. Annually, a progress report e.g. compiled by the responsible REMP body would highlight major changes in the information base which might give rise to decide an earlier than periodic review of the plan. After 5 years, the plan should undergo full review, including the production of a revised environmental report, and a re-assessment of the programmes and measures with a

view to eventual readjustments in order to reach the agreed regional objectives and targets (see chapter 3.4). A particular function is the control of the effectiveness of the indicators, and the thresholds set for acceptable environmental change caused by man-made disturbance.

4.2.1.3 Establish a clearing house mechanism

A clearing-house mechanism is essential for transparency and in order to enable States and stakeholders in the region to access, evaluate, disseminate relevant information. The clearing-house should comprise among others a web-based information platform, including a GIS-mapping facility, a pool of experts and practitioners in relevant fields, and all process-related information. Such a mechanism should be compatible with the clearing-house mechanism as will be established in the future 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, ILBI (Article 51 of draft agreement text)[72].

4.2.1.4 Publish a communication and participation strategy for the region

A communication and participation strategy is a tool to let all stakeholders know how the region (or ISA as a whole) intends to communicate with them, and what role stakeholders shall play in the development and implementation of the regional environmental assessment and management plan. So far, the ISA does not have such a strategy. See further in chapter 5.

4.2.1.5 Agree on public consultations

In addition, public consultations are required during various phases of the REMP cycle, for example in relation to the Environment report and on the draft management plan. Public consultations address all those that do not participate directly in the REMP development and provide a formal route for providing comments and suggestions on documents which are in the process of development. The participation of stakeholders and the broader public is one of the sustainability principles enshrined in Principle 10 of the Rio Declaration (1992), and has been recognised as essential for well-informed decision-making (Craig, 2008 quoted by Lallier and Maes, 2016). Public participation depends on the access to all of the environmental information which is relevant for the assessments and the determination of the measures of the REMP (see clearing house mechanism under 4.2.1.3). While the principles of the Clarion-Clipperton Zone EMP (International Seabed Authority, 2011) include transparency, in accordance with the Aarhus Convention (UNECE, 2005) approach to public participation, it is recommended to enable similar access to information and justice for all other REMPs.

The Aarhus Convention lists the documentation that must be made available to the public in the context of public participation in a decision-making process for a proposed activity likely to have significant effects on the environment:

- ‘A description of the site and the physical and technical characteristics of the proposed activity, including an estimate of the expected residues and emissions;
- A description of the significant effects of the proposed activity on the environment;
- A description of the measures envisaged to prevent and/or reduce the effects, including emissions;
- A non-technical summary of the above;
- An outline of the main alternatives studied by the applicant; and

[72] see footnote 14 and 66

- In accordance with national legislation, the main reports and advice issued to the public authority at the time when the public concerned shall be informed in accordance with paragraph 2 above.' This refers to the requirement of prior notification to the public, early in the decision-making procedure (Lallier and Maes, 2016).

The Aarhus Convention also stresses the need for transparent feedback on public and stakeholder comments requiring that *'the outcome of the public participation'* is duely taken account of in the decision-making, and that the decision shall be published *'along with the reasons and considerations on which the decision is based'*. Such reflection of comments in previous stakeholder surveys has not yet taken place and for decision-making on REMP measures, ISA will need to establish procedural elements to ensure such consideration and reflection in line with the Aarhus Convention (Lallier and Maes, 2016).

4.2.1.6 Provide for independent review

As a further element of a risk-averse REMP development, a review of the draft plan by an independent group of experts would ensure that the measures planned will be appropriate and based on a sufficient quality of information on the overall environment (as recommended also for EIA review, (Durden *et al.*, 2018; Lallier and Maes, 2016). This expert review should take place prior to the public consultation, and its results added to the documents supplied, so the public ('mankind') can evaluate a full set of information (Lallier and Maes, 2016) prior to LTC making its final recommendation to the Council. A similar independent review process has previously been suggested for the review of the environmental plans and performance assessments of contractors under the regulations on exploitation of mineral resources in the Area (ISBA/25/C/10) based on the competences given to LTC in Article 165 2.(e) UNCLOS. The mechanisms and criteria for a roster of experts will have to be developed. Other than suggested in ISBA/25/C/10, also observers to the ISA should be entitled to nominate competent persons for an independent review team, the composition of which should reflect the necessary expertise in the respective regional context.

4.2.1.7 Develop a cooperation mechanism with other management authorities and relevant international agreements

Although the Regional Environmental Management Plans of ISA are and will likely remain a sectoral management tool, decisions on measures require an integrated, holistic assessment of past, present and future pressures on those ocean regions, vulnerabilities and expected changes even without any mining taking place. Integration is required horizontally across sectors, as well as vertically from lawmakers to the public, be it in a top-down or bottom-up (Olsen *et al.*, 2014). Key challenges/tensions to sectoral interplay concern the governance structures and mechanisms, communication and sharing, participation and exclusion and the sectoral fragmentation. Creating coordinating structures which operate across sectors, fostering the means of inter-sectoral communication and data-sharing, and broad-scale participation processes are recommended as good governance measures (Alexander and Haward, 2019). Additionally, in the context of waters beyond national jurisdiction, the UNCLOS provides for the freedoms of a.o. navigation, fishing, cable laying and scientific research in the high seas. The related biodiversity conservation measures are currently unregulated and now subject to the ILBI/BBNJ negotiations (General Assembly resolution 72/249). Competent management organisations such as IMO or RFMOs act autonomously and until today their governance structures are ill-adapted to enable inter-organisational cooperation (Matz-Lück and Fuchs, 2014). REMPs could provide a platform for exchange on regional interests and of information. See further chapter 5.5.

4.2.2 Regional environmental status report with *à priori* assessment of mining-related impacts

A state-of-the-art regional environmental report provides the basis for decision-making on measures as to be laid down in the regional environmental management plan. The environmental report should be synthesised from all available sources and includes[73]

1. A context-setting introduction (4.2.2.1

2. An environmental description based on a sound knowledge base (4.2.2.2)
   - The current state and assumed development of the environment - An environmental baseline description and evaluation of the state of the regional environment (e.g. in a Quality Status Report), including observed natural variability, interconnectedness with other regions, and vulnerabilities to impacts from human activities, as well as all environmental and cultural values;
   - An inventory of past, present and planned human activities and their current regulation;
   - Description of known environmental problems, if possible including an assessment of the probability, duration, frequency and reversibility of prevailing environmental impacts and threats from direct and indirect pressures, their magnitude and spatial extent, including cumulative and synergistic and likely transboundary effects, as well as the effects of global warming on the ocean ecosystems with a view to determine the likely significant effects on the environment, including on biodiversity, fauna, flora, water.
   - Actual or potential use-conflicts - incl. among ISA contractors, with other legitimate users - and transboundary issues;
   - The identification of gaps in knowledge and uncertainties.
3. The regional vision, and operational objectives (4.2.2.3), including appropriate indicators and thresholds. In the report, it has to be explained how those objectives and any environmental considerations have been taken into account during its preparation.
4. Environmental Assessment (including cumulative effects, sensitivity/vulnerability, risk) of the state-of-the-art regional information (4.2.2.4) and the expected environmental effects of mining-related activities from one or more commercial mines with a view to determine the
   - Long term trends in the development of ocean health indicators;
   - Long term trends in conservation status of critical species and habitats;
   - Long term trends in human activity level and potential conflict areas;
   - the contribution of mining-related environmental effects;
   - the likelihood of achieving the respective management and conservation goals.

   A social and economic impact assessment would be of benefit, however is not further considered.

5. Management measures to reach the regional vision, goals and objectives under ISA authority (4.2.3). The spatial and non-spatial conservation measures shall prevent, reduce and as fully as possible offset any significant adverse effects on the environment, incl. potential sites of conservation interest according to global and sectoral measures and criteria;
6. Consideration of alternative actions (scale, intensity, frequency of action, technical conditions etc) and the no-action option; (4.2.2.5).

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[73] based on Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment. 2001/42/EC, Annex 1; Jones, D.O.B., Durden, J.M., Murphy, K., Gjerde, K.M., Gebicka, A., Colaço, A., Morato, T., Cuvelier, D., Billett, D.S.M., 2019. Existing environmental management approaches relevant to deep-sea mining. Marine Policy; Billett, D.S.M., Jones, D.O.B., Weaver, P.P.E., 2019b. Improving Environmental Management Practices in Deep-Sea Mining. In: Sharma, R. (Ed.), Environmental Issues of Deep-Sea Mining. Impacts, Consequences and Policy Perspectives. Springer Nature Switzerland AG, Cham, Switzerland, pp. 403-446.

All of the above will become part of the final management plan, which then also includes the set of measures enacted, as well as the programmes for monitoring the regional environment (4.2.4) and contractor compliance, research to fill knowledge gaps (4.2.5) and capacity building (4.2.6).

Public consultation during the assessment of the plan or programme, as well as the consideration of „reasonable alternatives' are important components to enable the weighing of benefits and costs of new policies, programmes or plans. An appropriate ISA guidance on the preparation of an environmental report, based on a standard template for the contents (such as the template proposed in ISBA/26/C/7) is required and should be annexed to the exploitation regulations. It is also essential to agree a regional assessment framework for the assessment of impacts and risks which can then be provided to contractors for application to activities in their responsibility. Action arising from the environmental report includes the assessment of knowledge gaps and resulting uncertainties. This knowledge then serves to either develop programmes to fill the gaps in knowledge through research and/or monitoring, or to proceed towards agreeing on appropriate regional conservation and management objectives and targets and the related management measures.

In the context of integrated planning and management, strategic regional assessments provide the multi-scale context for the above actions leading to the plan making for regions in the Area.

4.2.2.1 Introduction - setting the REMP into context

The introduction should comprise a brief description of the purpose, the geographic area and the relevant ISA policies and regulations. Here, also the overarching ISA goals and objectives, as well as the principles guiding the REMP (see chapter 2.4) shall be mentioned.

Although ISA has the exclusive competence to regulate activities related to mining of minerals in the Area, the regions of concern will also be of interest to other sectors and may eventually be subject to regional or global governance and management rules. An inventory of such regulation will be required in order to map and evaluate e.g. potential areas of conflict arising from the activities which will be permitted and controlled by the REMP. The inventory will also guide the survey of the key stakeholders and neighbouring coastal States in the respective region.

4.2.2.2 Establishing a sound knowledge base

Establishing a sound knowledge base for precautionary decision-making in a regional and deep-sea context is an impossible task. The deep sea is near to unknown in most regions of the world, and the dimensions are prohibitive. Climate change is changing ocean conditions at an accelerated rate. In addition, the degree of interconnectedness and the crucial dynamics in the complex web of life are near to unknowable. Nonetheless, a REMP will have to address all of the potential effects of exploitation activities on the marine ecosystem, including birds, potentially up to coastal waters. Therefore, apart from environmental impacts, also social considerations and transboundary issues have to play a role.

Given the gaps in scientific understanding of the relevant ecosystems and processes in the open ocean and deep sea, the effective collaboration with a wide set of stakeholders is required (Langlet and Rayfuse, 2018). Based upon a comprehensive stakeholder mapping, knowledge bearers from science, public administration in coastal States or traditional communities and actors from other sectors operating in the region can contribute invaluable experience. In addition, historic data and all available data sources from international management authorities and organisations (e.g. RFMOs, FAO, IMO), as well as international agreements (e.g. MPAs in OSPAR database, EBSAs in CBD database), and including traditional knowledge have to be considered. The participants of the Pacific Triangle workshop (International Seabed Authority, 2019c) recommended to compile a list of appropriate international and national resources from which data can be obtained should be compiled. Chapter V of the ISA Secretariats Guidance document (International Seabed Authority Secretariat, 2019) provides an extensive overview of possible data sources and data needs for systematic decision-making and planning.

The interplay between environmental data, knowledge and information generated by ISA contractors in the region and publicly available scientific and other sources is important here. So far, neither the annual or 5-year contractor reports, nor the corresponding reviews by LTC are accessible. The newly established ISA database for contractor data (DeepData[74]) provides no to limited details and no description of contractor work at all[75]. So far, the only information on environmental baseline studies of contractors is the partial information that which has been published as scientific articles elsewhere. But in all regions of the Area, reviews or summary environmental (and mineral) descriptions are missing. As such, at the current state of transparency of contractor work, scientific work forms the basis for establishing the regional environmental baselines.[76]

Partly derived from the contributions of an international workshop (Christiansen and Singh, 2020), a list of required scientific and other information for generating a sound environmental baseline for the respective region is given in the template proposed in ISBA/26/C/7, section 4.2 (see box below). The template will be commented and suggestions for additions being made.

Box: Template with minimum requirements for regional environmental management plans (ISBA/26/C/7, Annex)

4. Technical and scientific information requirements

4.2. Environmental baseline information

4.2.1. Description of the marine environment [Insert description of environmental baseline data and results of data analyses in the region, gathered through contractor reports to the Authority, the DeepData platform, as well as other global and regional databases (see document issued in November 2019 by the secretariat of the Authority on guidance to facilitate the development of regional environmental management plans, pp. 26–29[1]) and scientific literature, supported by geographic information system (GIS) maps and layers, where appropriate, and including the following categories:

4.2.1.1. Geophysical and chemical features:

- Physical properties (ISBA/25/LTC/6, para. 15(a)), including advection and eddy diffusion measurements
- Chemical properties (ISBA/25/LTC/6, para. 15(b))
- Geological properties (ISBA/25/LTC/6, para. 15(c)), including mineral resources

4.2.1.2 Biological features (ISBA/25/LTC/6, paras. 15(d)–(f), 17, 18) and associated biogeographic areas:

- Maps of the most recent applicable biogeographic classification of benthic and pelagic realms
- Biogeographic ranges of characteristic benthic and pelagic species, including transient and migratory species
- Habitat and abundance models derived from species occurrence data
- Analysis of species communities through ordination approaches or other techniques to assess species groupings
- Identification of representative species, taking into account variability of habitats

[74] https://data.isa.org.jm/isa/map/

[75] issues with the database have recently been acknowledged, see https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/deep_ccz_biodiversity_synthesis_workshop_report_-_final.pdf, Item 4, §22).

[76] for example, in the case of the CCZ, even at the review workshop in 2019 (https://www.isa.org.jm/workshop/deep-ccz-biodiversity-synthesis-workshop), only resource data came from the ISA database, while biological data where provided as data on individual samples from contractor-associated scientists. Also, the data report and "regional environmental assessment report" for the northern Mid Atlantic Ridge relied almost exclusively on published scientific envrionmental iinformation (see https://www.isa.org.jm/workshop/workshop-regional-environmental-management-plan-area-northern-mid-atlantic-ridge#BckDocs).

- ► Genetic connectivity of representative species, including source and sink dynamics within a metapopulation
- ► Connectivity of migratory species, including those of cultural significance to indigenous peoples and local communities
- ► Identification of food-web structure of benthic and pelagic habitats
- ► Ecosystem functioning, including the identification of key species
- ► Identification of rare and fragile, or otherwise ecologically important, or sensitive or vulnerable ecosystems, or communities
- ► Identification of main ecosystem services (e.g., natural carbon capture by biological pump).

4.2.1.3. Identification of natural stressors in the region, including climate change.]

4.2.2. Description of uncertainties [Insert details, using descriptive methods and GIS maps, on the identification of existing data gaps and uncertainties (due to data quality or quantity) with regard to environmental information.]

4.3. **Information on human activities and limitations in the region**

4.3.1. Activities in the Area [Insert details, using descriptive methods and GIS maps, of seabed mineral activities, including exploration and exploitation contracts, applications for contracts received, other spatial information from contracted areas such as preservation reference zones and impact reference zones in the region]

4.3.2. Activities in areas beyond the limits of national jurisdiction and in adjacent waters under national jurisdiction [Insert details, using descriptive methods and GIS maps, of identified descriptions, designations, management systems or standards by other international organizations or agreements (e.g., Convention on Biological Diversity, Food and Agriculture Organization of the United Nations, regional fisheries management organizations, International Maritime Organization (IMO), International Finance Corporation, regional seas conventions, marine biological diversity of areas beyond national jurisdiction, ecologically or biologically significant marine areas, traditional marine management areas and measures) relevant to the region]

4.3.3. Freedom of the high seas activities [Insert details, using descriptive methods and GIS maps, of other legitimate marine uses in the region (e.g., shipping, fishing, laying of submarine cables, marine scientific research projects)]

4.3.4. Dumpsites [Insert details, using descriptive methods and GIS maps, on identification of underwater munition, weapons, radioactive substances, or other spoil, if applicable]

4.3.5. Cultural heritage and interests [Insert details, using descriptive methods and GIS maps, of any cultural heritage and interests in the region (e.g., sunken ships, fossils, human remains, routes and marine features used by indigenous peoples and local communities for traditional instrument-free navigation)]

5. Established area-based management tools

Provide information on all existing area-based management tools, using descriptive methods and GIS maps, including the size and location of, and measures applicable, for example, in designated marine protected areas, in IMO-designated particularly sensitive sea areas, in special areas established by the International Convention for the Prevention of Pollution from Ships and in areas with restrictions established by regional fisheries management organizations.

The template addresses a wide range of information which can be considered a necessary ingredient of an environmental description of a region, which reflects on past, present and future changes as a basis for an assessment of the vulnerabilities and risks arising from present and future human activities, including various mining scenarios. There are few comments to be made:

- All of the template will require an accompanying guidance which indicates the desired quality level of information and the methods used for compilation and assessment.
- It is good that the template contains a requirement for a description of natural stressors in the region, including climate change, and a description of data gaps and uncertainties. Without this information, no serious assessment of impacts against natural changes can be made.
- The required information on area-based management tools in Section 5 is quite comprehensive. There are two additions to be made if not meant to be included:

    a) The Ecologically and Biologically Significant Areas, EBSAs, adopted by the Convention on Biological Diversity, although this is no protection status, should be listed as well for information.

    b) The regional MPA designations of OSPAR or other regional conventions should be acknowledged and efforts be made to meet the stated conservation aims, although binding only for its contracting parties.

    c) Also, science may have long term interest and focus areas, to which they will need unhindered access and eventually protection from disturbance by other users, as in the case of longterm observatories. So far, such sites cannot be designated for science.

Should the REMP determine the legal basis - or at least the information basis - for the recommendation on the approval of future exploration and exploitation plans of work by the LTC, then this mapping of existing designations will provide crucial information. A recent case where an existing EBSA designation was not taken into consideration was the permit for Poland to explore the mid-Atlantic ridge south of Portugal[77], all of which is designated as an EBSA (Convention on Biological Diversity, 2014),[78] including the Lost City vent sites which are on the list of proposed World Heritage Convention sites (Christiansen *et al.*, 2019b; Johnson, 2019). A persistent problem is the fact that so far no globally effective marine protected areas can be designated in the high seas. However, in view of the ongoing negotiation process under ILBI/BBNJ to make such MPA designations possible, ISA should regard the EBSAs adopted by the Conferences of Parties of the Convention on Biological Diversity[79] as an indication for the likely location of future MPA designations in the high seas.

The consideration of sites/habitats/species designated by other organisations will be a significant step in recognising the conservation efforts for biodiversity in the high seas and adjacent national waters by ISA. A second step could result in closer exchange and cooperation with these organisations. The far-field effects of ISA activities may interfere not only with activities under other management regimes, such as fisheries and navigation, or eventually interest of coastal States, but also with eventually existing conservation and management interests and aim of these entities in areas within and beyond national jurisdiction (see chapter 4.1.3. Therefore, it is not only essential to map all of the above mentionnend areas, but also to be informed on their purpose and eventual measures taken by the relevant body. ISA, though responsible for not causing environmental harm throughout the water column through its activities, needs to communicate with and come to agreements with other users and their representations in the region.

[77] see ISBA/23/C/11 and ISBA/23/C/14

[78] UNEP/CBD/COP/DEC/XII/22. Decision adopted by the Conference of the Parties to the Convention on Biological Diversity, 17 October 2014.

[79] see https://www.cbd.int/ebsa/

4.2.2.3 Regional vision, and operational objectives

An ecosystem approach to management, as envisioned by ISA to guide the management of the Area (see Draft Regulations) explicitly requires to manage human activities towards prior-agreed environmental quality goals and objectives (could e.g. be the avoidance of significant adverse impacts *sensu* (FAO, 2009), or towards 'Good Environmental Status' in EU waters (EU MSFD 2008a). Goals and objectives are required for all essential elements of an ecosystem approach, incl.:

- Implementing a precautionary approach (Jaeckel, 2015, 2017a, b): Without environmental objectives, it is impossible to assess whether a protective measure is effective in and proportionate to (the two key criteria for selecting precautionary measures) the desired preservation outcome;
- Setting thresholds for impacts in EIA/SEA (Durden *et al.*, 2018): EIAs and SEAs provide the basis for determining whether the expected harm reaches an unacceptable level ('substantial evidence indicates the risk of serious harm to the marine environment') and should, thus, not be allowed to proceed, or should only be permitted with measures to reduce or mitigate the harm. Without conservation objectives, it remains unknown what level of harm is acceptable. Further, without conservation objectives, it is impossible to determine e.g. how many mining operations can be conducted in parallel within a particular region or over a certain timeframe without jeopardising the desired conservation outcome;
- Assessment of new applications (Jaeckel, 2017a): without conservation objectives, it is unclear how the LTC assesses whether an application provides for '*effective protection and preservation of the marine environment including, but not restricted to, the impact on biodiversity'*[80];
- Transparency: Without conservation objectives that can guide the ISA's decisions, it is unclear whether all applications are held to the same environmental standard. At present, the LTC has to conduct not only scientific and technical assessments but also make subjective determinations regarding the acceptability of risks, without objective evaluation criteria or the benefit of overarching conservation objectives.

Long term vision for the region

Visions are aspirational goals developed to guide the very longterm direction of a policy framework and interventions. So, for example, the States parties to the Convention on Biodiversity expressed their vision, that

> *'By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.'*

An appropriate vision for the Area, which is the common heritage of mankind, with benefits to be shared equitably among this and future generations could be, as suggested by (Tunnicliffe *et al.*, 2018):

> *'Sustain marine (benthic and pelagic) ecosystem integrity including the physical, chemical, geological and biological environment'*

However, a vision should preferably be developed in a stakeholder-inclusive process (see chapter 5), and specified to the regional conditions and needs. In the context of ISA regional environmental management plans, the collective development of a vision for the respective region is a prime opportunity to bridge the sectoral view and interact with other users of the sea and stakeholders to agree on a common idea. Vision building is often a first step to closer collaboration while not requiring substantial institutional mechanisms for coordination. In this case, the stakeholders to be consulted are not

[80] Nodules Exploration Regulations, regulation 21(4)(b); Sulphides and Crusts Exploration Regulations, regulation 23(4)(b).

only users and signatory states of UNCLOS, but all of mankind, *i.e.* in particular civil society from the respective regions.

Regional operational objectives

Good spatial governance involves another, more concrete step: based on the regional vision, the over-arching environmental goals (see chapter 2.5.1), have to be broken down into measurable objectives (and targets, once the management plan is operational). Each goal is here likely to be supported by several objectives, which specify certain aspects of the ecosystems and/or of available management tools, such as the area covered by no-take areas, or measures to protect listed species and habitats under threat and/or decline.

For example, as proposed by a participant in the Hamburg REMP Workshop[81] each REMP could specifically aim to avoid impacts of activities in the Area on mid-water fish stocks and ecosystems, not least to prevent impacts on commercially-fished species (Christiansen *et al.*, 2019a; Drazen *et al.*, 2019). In addition, specific objectives are needed in relation to climate change. Examples include: to preserve a certain percentage of sites that are least impacted by climate change (Dunn *et al.*, 2018), to prevent exacerbation of ecosystem vulnerability to ongoing climate change, or to ensure that activities in the Area would not cause 'adverse effects on climate or weather patterns'. Also, the ISA's Preparatory Commission in its draft regulations from 1990 could provide a relevant basis for regional objectives in REMPs.[82]. Here it was suggested that '*serious harm'* would include '*any effect … which represents … loss of scientific or economic values which is unreasonable in relation to the benefit derived from the activity in question*.'

REMPs provide a spatially explicit approach to environmental management and, depending on the institutional framework, have some similarities with regional spatial planning. As shown by (Foley *et al.*, 2010) high level strategic goals, for example healthy ecosystems, delivery of ecosystem services and sustainable uses, have to be broken down to operational/planning objectives within the framework set by the applicable environmental, economic, governance and social principles principles. The planning goals and objectives could e.g. include to maintain ecological connectivity, habitat and species diversity, and prevent the loss of biodiversity. Against an account of the baseline ecosystem condition, the operational objectives and shorter-term targets address components of the ecosystem which are to be kept under review or in need of improvement. Time-bound objectives provide the direction for the result of management measures to be decided on this basis. Therefore, the agreement on regional environmental objectives is the crucial basis for determining measures to regulate human activities.

For this purpose, all information collected from a region (first when initiating the plan design, later from monitoring, see chapter 4.7) needs to be evaluated and assessed with a view to determining a.o.

- The most appropriate indicators for a 'healthy' ecosystem(s), *i.e.* for effective protection;
- The species and habitats under threat and decline
- The vulnerability of species and habitats with regards to certain activities, in this case those that are related to mining s.l.
- Those areas of high sensitivity and risk from other pressures, e.g. climate change or fishing
- Possible hotspots for cumulative impacts

Once formulated as indicators with an appropriate metric, these features could become part of the suite of indicators needed to evaluate the success of management measures.

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[81] see footnote 26, presentation by Dr. Aline Jaeckel.

[82] Preparatory Commission for the International Sea-bed Authority and for the International Tribunal for the Law of the Sea, *Draft Regulations on Prospecting, Exploration and Exploitation of Polymetallic Nodules in the Area*, LOS/PCN/SCN.3/WP.6/Add.5 (8 February 1990), article 2(2).

This way, carefully designed and responsibly implemented REMPs may enable ISA to comply with its environmental mandate in particular regions.

4.2.2.4 Assessment of the environmental information

Regional environmental assessment is particularly important as it provides a means of anticipating and managing cumulative adverse impacts of the environment, for multiple industries, multiple mining projects and other environmental change (e.g. climate change). It also feeds into spatial planning.

Preventive action is one of the key operational principles of an ecosystem approach to management, and Strategic Environmental Assessment, SEA, and Environmental Impact Assessments, EIAs, are the primary tools for preventing unexpected or undesired loss of biodiversity. Strategic assessments shall identify and evaluate at an early stage the environmental implications of proposed policies, plans or programmes with a view to integrate environmental, economic and social concerns to improve environmental sustainability in the strategic decision-making (see e.g. (Abaza *et al.*, 2004; UN Environment, 2018)).[83] Examples are the Kiev Protocol on strategic environmental assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (Kiev Protocol, 2003), or the Strategic Environmental Assessment Directive of the European Union (2001). The ambit of the Kiev Protocol includes plans and programmes (not policies) which set the framework for future development consent of certain listed projects, including e.g. mining and offshore hydrocarbon production, and generally for projects which require a EIA under national legislation. The provisions of the protocol relate to environmental effects wherever they occur (Convention on Biological Diversity, 2009). Therefore, the Kiev Protocol would provide the appropriate guidance to assessments under the auspieces of the ISA, in particular in context with developing REMPs.

SEA is a continuous and iterative process which is adapted to the relevant decision-making context and may take different forms and use different methods to achieve a variety of objectives. This lack of formal guidance was a.o. considered as one of the weaknesses of the current SEA implementation (Gru, 2019)[84]. However, Annex III of the Protocol provides criteria to be taken into account when assessing plans or programmes likely to have significant environmental effects, including

- The transboundary nature of effects •
- The degree to which the plan or programme will affect valuable or vulnerable areas, including landscapes with a recognized national or international protection status
- The nature of the environmental, including health effects, such as probability, duration, frequency, reversibility, magnitude and extent (such as geographical area or size of population likely to be affected).

Of particular relevance for guiding the needed assessments and for scaling the degree of risk, vulnerability and sensitivity, is the development of indicators (Potts, 2006; Potts *et al.*, 2015), the setting of significance thresholds as well as consideration of resilience (Hughes *et al.*, 2005); (Palumbi *et al.*, 2009); (Walker, 2005), the ecological functions of rare species (Mouillot *et al.*, 2013), and ecosystem health (Tett *et al.*, 2013). Of importance is that these indicators have a metric that can be monitored and assessed over appropriate time scales. For example, in shallow water, the population dynamics of key species would be used as indicators for the health/recovery/decline of particular ecosystem components. A comprehensive set of such indicators has to be agreed for the respective regional ecosystem.

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[83] see also review in UNEP/CBD/EW-EIAMA/1/INF/1/Add.1 (2009)

[84] https://ablawg.ca/2019/03/26/assessing-the-role-of-strategic-environmental-assessments-in-the-conservation-and-sustainable-use-of-marine-biodiversity-of-areas-beyond-national-jurisdiction/

Therefore, the related significance thresholds should be based on established population-level thresholds, as well as community or ecosystem-level attributes (Livingston *et al.*, 2005). Significance (of adverse effects) takes into account (either qualitatively or quantitatively) the magnitude, extent, duration, frequency, and likelihood of the impact (FAO, 2009, 2016; Livingston *et al.*, 2005). This, of course, requires an appropriate knowledge basis.

Science can advise on many of these issues (Cormier *et al.*, 2017), however it is unlikely to be realistic as an *ad hoc* action, such as a one-time workshop. Most likely, the development of meaningful regional ecosystem/habitat/population health indicators and significance thresholds will be a long term and iterative process which should be carried out by a dedicated expert group which accompanies the work of the REMP development. Without these indicators and thresholds, it will be impossible to define operational management objectives, or to control the success of measures in achieving such objectives.

Mapping exercise and spatial planning scenarios

As indicated in chapter 4.2.3.3 , a first step to assessment can be the mapping of all known facts from the ecosystem and present and future activities and their effects. This will provide an overview of the region, including other interests and indicate transparently

- The overlap of mine sites with existing and potential sites of conservation interest;
- The possible interaction of mining related effects with other stakeholder interests and/or adjacent coastal States waters;
- Potential conflict areas with other stakeholders.

The mapping should cover both the region at large, but also the exploration and future mine contract areas at a fine scale. For this an effective cooperation with the contractors is required, including public access to their environmental baselines established.

Cumulative effects assessment

Apart from identifying and evaluating the effects arising from activities individually, the effects also have to be assessed in concert. Cumulative effects assessment is defined as *'a systematic procedure for identifying and evaluating the significance of effects from multiple sources/activities and for providing an estimate on the overall expected impact to inform management measures. The analysis of the causes (source of pressures and effects), pathways and consequences of these effects on receptors is an essential and integral part of the process'* (Judd *et al.*, 2015).

Different stressors may have the same type of effect on biota, or affect biota through a different cause-effect relationship. Both paths can lead to additive, synergistic or antagonistic effects over space and time and can vary with the interaction of stressors across organisational and trophic levels (Crain *et al.*, 2008). In the marine realm, and in particular in the deep sea, the cause-effect relationships are poorly known. Cumulative effects assessment is therefore highly complex and may best be approached as an element of a risk assessment process (Judd *et al.*, 2015; Stelzenmuller *et al.*, 2018), see below.

Mapping can be instrumental to indicate particularly sensitive areas because of multiple pressures from one or several sectoral activities (Gissi *et al.*, 2017; Menegon *et al.*, 2018). Some parts of the region may also be particularly sensitive to the effects of climate change so that any additional impacts will be crucial. A cumulative risk assessment at the scale of the region will be helpful for prioritising spatial conservation needs and measures, and at the scale of the contract area will indicate the total extent of effects that the mining activity has within and beyond the mining site itself.

Sensitivity/vulnerability assessment

UNCLOS requires states to implement measures *'to protect and preserve rare or fragile ecosystems as well as the habitats of depleted, threatened or endangered species and other forms of marine life'* (Article 194.5). Prior to the approval of the first application for exploitation, the International Seabed Authority has to adopt '*rules, regulations and procedures incorporating applicable standards for the protection and preservation of the marine environment'*[85], including the prevention of interferences with the ecological balance (Article 145). This vulnerability assessment will have to be done in relation to the known and likely effects of mining-related activities in the region. The assessment will have to consider the individual effects, such as the pollution load of the mining plume, on the individual species and habitats as well as ecological functions of the particular habitats, including in the water column.

FAO (2009) defines vulnerability as *'the likelihood that a population, community, or habitat will experience substantial alteration from short-term or chronic disturbance, and the likelihood that it would recover and in what time frame'*. These are, in turn, related to the characteristics of the ecosystems themselves, especially biological and structural aspects. VME features may be physically or functionally fragile. The most vulnerable ecosystems are those that are both easily disturbed and very slow to recover, or may never recover.[86] While these definitions relate mostly to visible benthic structure-building fauna, the approach is relevant for other parts of the ecosystem, in particular in not easily identifiable niches or where effects spread at large scale, such as pollutants. A difficult, nonetheless important issue is also the consideration of ecosystem function, the factors which could impact on for example food webs, and at which scale.

Risk Assessment

Risk assessment, including the steps of risk identification, analysis and evaluation, is the first step to risk management, which falls into ISAs management function (Cormier and Lonsdale, 2019), also in context with establishing REMPs. As detailed in (Christiansen *et al.*, 2019b), chapter 3.4.5.4), ecological risk assessment '*evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more stressors*' (EPA, 1998). In the case of deep seabed mining, the direct and indirect effects of the mining activity on the marine environment are to be considered from seabed to surface and should best be integrated in an Ecological Risk Assessment Framework (O *et al.*, 2015). The risk needs to be evaluated in conjunction with other prevailing risks for environmental change against objective criteria and thresholds which are independent of management measures.

The criteria to be employed for determining the acceptability of risks derive from the overall obligation of States to individually and jointly prevent damage to marine flora and fauna (UNCLOS, Part XII). In addition, Part XI, Article 145, provides for the protection of all flora and fauna, irrespective of whether they occur on the seabed (the Area) or in the water column (high seas), from adverse effects of seabed mining (see also Annex III art. 17(1) and 1994 Implementing Agreement, annex section 1(5)(g)). Here, the threshold to be avoided is the likely occurrence of 'harm' (Article 145 UNCLOS, *'harmful effects which <u>may</u> arise from such activities'*). This needs to be achieved proactively, through measures to prevent pollution (Article 194), to enhance environmental quality (Nordquist and al., 1991) or at least to avoid 'serious harm' (Birnie *et al.*, 2009)[87], the latter triggering certain measures. If there are indications for *'significant and harmful changes of the marine environment'* (Article 206 UNCLOS), an EIA process is triggered, for example in case of the likelihood of substantial pollution or of

[85] 1994 Agreement, Annex, Section 1, para 5 (g)

[86] see further Christiansen et al., 2019, chapter 2.4

[87] Exploration Regulations, Part 1, Regulation 1

(f) "serious harm to the marine environment" means any effect from activities in the Area on the marine environment which represents a <u>significant adverse change</u> in the marine environment determined according to the rules, regulations and procedures adopted by the Authority on the basis of internationally recognized standards and practices.

significant harmful changes (see further Christiansen *et al.*, 2019, chapter 3.4.6). All of the thresholds need further definition and substantiation for the relevant deep-sea context.

The risks to a marine ecosystem are determined by its vulnerability, the probability, duration, frequency of a threat occurring, its interaction with other pressures and the mitigation means applied to the threat. In context with deepwater fishing, (FAO, 2009) defines 'significant adverse impacts' as:

> *Impacts (evaluated individually, in combination or cumulatively) which compromise ecosystem integrity (i.e. ecosystem structure or function) in a manner that impairs the ability of affected populations to replace themselves, that degrades the long-term natural productivity of habitats, or causes on more than a temporary basis significant loss of species richness, habitat or community types.*

This is a less formalistic and ecologically more meaningful threshold compared to the current definition given by ISA (see footnote 87) and could provide a basis for developing a corresponding threshold in relation to deep seabed mining.

Although not explicitly termed 'assessment', the REMP template proposed in the submission of Germany, the Netherlands and Costa Rica to the ISA Council in 2020 implicitly also requires the reporting on a cumulative risk assessment of expected future effects originating from various mining scenarios, see box below.

Box: ISBA/26/C/7, Annex, para 6

Scenarios for mining activities and forecast of possible effects at the regional level
Provide a forecast of the possible effects of various mining scenarios (extent, duration, frequency of exploitation), taking into account cumulative impacts and climate change, potential stress from outside the region, using modelling that follows the best available scientific techniques and comparisons against the baseline established above.

4.2.2.5 Alternative development strategies;

The consideration of alternatives is an essential element of Strategic Environmental Assessments (SEA, see (Christiansen *et al.*, 2019b)) and prescribed for example, in the EU SEA Directive (Directive 2001/42/EC). Alternatives are understood as different options, choices or courses of actions to deliver a policy, plan or programme's objectives while accomplishing a high level of environmental protection (Desmond, 2007). This can also be in the form of different scenarios, or future visions. Addressing alternatives at a high policy level should theoretically result in more sustainability-led decision-making.

The assessment of alternatives is not only part of the regulatory but also of industry risk assessment as part of environmental impact assessments to reduce environmental risks, *i.e.* from pollution. As an example from deep seabed mining, the identification and evaluation of different options for the discharge of return water after dewatering of marine minerals on board of vessels (discharged quality, quantity, volume per time unit, depth, pipe configuation, etc) should

- Encourage industry to move to safer alternatives,
- Complement regulatory action by showing that safer and higher functioning alternatives are available, or
- Point out the limitations to chemical/technical etc substitution for a particular use (EPA[88]).

[88] https://www.epa.gov/saferchoice/design-environment-alternatives-assessments

In the current practice of SEA, however, alternatives only play a limited role (González *et al.*, 2015): the alternatives considered are often limited in scope, unrealistic to favour a preferred option, eliminated from further assessment early in the process, and subject to only limited stakeholder contributions. In addition, the documentation of the alternatives and their assessment in environmental reports needs improvement. (González *et al.*, 2015) recommend to develop realistic, reasonable, viable and implementable alternatives that promote environmental benefits while fulfilling the plan's/programme's objectives as early as possible in the assessment process.

In the case of REMPs, developing alternative action requires that the regulator/ISA, in consultation and ideally in a participatory approach with stakeholders

- Establishes a comprehensive view on the overall present and future environmental pressures, including those to be expected from mining contractors in the region;
- Assesses these pressures and the expected impacts against the regional environmental objectives;
- Seeks to generally minimise environmental effects by enforcing the application of BAT and BEP;
- Cooperates closely with contractors to improve their environmental performance through alternative technical or operational approaches;
- Keeps under review and implements an arsenal of measures to limit environmental disturbance, such as area closures, limiting the number of exploitation contracts or mining operations at any one time, etc.);
- Communicates the different alternatives and reasoning behind choosing certain options.

Provided that the ISA approval of exploitation applications and Plans of Work will effectively be cross-linked to the respective REMP, the modelling of the long term regional environmental development under different climate change scenarios (Abram *et al.*, 2019), could also lead to considerations on e.g.

- Whether the (long term) environmental effects from mining operations are acceptable;
- If yes, how many operations and where;
- How best to reduce conflicts with other users;
- How to avoid impacts on certain vulnerable species and habitats;
- How best to reserve minerals for future generations?

4.2.2.6 Gap analysis and uncertainties

A lot of unknowns, unknowable's and uncertainties are inherent in attempting to assess and reduce/minimise and mitigate the impacts of human activities on deepwater ecosystems rather than avoiding such impact. Uncertainties arise from scientific uncertainty e.g. due to a lack of appropriate investigations (ignorance, (Buhl-Mortensen, 1996; Frid *et al.*, 2006; Hildén, 1997), poor data analysis (Buhl-Mortensen (Buhl-Mortensen, 1996; Friess and Webb, 2011), limited transferability of existing scientific results (incommensurability) or a general unlikeliness to ever understand the complexity and variability of ecosystem functions, such as in the deep sea (ontological uncertainty, Cooney (Cooney, 2006; Walker *et al.*, 2003). The latter is what was called the 'unknowable' by the Census of Marine Life Project (CoML, 2010). Therefore, more research does not necessarily reduce uncertainty (usually, new questions are raised), and political decisions have to be made before conclusive evidence is available (Wardekker *et al.*, 2008).

Uncertainties derive not only from scientific unknowns of the ecosystems, the so far undescribed and untested technology at scale, but also origin in deficiencies in the operational control (Cormier, 2019) and contribute to the risks taken to an unknown degree. Therefore, it is advisable to be clear about the uncertainties (and gaps in the assessment!) to be able to establish precautionary measures to make sure to reach the REMP goals and objectives rather than risk that the measures taken are ineffective or

not effective enough in preventing pollution and other hazards to the environment. Risk management as proposed by (UNECE, 2012)and (ICES, 2013) seeks to identify and reduce the root causes and environmental consequences of the risk through operational controls (Cormier, 2019).

4.2.3 Management measures to reach the regional vision, goals and objectives under ISA authority

Based on the environmental report (4.2.2) and considering the regional vision, goals and objectives set out, the REMP will determine the measures to be taken to ensure an effective protection of the marine environment from harmful effects of mining activities, taking into account other pressures. The processes and measures set out operationally control how to achieve the given goals and objectives, including through reducing the root-causes of environmental effects (Cormier, 2019)

Under conditions of good knowledge, a systematic conservation planning process would be appropriate. Given the lack of knowledge on the deep sea, a first step to precautionary conservation could be ecological modelling of presumed environmental baseline conditions, including vertical and horizontal connectivity, food webs and temporal dynamics. A sound regional knowledge base is the precondition for (a) being able to evaluate any regional environmental degradation once mining has started; (b) being able to assess whether there may be a scale, duration, and intensity of environmental effects of mining related activities which will not lead to irreversible, large-scale degradation at local and regional scale; (c) determining the management direction.

This knowledge-dependence gives science a crucial role in advising the REMP process on the different repercussions of various management scenarios and to inform on what can be assumed to be a 'safe operating space' for human activities avoiding the risk of unsustainable interaction with the marine ecosystems (Cormier *et al.*, 2017). The 'safe operating space' as laid down in the REMP will have to be highly precautionary, as the numerous and long-lasting unknowns and uncertainties will make it impossible to fully assess the social, cultural, economic and environmental impacts until after commercial mining has begun. By that stage, impact mitigation will be difficult or ineffective.

4.2.3.1 Setting a window of options for exploitation: regulating emissions

Spatial protection may not be sufficient to prevent the loss of biodiversity locally and regionally. Measures to minimise emissions are an even more effective tool for minimising environmental damage. Such measures will be regulated globally through ISA Standards and Guidelines, as well as guidances on Best Environmental Practice and Best Available Technologies, however may need adaptation for regional or subregional purposes. Emissions control could include e.g. measures to minimise sediment plumes, to decrease weight/pressure on the seafloor, minimise toxic waste and discharge etc.

For this purpose, all mining-related activities have to be listed, specified and evaluated with respect to their effect on biota when in operation (this should be done in the hazard identification phase in the risk assessment process). Alternatively, precautionary action could be taken. For example, contractors could be forced to limit the extent of disturbances from mining activities to the limits of their mine site in order to encourage the technical minimisation of e.g. mining plumes and pollution, as well as noise reduction and a minimalistic light scheme.

If detailed emission thresholds are planned based on the proven/suggested environmental change, then it will be necessary to first:

- Identify appropriate biotic and abiotic indicators with measurable metrics;
- Identify preliminary thresholds;
- Determine maximum allowable environmental impact overall - minimise cumulative environmental effects
- Determine maximum allowable environmental harm from minerals exploitation in the region

- Determine maximum allowable environmental harm from individual projects
- Determine maximum allowable level of operational impacts from e.g. dredging, drilling, volume of sediment discharge, plume seafloor coverage, *i.e.* Best Available Technology and Best Environmental Practice.

Based on the information above, the ISA can condition the approval of a plan of work for exploitation. A comparison of environmental performance of the equipment of different operators will be instructive in determining the Best Available Technology and Best Environmental Practice, and eventually stimulate improvements. Regulatory stringence together with economic incentives may trigger innovation for least-invasive techniques.

4.2.3.2 Reducing immissions on specific biota

This could be measures to protect specific biota not necessarily by spatial measures, but for example by Best Environmental Practice to avoid air guns operation and other noise when cetaceans are in the near. This could also concern measures to prevent or minimize impacts on e.g. areas of scientific value and /or interest, areas/species/ecosystems of particular cultural or social importance (see also ISBA/26/C/7, Annex, 8.4).

4.2.3.3 Spatial management and spatial planning

As emphasised in the ISA Secretariat´s REMP Guidance (2019, see box below) an objective mapping of the regional environment together with ongoing or planned activities and their effects, and eventually a spatial planning exercise, will be required. The benefit of doing so could be the

- Increased transparency *vis à vis* stakeholders and the public;
- Mapping of sites of potential transboundary and cumulative impacts;
- Reconciliation of all potential uses and interactions;
- Guidance on the optimum location of mine sites within contract areas;
- Eventually limiting the maximum number of mine sites.

The ISA Secretariat Guidance generally distinguishes between what is called a coarse and a fine-filter approach to ISA spatial conservation measures. Generally, the intent is to suffice the requirements of UNCLOS Article 145 to establish rules, regulations and procedures to ensure the effective protection of the marine environment from harmful effects of mining activities. As the mining-related environmental effects can be very large scale in the case of nodule mining (Volkmann and Lehnen, 2017) and effectively irreversible (Niner *et al.*, 2018; Van Dover *et al.*, 2017), the protection of representative swaths of seafloor shall help to maintain the regional biodiversity. Mining minerals on mid-ocean ridges, in particular close to hydrothermal vents will destroy irreplaceable (Van Dover *et al.*, 2018) and largely unknown ecosystems (Van Dover, 2019), and impact to an as yet unknown extent on the features of the ridge valley and the water column. Like hydrothermal vents, each seamount has unique physical and biological characteristics (Schlacher *et al.*, 2013) and destroyed habitat cannot easily be replaced by representative set-aside areas. Here minimising the environmental impacts from mining is crucial.

Box: REMP Guidance ISA Secr. July 2019, p. 16ff

Spatial planning considerations of REMPs

Evidence-based regional environmental management in the Area will require objective and transparent spatial planning. The ISA is developing regional environmental management plans (REMPs) as a best practice for regions within the Area in which future mining is contemplated. A REMP will describe the goals, guidelines, and specific management measures particular to a specific region where mining could occur. REMPs are expected to include both area-based management tools (ABMTs) as well as other management measures as guided by the Convention and ISA rules, regulations and procedures. The ABMTs considered for REMPs will likely vary between regions and mineral types. Different biogeographic regions and habitats may require different approaches and thresholds to ensure effective management. REMPs will need to be tailored to the ecosystem structure and function for the specific area in question, as well as the different habitats, community structure, biodiversity, connectivity, and resilience of the area.

The development of a REMP will require proactive area-based planning, building on the identification of both large regional-scale management areas as well as the identification of individual sites in need of special consideration. REMPs are expected to primarily protect regional areas of the seabed through a network of areas of particular environmental interest (APEIs). APEIs are expected to cover the full range of habitats, biodiversity, and ecosystem functions within the overall management area. Development of the APEI network should be based on scientific principles. Placement of such networks is typically based on spatial analyses of physical, geochemical, ecological, and social datasets (Wedding *et al.* 2013).

APEIs are generally described as: *'*Large areas with self-sustaining populations and a broad range of habitat variability. Those should not be affected directly by physical activity or indirectly by mining effects such as plumes, although the degree of impacts raised by potential deep-sea mining is still unknown.*'* (ISBA/17/LTC/7)

Comparison of planning approaches: *'*coarse filter*'* (e.g. APEIs) versus *'*fine filter*'* (e.g. vulnerable sites in need of protection) planning approaches

At the time of designing the initial area of particular environmental interest network in the Clarion- Clipperton Zone (CCZ), the scientific criteria adopted by the Convention on Biological Diversity and Food and Agriculture Organization of the United Nations (FAO) for identifying and managing habitats and faunal communities vulnerable to human activities were not fully developed. In particular, the CBD's scientific criteria for ecologically or biologically significant marine areas (EBSAs) are focusing more on the inherent ecological or biological value of the marine environment, rather than addressing any specific impacts from human activities. As such, EBSAs are not management measures per se. FAO's criteria for vulnerable marine ecosystems (VMEs) are focusing on preventing significant adverse impacts of bottom fisheries on vulnerable marine ecosystems.

Building on the experience and lessons learned from CCZ-EMP as well as the long-term experience from CBD and FAO in applying their respective scientific criteria in the past decade, it would be worthwhile to examine how their experience can be applicable and contribute to the future development of REMPs. This would to enable ISA with the necessary spatial planning tools to scientifically describe and identify sites, at a finer scale, in need for protection to preserve ecological balance of the marine environment, as stipulated in article 145 of the Convention, in addition to ISA's experience on designating APEIs in CCZ-EMP. As FAO's VMEs focus on addressing impacts of human activities, the analysis in this section will focus on comparing the FAO's VMEs (as an example of finer scale spatial planning) with APEIs (building on CCZ-EMP experience), with regard to their generic planning approaches.

As noted above, VMEs of FAO have been used, within the context of managing deep sea fisheries[89], as identifier for specific habitats and ecosystems that are particularly vulnerable due to their uniqueness or rarity, their structure forming characteristics and/or also for potential fragility or slow recovery from disturbance, being defined as areas that meet one or more of the following criteria (see the table in the Annex I)

- Uniqueness or rarity
- Functional significance of the habitat
- Fragility
- Life-history traits of component species that make recovery difficult
- Structural complexity

APEIs and VMEs would be expected to be selected for distinctly different reasons and to serve distinctly different purposes. The selection of APEIs in a region is meant to preserve large, representative and self-sustaining areas of the ecosystem, while the selection of VMEs is meant to preserve specific examples of ecosystems and habitats that are vulnerable to disruption or impact from human activities (e.g. for FAO, bottom fisheries). In the terms used in conservation planning, APEIs would be generally selected on *'*coarse filter*'* criteria such as representation of broad ecosystem features and gradients (Hunter *et al.* 1988, Hunter 1991). VMEs would generally be selected on *'*fine filter*'* criteria such as the occurrence of unique species combinations or examples of fragile habitat structures. This general combination of coarse and fine scale approaches is commonly used in both marine spatial and conservation planning in numerous national and international processes.

A dual *'*coarse-filter*'* and *'*fine-filter*'* spatial planning approach provides for :(i) regional approach (seascape scale) targeting broad ecosystem features and gradients, and (ii) special sites that may be of particularly high values or at particularly high risk. A coarse filter approach will generally focus on levels of ecological organization above the homogeneous community type to include seascape level ecological phenomena (including disturbance regimes) and heterogeneity. Ecological communities may not be sufficiently independent to be considered as separate components of biodiversity. Therefore, it has been recommended that maintenance of a diverse representation of physical environments should be used to maintain a majority of species diversity as a coarse filter approach to conservation of biological diversity (Hunter *et al.* 1988). It has also been also suggested that maintaining areas of high physical and ecological heterogeneity through a coarse filter approach offers increased resilience under changing climatic conditions (Halpin 1997). As such, in the context of the REMP development, APEIs may be best suited to perform this coarse scale function of protecting broad gradients of habitats and physical conditions.

The complementary fine filter approach (e.g. VMEs) focuses on conserving individual rare or specialized species that may slip through the coarse filter and are not necessarily protected in the reserves (e.g. APEIs). An illustration of this point using hydrothermal vents as an example suggests that *'*APEIs are expected to work for broadly distributed organisms, but are likely inadequate for small, rare, and isolated habitats with idiosyncratic physico-chemical environments and with faunal assemblages endemic to and dependent on those environments*'* (Van Dover *et al.* 2018). Under this example coarse filter planning approach (e.g. APEIs) would need to be supplemented with fine-filter planning approach (e.g. VMEs) in order to capture these isolated and rare (at a global scale) hydrothermal vent features.

Due to the very different scale and purpose of these two different area-based planning approaches, the process for describing and identifying a broad collection of representative APEIs areas (*'*coarse filter planning*'*) will focus on different objectives, different criteria and different analytical methods than the identification of potential VME sites, in other words sites in need for protection to preserve ecological balance of the marine environment (*'*fine filter planning*'*).

[89] http://www.fao.org/in-action/vulnerable-marine-ecosystems/en/

Spatial Planning Criteria and Methods

Evidence based spatial analysis to support the development APEIs within the REMP planning process should adhere to the standards of 'Best Available Scientific Evidence,' 'Best Available Techniques,' and/or 'Best Environmental Practices' as described in the draft regulations on exploitation of mineral resources in the Area (ISBA/25/C/WP.1). There is an extensive and growing scientific literature on the best practices and methods for conducting spatial planning for conservation and management. Current best environmental practices include systematic conservation planning (SCP) approaches that allow for objective, multi-criteria analysis in the site selection process (Ban *et al.* 2013) Key components—and benefits—of systematic conservation planning, compared to sector-specific or *ad hoc* approaches, include transparency (e.g., defined goals, explicit analyses of data, quantitative objectives), inclusiveness (e.g., engaged stakeholders, consideration of known elements of biodiversity), integration (e.g., complementarity of selected areas and actions, spatial connectivity), and efficiency (e.g., costs to users and implementers are minimized) (Margules & Pressey 2000; Pressey 2007; Pressey & Bottrill 2009; Ban *et al.* 2013).

Where possible, more sophisticated spatial planning approaches now also suggest the use of multi- criteria trade-off analyses to allow for more transparent and objective analysis of potential siting and potential outcomes (White *et al.* 2012, Lester *et al.* 2013, Best and Halpin 2019). The contrasting tradeoffs between habitat conservation and resource use can be explicitly modeled in terms of an efficiency frontier (White *et al.* 2012). Originally developed as portfolio analysis to weigh financial investment in terms of risk versus return over time (Markowitz 1952), tradeoff analysis provides a useful view for evaluating across many sites the risk to environmental protection versus the profitable return to industry. Ideally, alternative sites can be chosen that maintain profitability while also maximizing conservation benefit. Plotting the value of each site along two axes (*i.e.* profitability versus conservation) readily yields a relationship, which for the ideal scenario of interacting services is concave across the range of values (Lester *et al.* 2013).

Systematic conservation planning (SCP) and trade-off analysis are best-practice standards that should be implemented where possible in the development of REMPs. These approaches benefit from a growing set of tools and techniques in both the terrestrial as well as marine spatial planning fields. A very important caveat is that both systematic conservation planning (SCP) and trade-off analysis require significant data coverage and precision in order to be fully implemented.

Better data can provide increased spatial precision

To date, the development of proposed APEIs to support REMPs has been conducted using very coarsely defined areas using simple geometric features. In the case of the CCZ region, the size, shape and configuration of individual APEIs were based on simple criteria stating that each APEI:

- should take into account biophysical gradients which affect the biogeography of marine biodiversity in the planning region;
- should protect a full range of habitat types found within each subregion;
- should be large enough to maintain minimum viable population sizes for species potentially restricted to a subregion;
- should be surrounded by a buffer zone to ensure that biota and habitats in the protected area are not affected by anthropogenic threats occurring outside the APEIs; and
- The boundaries should be straight lines to facilitate rapid recognition and compliance.

This process resulted in a collection of 9 rectangular APEIs composed of 200km x 200km core areas surrounded by an addition 100km buffer zones providing 400km x 400km final APEI units. The simple spatial design of these APEIs reflects both a desire to use parsimonious criteria, but also reflect the matching the limits of spatial precision to the data and knowledge limitations in the region (Wedding *et al.* 2013, Wedding *et al.* 2015).

In data poor situations, spatial planning will necessarily rely on broad assumptions concerning species distributions, expected larval connectivity, and geophysical gradients to develop guidance on the size, shape and spatial configuration of proposed APEI sites (Wedding *et al.* 2013, Wedding *et al.* 2015, Dunn *et al.* 2018.

With increased coverage and density of appropriate data and information, the ability to propose and justify more precise, finer-scale and potentially more complex shapes and configurations become more possible. This potential for increased precision in the future could be beneficial to the development of more detailed REMP planning that could provide for targeted selection of representative APEIs. It is hoped that new data aggregated and shared under the emerging ISA DeepData information system (see section V) will directly help provide more information and precision in the REMP development process.

Site versus Regional Network Analyses

In general, spatial planning requires two types of criteria and scales of analysis: (1) individual site criteria that provide guidance on the priority, size, shape, and orientation of individual sites; and (2) network or regional criteria that provide guidance on the representativity, adequacy, spatial configuration, connectivity and other broader criteria guiding the development of the entire collection of sites. Table 1 presents general APEI selection criteria with general assessment approaches.

Table 1. APEI criteria and general assessment approaches

APEI Criteria	Assessment Approach
large areas	spatial analysis of ecosystem extent vs. relative areas
self-sustaining populations	Metapopulation, dispersal distance and connectivity analysis
broad range of habitat variability	Habitat models & representativity analysis
no direct mining effects	disturbance & recovery models
no indirect mining effects	physical models (plumes)
unknown impacts	precautionary approach

Timing of spatial planning in the REMP process

The best practices of systematic conservation planning are based on the expectation that all areas in a planning region are evaluated in the process. The timing and sequencing of when areas are considered in the planning process can contribute to the number and types of alternatives that are available for consideration and the completeness of the planning process. Trade-off analyses are optimized when decisions can be made that provide positive outcomes for both resource extraction value and conservation value simultaneously.

In general, there are more possibilities for identifying the least conflicting outcomes when all areas can be considered simultaneously. Early, regional scale scoping of both areas of high mineral value as well as areas of high conservation value can increase the probability of identifying spatial configurations that support win/win outcomes. If areas are locked out of consideration in initial scoping, the possibilities for finding spatial solutions that optimize both mineral value and conservation value may be limited. Best practices in systematic conservation planning and multi- sector marine spatial planning suggest that conducting REMP analysis prior to any area allocations would provide the most options for spatial consideration and lower the likelihood for conflicts at later stages of the process.

Development of a REMP and associated APEIs will not be the end of a process; instead, ongoing evaluation and monitoring and the ability to adjust the REMP upon receipt of new data will be necessary.

Precautionary representative spatial protection[90]- the coarse filter approach

The use of area-based management tools, an umbrella term for all sorts of spatial protection measures under all possible regimes, is being promoted by the Convention on Biological Diversity since a long time as one option to safeguard a representative section of ocean ecosystems and buffer the effects of human use. The States parties of the CBD decided that by 2020 at the latest *'as a minimum 10 % of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes'* (Aichii Target 11, (Convention on Biological Diversity, 2010b), reflected in Sustainable Development Goal 14.5, (UN General Assembly, 2015)). In areas beyond national jurisdiction, this can only be implemented jointly through organisations with competence in ABNJ, such as the ISA or CCMLR. CBD adopted a set of criteria for designating representative networks of protected areas (Secretariat of the Convention on Biological Diversity, 2009) and developed the concept of 'Ecologically and Biologically Significant Areas', EBSAs, which represent sites that qualify for priority protection according to the criteria above (Secretariat of the Convention on Biological Diversity, 2014). These EBSAs should be of interest to the competent organisations, yet, there is no mechanism yet that requires competent sectoral organisations in ABNJ to recognise and implement EBSAs that would come under their remit. This may eventually be addressed by the ILBI/BBNJ agreement under negotiation.

a) Areas of Particular Environmental Interest

Due to this incoherence, and in view of the emerging threat from mining to deep sea ecosystems, ISA has started to develop its own precautionary designation of a network of representive areas in one of the potential mining regions, the Clarion Clipperton Zone (Lodge *et al.*, 2014; Lodge *et al.*, 2017), called Areas of Particular Environmental Interest, APEIs. APEI networks are ISA´s sectoral tool for spatial protection of representative habitats. However, representativity is compromised by present and potential contracts, operational selection criteria and objectives are needed, the areas are not permanently unavailable to exploration, and the effect of APEIs is as yet not ascertained. In order to ensure representativity, the network should be designated as early as possible (Wedding *et al.*, 2013; Wedding *et al.*, 2015). Later placement requires an adaptive scheme of optimising the placement of APEIs over time, in particular once a more realistic idea of the extent of mining effects will be known. This could include the consideration of relinquished areas and appropriate parts of the former exploration areas (Dunn *et al.*, 2018; Wedding *et al.*, 2013 ; Wedding *et al.*, 2015).[91]

It needs to be investigated whether such a network of APEIs will be successful to ensure the prevention of loss of biodiversity, including ecosystem functions and services once mining will start. Despite all associated uncertainty as to the biological variables, prior modelling of potential mining effects and the possible effectiveness of APEIs is crucial to designing further measures as part of the regional EMP. (see 4.5).

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[90] see also International Seabed Authority Secretariat, 2019. Guidance to facilitate the development of Regional Environmental management Plans (REMPs). Kingston, Jamaica, pp. 1-40. (pp.16-21 and 27-30)

[91] However, as witnessed during the 2019 workshop on the REMP for the Area of the northern mid-Atlantic Ridge in Evora, members of LTC and the ISA Secretariat do not consider relinquished areas or not yet contracted areas as available for APEI designation. The representative APEI network proposal by Dunn et al. was refused Dunn, D.C., Van Dover, C.L., Etter, R.J., Smith, C.R., Levin, L.A., Morato, T., Colaco, A., Dale, A.C., Gebruk, A.V., Gjerde, K.M., Halpin, P.N., Howell, K.L., Johnson, D., Perez, J.A.A., Ribeiro, M.C., Stuckas, H., Weaver, P., Participants, S.W., 2018. A strategy for the conservation of biodiversity on mid-ocean ridges from deep-sea mining. Science Advances 4 (7), 1-15..

b) Marine Protected Areas, MPAs

MPAs are the instrument used for spatial protection under national jurisdiction. MPAs are by definition a permanent designation but with adaptable measures for some or all elements of the ecosystem and addressing some or several threats. The ongoing ILBI/BBNJ negotiations seek to enable MPA (ABMT) designation also in ABNJ.

As the ISA is only competent to address threats from mining-related activities to the ecosystems of the Area and high seas, for all other threats the later ILBI agreement will set the framework. As a first indication of spatial conservation need, the CBD has initiated and adopted a global set of Ecologically and biologically significant areas, EBSAs (Clark *et al.*, 2014; Dunn *et al.*, 2014; Dunstan *et al.*, 2016; Secretariat of the Convention on Biological Diversity, 2014). As a first step, ISA should cooperate with CBD and exclude the designated EBSAs from the areas available to exploration or exploitation contracts. In two cases, there has already been a conflict which led to an exploration contract in a designated EBSA (northern mid-Atlantic Ridge) and the other time to the refusal of an EBSA proposal on the grounds of an already existing exploration contract (SW Indian Ocean Ridge) [92]. Both cases question the respect of both organisations for each other, as well as their cooperation practice.

A similar lack of effective cooperation exists in relation to the desired 'Collective Arrangement' with other competent organisations in relation to MPAs designated by OSPAR in the north-east Atlantic, where still the North-East Atlantic Fisheries management organisation, NEAFC, and OSPAR are the only members (NEAFC and OSPAR, 2015). ISA member States did not approve this cooperation.

Contractor designations

Contractors are contractually obliged to designate particular zones within their contract area, and later mine area, to monitor the impact of mining, an impact reference zone, IRZ and a preservation reference zone, PRZ. Although to be selected, based on guidance and criteria by ISA, by contractors, the PRZ could count as a representative protected site within the region. The criteria for PRZ designation, although not yet legally fixed, include that it must act as a refuge for species and habitats in the mined areas and impact areas and as such can prevent biodiversity loss (International Seabed Authority, 2018b). A number of exploration contractors have already proceeded with the selection of their IRZ and PRZ in order to be able to advance with test mining activities, as required by the ISA.[93] As there are no legally binding requirements on the size, location and quality of the sites, there is the risk that the sites chosen by the contractors will in the end not be compatible.

The REMP Guidance document issued by the ISA Secretariat[94] also suggests that REMPs may be instrumental for guiding on the relinquishment of exploration areas in a way that may best advance environmental objectives. However, the recent guidance for contractors on relinquishment (ISBA/25/LTC/8)[95] allows contractors to relinquish areas of any size larger than 1x1 km and quality. A REMP recommendation would restrict this freedom and is therefore unlikely to be observed. The other point that the Secretariat´s guidance makes is that the REMP may provide guidance to enhance the recovery of habitats and ecosystems, which may be of importance for the drawing up of contractor´s Environmental Management and Monitoring Plans as well as closure plans.

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[92] UNEP/CBD/RW/EBSA/SIO/1/4 at https://www.cbd.int/doc/meetings/mar/ebsa-sio-01/official/ebsa-sio-01-04-en.pdf; http://moocs.southampton.ac.uk/oceans/2014/03/09/shedding-some-light-on-the-international-seabed-authority/

[93] ISBA/25/LTC/6 and earlier versions

[94] International Seabed Authority Secretariat, 2019. Guidance to facilitate the development of Regional Environmental management Plans (REMPs). Kingston, Jamaica, pp. 1-40.

[95] Recommendations for the guidance of contractors on the relinquishment of areas under the exploration contracts for polymetallic sulphides or cobalt- rich ferromanganese crusts, first issued 17 July 2019.

Spatial conservation of vulnerable, unique, rare and otherwise endangered species and habitats - the fine filter approach

a) *Recognise conservation areas other than MPAs by other organisations*

The suite of representative sites should be complemented by priority sites, species and habitats for conservation, such as indicated by the criteria of CBD (Convention on Biological Diversity, 2010a), FAO (FAO, 2009)and other organisations, including regional conventions. The World Heritage Foundation may in the future also designate World Heritage Sites in ABNJ (Freestone *et al.*, 2016). In the North-East Atlantic, the presence of species and habitats under threat and/or decline as listed by OSPAR (OSPAR Commission, 2008).[96] Eventual future designations by the International Maritime Organisation, IMO, of MARPOL Special Areas or Particularly Sensitive Sea Areas in the high seas would also be candidates for an account of external conservation areas to be considered by ISA.

Measures could require the full setting-aside of such areas, or eventually require only temporal/seasonal restrictions. This could for example be the case if a certain species uses the ocean next to a mining site only temporarily, e.g. as nursery (see also ISBA/26/C/7, Annex, para 8.3).

b) *Proactively apply the criteria set out above to the region concerned*

Given the ubiquous committment of States to the criteria set out for determining vulnerable species and habitats with respect to the physical effects of bottom fishing (FAO, 2009) and ecologically and biologically significant ecosystems (Convention on Biological Diversity, 2010a), an ecosystem-based regional environmental management plan should take account of features which qualify as vulnerable (to mining), rare, unique, fragile, sensitive or of particular importance for particular life history stages, for species and habitats under threat and decline or of particular functional significance. Ideally, each exploration contractor would carry out a spatial analysis of its contract area and map the distribution of at least mesoscale benthic habitats and communities considering potential conservation areas acc. the criteria of FAO (2009) and CBD (Convention on Biological Diversity, 2010a). The ISA Secretariat´s REMP Guidance (2019, Annex II) establishes the context between the criteria above and the requirements of UNCLOS Articles 145 and 194(5) to provide for the effective protection of the marine environment from harmful effects of mining activities, including to keep the ecological balance at large, preventing biodiversity loss and maintaining functional characteristics and productivity (see in Annex 1).

Addressing potential conflicts with other legitimate uses

The regions covered by the future REMPs will be determined by the habitats/seascapes where deep seabed mining will potentially take place, *i.e.* manganese nodule mining at deep sea abyssal plains, seafloor massive sulphides, SMS, excavation from mid-ocean ridges and scraping crust from subtropical seamounts. Even in the remote Clarion-Clipperton Zone, mining will have to operate with *'due regard'* (UNCLOS Part VII, Art. 87) for other activities, such as (tuna) fishing and science, cable laying and shipping, which are all guaranteed high seas freedoms. It is very likely that sulphide mining on mid-ocean ridges, for example in the Indian and Pacific Ocean, will to some extent coincide with sites relevant for deepwater bottom fishing (Thompson *et al.*, 2016). Almost all the northern and central Indian Ocean Ridge, and all of the northern Mid Atlantic Ridge south of the Azores are covered with exploration contracts. So far, the activity level is limited to exploration and research cruises, however, once developments move closer to exploitation, much more investigations will be required, eventually limiting opportunities for pelagic and benthopelagic fishing, and in particular for independent research.

[96] https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats

The potential for conflict with fishing is even more relevant should cobalt crust mining take place at the preferred depth of deepwater fishing at seamounts in the Pacific. In addition, tunas aggregate at or near such seamounts (Morato *et al.*, 2010a, b) and the activity level as well as the pollution and noise incurred may substantially impact on fishing opportunities.

Also, scientific research may be affected. States around the world have invested in deep sea research, including on the biology and the resources of hydrothermal vents, seamounts and on the abyssal plain. It is in the interest of independent knowledge generation to carry out science-driven rather than exploration-driven research also in contracted exploration [and exploitation] areas. Yet, the contract reserves the exclusive right to explore to the contractor. However, the intersection between research and exploration is currently undefined. It can be expected that the conflicts will increase, once an operator has an exploitation contract.

Overall, conflicts can be in the form of direct competition for space, such as with shipping, cable-laying, fishing and research, but also restricted areas for conservation or indirectly through deterioration of environmental quality which impairs the opportunities of other users, e.g. fishing or prospecting for marine genetic resources, and could impact on, coastal communities as well (Blue Ocean Law and Pacific Network on Globalisation, 2016).

Therefore, deep seabed mining of minerals in the Area does directly affect quite a range of stakeholders. In addition, the indirect conflict with global societal goals such as the CBD Biodiversity targets and the 2030 Agenda has to be considered. If the potential deterioration of relevant ecosystem functions and services is taken into account, it is the world community which could be affected through e.g. a lessening of the ocean´s buffering capacity of climate change effects (Sweetman *et al.*, 2017). Here, also the objectives and instruments of the currently negotiated ILBI/BBNJ to enable the conservation of biodiversity in the high seas have to be included in the analysis with a view to avoiding conflicts. The mining-related destruction of critical habitats may also lead to the loss of future opportunities for exploring and eventually exploiting so-called marine genetic resources in the Area. This is particularly relevant for organisms found at or close to hydrothermal vents, which often show a very high specialisation to the respective living conditions, which may become useful for developing human materials, tools and cure.[97]

The information to be provided includes the consideration of the conflict potential (who was involved? which actions taken?) and the solutions found, including eventual procedural arrangements with other international bodies (see also ISBA/C/26/7, Annex para 8.5).

4.2.4 Monitoring, evaluation and review of adopted REMP

4.2.4.1 Regional monitoring programme

Monitoring is well-anchored in ISA policies, and based on Article 145, the qualities and scope are defined: In the ISA Strategic Plan, Strategic Direction 3.4 it reads *'Develop scientifically and statistically robust monitoring programmes and methodologies to assess the potential risk for activities in the Area to interfere with the ecological balance of the marine environment'* and in 3.5 *'Develop appropriate regulations, procedures, monitoring programmes and methodologies to prevent, reduce and control pollution and other hazards to the marine environment, as well as interference with the ecological balance of the marine environment, prevent damage to the flora and fauna of the marine environment and implement the relevant requirements relating to the protection of the marine environment as contained in Part XII*

[97] A recent example for the extremely high importance of preserving ecosystems and biodiversity for mankind was the test being used to diagnose the Covid-19 virus from marine genetic material derived from hydrothermal vents. https://www.whoi.edu/news-insights/content/finding-answers-in-the-ocean/

of the Convention'. It is up to the LTC to *'make recommendations to the Council regarding the establishment of a monitoring programme to observe, measure, evaluate and analyse, by recognized scientific methods, on a regular basis, the risks or effects of pollution of the marine environment resulting from activities in the Area, to ensure that existing regulations are adequate and are complied with and coordinate the implementation of the monitoring programme approved by the Council*; (ISBA/23/LTC/5, B.8(h)).

The objective of a REMP-wide monitoring programme is to keep track of environmental changes in the region, to determine the spatial and temporal extent of mining-related impacts, and to control the success of the management plan in view of these changes and the actual mining activities carried out. Such a regional standard monitoring programme should best be developed in cooperation with adjacent States and relevant regional or global organisations. In particular the collaboration of contractors is required. The design of the monitoring programme, including spatial and temporal sampling coverage and methodologies, as well as the subsequent assessment framework and the supporting modelling and should be elaborated by a group of experts. Monitoring should start as soon as possible to gather the baselines and last so-to-say in definitively, as a recovery after any mining ends should also be documented. Over time, the details of the monitoring scheme will have to be adapted.

In order to be able to assess any changes of ecosystem quality due to mining-related activities, and in conjunction with cumulative pressures, a sound environmental baseline for the respective regions is a required first step (this should be provided for in the Environmental Report, see 4.3) and be supplemented with new scientific knowledge over time. The second critical factor is that REMP-specific regional, subregional and eventually localised environmental goals and SMART objectives have been agreed and associated with measurable indicators (should be part of REMP development, see 4.2.2.3). The identified indicators will be the basis for developing a monitoring programme. It is more than likely, that the indicators and their exact metrics will have to be adapted over time with experience gained.

The resulting coarse regional REMP monitoring scheme, should be complementary to other deep ocean observations as are suggested by (Danovaro *et al.*, 2017; Levin *et al.*, 2019; Muller-Karger *et al.*, 2018). Therefore, the search for appropriate monitoring indicators as well as thresholds for assessments of the ocean health status, should be done across all existing or planned ocean observation initiatives. In addition, a fine-scale REMP monitoring programme will have to develop particular indicators of environmental harm from mining-related activities. These should then be used by contractors and independent research and monitoring alike.

Technically, the standard monitoring programme could usefully be based on remote, permanently recording instruments, however this may prove difficult for biological parameters. Scientific research of multiple kind, including observations of migratory species behavior will supplement longterm stationary data acquisition. In addition, the inspection regime of ISA will have to assure contractor compliance with permit conditions.

4.2.4.2 Evaluation of monitoring results/assessment of change

While monitoring is an ongoing activity, the information gathered will have to be compiled and evaluated periodically by scientific experts to

- Establish periodically a state-of-the-art quality status report of the region;
- Integrate the latest state with the longterm picture and detect natural and man-made changes;
- Evaluate the gravity and if possible causes for the changes observed;
- Evaluate the performance of APEIs in preserving the ecological diversity and balance of the region;
- Evaluate the appropriateness of indicators and eventual thresholds;

- Assess whether mining-related activities have had measurable effects which exceed the *à priori* expectations which are the basis of the REMP;
- Recommend new or adapted measures in the REMP.

In summary, at this stage the environmental performance of the REMP is assessed for the entire planning area with respect to achieving the regional goals and objectives for biodiversity conservation. The results should inform the Environmental Management and Monitoring Plans of contractors active within the region. Technically, it is advisable to develop standardised assessment formats and processes.

4.2.4.3 Review

A review of the REMP should take place periodically, *e.g.* every 5 years. The interval should depend on the increase in exploitation contracts in the region, as well as triggers set by other environmental change, such as new knowledge on the effects of climate change, significantly changing use patterns by other sectors, or revised globally applicable environmental or sustainability targets. As suggested in ISBA/26/C/6, Annex, section 4) the review process should be supported by annual reporting to the Council of all new environmental information coming in from contractors, relevant new scientific literature and monitoring data and information. An independent expert review could provide strength to the findings (Lallier and Maes, 2016). It is suggested that the committee provides recommendations as to the implications (if any) of new knowledge and findings for the plan.

For this purpose, and for further developing regional cooperation mechanisms, a permanent body responsible for following-up the issues of the region would be the best option.

4.2.5 Science programme

While the monitoring programme will have to be funded by ISA and contractors, if not in conjunction with other international initiatives for global observing programmes, marine scientific research is likely to be funded either on a national or a private basis. REMPs offer a great opportunity for ISA to agree with scientific research institutions on priority research questions in the region and to facilitate corresponding research programmes in line with Art. 143 UNCLOS.

For this purpose, an independent scientific advisory group affiliated with the ISA could be more effective than the usual *ad hoc* cooperation. This group could for example advise on the need for regional assessments, on research cooperation and funding options for research in a systematic and quality-controlled way. State cooperation in research could be a powerful mechanism to raise funds to support the research necessary for establishing regional environmental baselines and for conducting environmental monitoring.

For achieving the regional goals and objectives of the REMP, and in particular for enabling the identification of meaningful environmental indicators and thresholds, the environmental research carried out by contractors will have to be supplemented with strategically planned, independent scientific research projects. Supplementing (local) research by contractors with independent research is essential for verifying baselines and fully observing potential changes in the marine environment. Contractors are not legally required to extend their monitoring outside their contract area. This is problematic in view of the fragmentation of contract areas due to relinquishments.

Science has a lot to offer for environmental management: Science can advise on how best to standardise taxonomy, sampling and data analysis to the extent needed, recommend modelling approaches, identify appropriate indicators for ocean health and harm and grade the risk to the environment. Test mining has a role to play here, and any in situ testing should be accompanied by a scientific monitoring programme. Overall, science will approach the many ecological unknowns of the deep, for example the role of rare species for ecological functioning (Turner *et al.*, 2017), the role of microbes for ecosystem

services and carbon sequestration (Orcutt *et al.*, 2018), the deep pelagic realm (Christiansen *et al.*, 2019a; Drazen *et al.*, 2019), the needs and role of migratory species (see e.g. in (Chin and Hari, 2020).

4.2.6 Capacity development

Capacity development for deep sea research and the management of mining-related issues is an important task and REMPs should deliver opportunities for education, exchange and cooperation within and beyond the region. The most fruitful option might be through cooperation with actors in the region, be it regional science, management or governance organisations, with coastal States and other stakeholders such as shipping, policing, or non-governmental organisations, NGOs. A regional marine environment-dedicated academy or study with deep-sea focus could provide a long term educational benefit. It has to be observed, however, that the island nations of the Pacific and Indian Oceans have a small population, and as such capacity problems which will never match the capacities that large industrial nations such as Germany are able to raise.

4.2.7 Conclusions

REMPs, if designed to enable a systematic conservation planning along the general frameworks known from Strategic [Environmental] Assessment, not only provide for designing and implementing measures in line with the precautionary and the ecosystem approach, but may also develop into a platform for regional cooperation for environmental conservation. Both aspects, the internal regulatory process and the external communication are essential for achieving an improvement rather than a deterioration of the state of the oceans. Transparency, inclusion of stakeholders of all kind, coherence with other, in particular the emerging ILBI/BBNJ, mechanisms, and most important of all the desire to maintain healthy ocean ecosystems are key to effectively protecting flora, fauna, ecosystem functioning and services from the effects of current and emerging pressures, such as deep seabed mining. *Vice-versa*, a REMP which has no steering power and no means of control, such as the CCZ EMP in its current form, is merely window-dressing.

5 Stakeholder engagement

5.1 The role of stakeholder engagement in an ecosystem approach to management

Stakeholder involvement is one of the key principles for the application of an ecosystem approach to the management of human activities (Long *et al.*, 2015), and is viewed as a critical success factor next to political will and leadership, and process transparency (Olsen *et al.*, 2014). It is fundamental for knowledge acquisition and a means to enhance the understanding and acceptance of policies and measures (Langlet and Rayfuse, 2018). This is essential to gain a 'social license to operate' (Grimmel *et al.*, 2019; Voyer and van Leeuwen, 2018). Around the world, existing national and regional initiatives to implement holistic regional ocean governance regimes have made progress towards developing various solutions to come to the best possible interplay between planning authority, government, legislation, planning system and stakeholders. There are a number of lessons to be learned by ISA from these experiences.

Although the Regional Environmental Management Plans of ISA are and will likely remain a sectoral management tool, decisions on measures to enable the effective protection of the marine environment from harmful effects arising from mining-related activities require an integrated, holistic view on and assessment of past, present and future pressures on those ocean regions, vulnerabilities and expected changes even without any mining taking place. Integration is required horizontally across sectors, as well as vertically from law-makers to the public, be it in a top-down or bottom-up (Olsen *et al.*, 2014). This requires also a certain degree of cooperation among regional actors for environmental conservation as a common aim (see chapter 5.5).

However, (Alexander and Haward, 2019) reviewing more than 1000 articles on ecosystem-based/ecosystem approach to management identify four key challenges/tensions to sectoral interplay which need to be addressed, including: governance structures and mechanisms, communication and sharing, participation and exclusion and fragmentation. In order to ensure good governance based on active stakeholder participation, they recommend to

- Create coordinating structures which operate across sectors •
- Foster means of inter-sectoral communication and data-sharing
- Design participation processes to facilitate broad-scale participation.

Two further challenges consist in the likely imbalance of powers and means among stakeholders, and obstacles to bridge the communication divide between policy and science as well as to resource users (Langlet and Rayfuse, 2018 and lit quoted). These challenges can only be overcome by inclusive, collaborative processes which are allowed sufficient time to mature (Slater and MacDonald, 2018).

And in the context of waters beyond national jurisdiction, the UNCLOS provides freedoms of use in the high seas, an issue which is now subject to the negotiations 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 (General Assembly resolution 72/249). Competent management organisations such as IMO or RFMOs act autonomously and until today their governance structures are ill-adapted to enable inter-organisational cooperation (Matz-Lück and Fuchs, 2014).

Transparency through stakeholder engagement is particularly relevant for novel activities with presumably large scale and long term consequences, such as deep seabed minerals mining. It aids the implementation of the precautionary principle in that stakeholders are informed about eventual risks, uncertainties and priorities in decision-making. In addition, stakeholder involvement *'provides an opportunity to deepen mutual understanding about the issues at hand, explore and integrate ideas together,*

generate new options and solutions that may not have been considered individually and ensure the long-term availability of resources to achieve mutual goals' (Pomeroy and Douvere, 2008).

Different levels of stakeholder engagement can be distinguished and should be negotiated at the beginning of the engagement process: options extend from the mere provision of information and consultation (vertical approach) to dialogue formats which build horizontal interactions and have more or less negotiating power (Pomeroy and Douvere, 2008).

Stakeholder mapping and analysis is an important process in order to make sure nobody is 'left behind', or relevant interactions are not considered. Stakeholders may be affected by management decisions, dependent on the resources to be managed, have claims over the area of resources, exercise activities that impact on the area or resources, or may have, for example, special seasonal or geographic interests (Pomeroy and Douvere, 2008). These and other groupings have to be analysed to understand their interests, relationships and concerns, and weighed through a transparent set of criteria as to their importance for the process (Quesada-Silva *et al.*, 2019). Another important aspect of stakeholder engagement, in particular in the ISA REMP processes, is capacity development and raising awareness by sharing the knowledge on the region, its vulnerabilities and factors that impact on the environment.

Sited in a transparent, interactive governance framework (UNECE, 2014) the public dialogue should to start early in the process as long as all options are open, and due account has to be taken of its outcome (Gopnik *et al.*, 2012). All planning phases require different levels of interaction with stakeholders (Pomeroy and Douvere, 2008; Quesada-Silva *et al.*, 2019). Under these conditions public participation can ensure benefits such as:

- Enhanced legitimacy and facilitation of public acceptance of a treaty regime;
- Improved quality of decision-making by increasing the information and perspectives available to decision makers;
- Enhanced accountability of decision-making through public scrutiny; and
- Assisting small and less-developed states in building their capacity to participate effectively in the agreement (Wiser, 2001).

Implementing a management regime which aims to regulate human use to sustainable levels is not a one-off exercise and requires stakeholder input not only over a long planning cycle, but also during assessment and review phases (Rist *et al.*, 2013). The role of stakeholder and public involvement should be particularly strong in determining management objectives and actions, and may be essential for providing all available knowledge to the table (Arkema *et al.*, 2006). Essentially, the involvement of as broad a stakeholder constituency as possible aims at understanding divergent views and developing strategies that accommodate such differences in order to achieve a common goal of stewarding marine resources for this and also for future generations.

5.2 Stakeholder participation in the international context

Transparency, public participation and accountability are emerging standards in environmental governance (Ardron, 2014; Ardron, 2016; Ardron *et al.*, 2018; Wiser, 2001) [98], a requirement clearly expressed in principle 10 of the Rio Declaration on Environment and Development (1992):

[98] see e.g., in the EU Transparency Regulation (EC) No. 1049/2001; Sutherland et al. (eds), 2004. The Future of the WTO: Addressing Institutional Challenges in the New Millennium, Geneva; World Bank, 2010. World Bank Policy on Access to Information. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2010/06/03/000112742_20100603084843/Rendered/PDF/548730Access0I1y0Statement01Final1.pdf

'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.'

The Agenda 21 (UNCED, 1992) acknowledges broad public participation in decision-making as '*one of the prerequisites for the achievement of sustainable development*'. And the Aarhus Convention (1998) and related Protocol, which acknowledge the right of citizens to a healthy environment, establish the right of individuals and civil society on

- Access to environmental information;
- Participation in decision-making in environmental matters;
- Access to justice in environmental matters

for currently 47 parties to the Convention. These parties are required to ensure public participation to be as broad and timely as possible and to '*promote the application of the principles of the Convention in international environmental decision-making processes*' (UNECE, 2005, see also Annex x).

Subsequently, the outcome document of the United Nations Conference on Sustainable Development, Rio+20, *'The future we want'* (Convention on Biological Diversity, 2012a, in para 88(h)) calls to

'ensure the active participation of all relevant stakeholders, drawing on best practices and models from relevant multilateral institutions and exploring new mechanisms to promote transparency and the effective engagement of civil society'.

Sustainable Development Goal 16 of the 2030 Agenda for Sustainable Development (UN General Assembly, 2015 (UN General Assembly, 2015)) calls for making progress towards inclusive and peaceful societies, access to justice and effective, accountable institutions at all levels.

In addition, indigenous people have the right to free prior public consent on all matters of their concern (UN General Assembly, 2007).

5.2.1 Participation in policy development

Several global or other international organisations have revisited their stakeholder engagement policies. For example, UNEA, the United Nations Environment Assembly of the United Nations Environment Programme, proposed to revise its policy on stakeholder engagement[99] fully aligned with all relevant UNEP and United Nations rules and regulations, as well as with the guidelines and initiatives relating to United Nations cooperation with stakeholders. However, as of 2019, no consensus was reached on a UNEA policy, but changes in practice were published in a handbook[100]. Due to funding issues, this has led to a weakening of the role of civil society *vis-a-vis* the private sector[101].

Overall, UNEP applies the nine Major Groups approach (as outlined in Agenda 21 (UNCED, 1992)) which categorises not-for-profit and non-governmental organisations in 9 major groups, including the *'Scientific and technological community (incl. research and academia)', 'indigenous peoples and their communities', 'business and industry', 'non-governmental organisations'* and *'local authorities'*. Accredited observers have the opportunity to participate at two levels: on agenda-setting processes, and on policy-making and decision-making processes. During the UNEA opening and closing plenary, Ministerial Roundtables, UNEA parallel themes, Committee of the Whole (COW), informal side events, MGS

[99] UNEP/EA.2/18. Policy on stakeholder engagement. Report of the Executive Director. United Nations Environment Assembly of the United Nations Environment Programme Second session Nairobi, 23–27 May 2016 Item 6 of the provisional agenda. This policy is complemented by an implementation handbook.

[100] http://wedocs.unep.org/bitstream/handle/20.500.11822/7449/-Handbook_for_Stakeholder_Engagement_at_UNEP-2015Handbook_for_Stakeholder_Engagement_at_UNEP.pdf.pdf?isAllowed=y&sequence=3

[101] https://wedocs.unep.org/bitstream/handle/20.500.11822/26042/Stakeholder_engagement_policy.pdf?sequence=1&isAllowed=y

representatives may make written and oral interventions, access all public sessions and meeting of CPR, have designated seats, and access all public documents. The same formal conditions apply in other UN context. Nonetheless, the number of NGOs that have successfully obtained consultative status with the United Nations Economic and Social Council, ECOSOC, has increased to 4045 in 2014 (Willetts 2015, quoted by Blasiak *et al.*, 2016).

In practice, however, processes such as the development of the 2030 Agenda (UN General Assembly, 2015) or the process towards and the negotiations on a future agreement for the conservation of biodiversity in ABNJ[102] were and are perceived as comparatively open and transparent, encouraging the provision of substantial input by particularly non-governmental stakeholder (Blasiak *et al.*, 2016). Also, a regional environment convention such as OSPAR acknowledges that the observer community plays an essential role in the promotion of protecting and conserving the North-East Atlantic and its resources. The observers are encouraged to contribute actively to its work and to shaping policy development.

For the EU, following the adoption of the 2015 Better Regulation Guidelines[103], the European Commission has extended its range of stakeholder engagement methods to enable stakeholders to express their view over the entire lifecycle of a policy. Nonetheless, a recent analysis of the language used in the proposals made by the European Commission, Council and Parliament on the draft Regulation for the Governance of the Energy Union (Article 10 concerned with public participation) highlights different degrees of compliance with the Aarhus Convention. The key criteria are early engagement before decisions are taken, reasonable timeframes for information and response, the effective participation in all stages of planning, the publishing and consideration of the stakeholder views (what and why or why not), dialogue forums (Stockhaus, 2018).

Major limitations to stakeholder engagement in global environmental processes may arise from insufficiently prepared and organised meetings (unclear meeting goals, improper dealing with conflicts, unbalanced representation, unsatisfactory outcome) (Garard and Kowarsch, 2017). The establishment of multi-stakeholder advisory boards is seen as one option to improve engagement.

5.2.2 Participation in regional planning

Subsequent to the agreements in Agenda 21, at least 23 countries and four major regions are making efforts to develop holistic marine integrated management regimes (Balgos *et al.*, 2015 quoted by (Rodriguez, 2017)) which to some extent comply with the main characteristics of such regimes including:

- collaboration between government and user interests,
- integration,
- a system to handle environmental impacts,
- a system to handle multi-use of the ocean,
- cumulative effect assessments.

In particular in transboundary marine spatial planning processes, stakeholder involvement is of particular importance, and good practices include (modified after (Kull *et al.*, 2019))

- Enhancement of existing partnerships and transboundary cooperation networks;
- Development of stronger participatory processes and tools;
- Enhancement of convergence between policy and legislative arrangements;
- Development of transboundary data and information base;

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[102] ILBI/BBNJ, see footnote 49

[103] see https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how_en

- Establishment of clear joint objectives.

This also holds for developing REMPs in the Area *vis à vis* other legitimate users of the sea and their interests, as well as potential transboundary issues arising with adjacent coastal States. Challenges are in all cases the non-harmonised legal, government and planning systems and requirements, eventually competing interests and other communication barriers (Kull *et al.*, 2019). To overcome these barriers, the authors recommend

- To establish a coordination body which is respected by all relevant stakeholders;
- To create a regular dialogue for continued exchange, including on differences in expectations and planning systems;
- To design the stakeholder engagement to fit the stakeholders and the purpose, addressing the 'who?', 'when?', 'how' and 'why would stakeholders want to be involved';
- To facilitate transparent data sharing, including regular exchange of information, supporting comprehensive transboundary mapping exercises;
- To identify jointly possible areas of conflict and develop long-term solutions for particular issues.

Major challenges for such regional processes arise because in reality, the processes tend to a.o. be a-cyclical and *ad-hoc* and focusing on particular problems and sectoral objectives rather than being a precautionary and comprehensive *a priori* settlement of potential later disputes and conflicts (Jones *et al.*, 2016). The substantial deviations from the desired ecosystem-based marine spatial planning processes make a meeting of the political and conservation targets unlikely (Jones *et al.*, 2016). This is the risk run by the ISA if the REMP processes are not properly designed and managed from the start.

5.3 The role of stakeholder engagement in current ISA REMP activities

The International Seabed Authority (ISA) is the authority that administers the Area and its resources on behalf of and for the benefit of mankind as a whole (UNCLOS, Arts. 136, 137(2), 153(1)), while protecting the marine environment from the harmful effects that may arise as a result of seabed mining and related activities (Art. 145). The status of the Area and its mineral resources as a common heritage of mankind strengthens the call for transparency, in particular a benefit-sharing processs which is fair, transparent and accountable (Jaeckel *et al.*, 2016).

Neither UNCLOS, nor the Implementing Agreement of 1994, or the Mining Code discuss transparency *per se,* nor are the terms in Articles 168 and 181, 'industrial secret', 'proprietary data', 'confidential information', or the exact nature of related 'data and information' defined (International Seabed Authority, 2016a). However, it is made clear in UNCLOS (Annex II, Art. 14(2)) and the current mining code that data necessary for the formulation by the ISA of rules, regulations and procedures concerning protection of the marine environment and safety, other than equipment design data, shall not be deemed proprietary and therefore have to be made available to the publically. A first step was taken by ISA when releasing the database 'DeepData' in July 2019[104].

Therefore, stakeholder engagement should be at the heart of developing and implementing Regional Environmental Management Plans, a purely environmental management tool to safeguard the requirement of UNCLOS Article 145 *'to provide for the effective protection of the marine environment from harmful effects of activities in the Area'*. Along these lines, the Council explicitly requested *'that plans be developed in a transparent manner under the auspices of the Authority'* and supported the Secretariat´s efforts to expand the breadth and depth of its strategic partnerships, encouraged further outreach and

[104] https://data.isa.org.jm/isa/map/

consultation with relevant stakeholders as well as broad participation in the programme of workshops as a whole (ISBA/24/C/8, A.§9´and 10).

Yet, the current model for the participation of stakeholders in the development of REMPs in the Area is limited to the participation of a limited number of experts in scientific and technical workshops, as indicated by the ongoing REMP workshop announcements and (International Seabed Authority Secretariat, 2019). The efforts of the Secretariat to communicate with other users of the region and international organisations are not reported on. Workshops have 30-40 participants, all included, and the ISA Secretariat is responsible for the selection according to own criteria. Selection criteria generally include *'geographic factors and gender balance and ensuring the effective participation of relevant stakeholders (such as member States, in particular developing countries, contractors, sponsoring States, representatives of industry sectors and non-governmental organization) and experts in relevant fields'* (International Seabed Authority Secretariat, 2019); ISBA/25/C/13). However, the qualifications required are mostly scientific.

The current procedure is as follows:

- In cooperation with an external party, which usually hosts the workshop (State, NGO, contractor), the ISA secretariat drafts the terms of reference and announces the meeting on its website;
- Nomination of experts is invited which adhere to the selection criteria for participants (see ISBA/25/C/13, section II, 7(b). The selection criteria are
    c) Good scientific knowledge and research experience, with peer-reviewed publications,
    d) Experts with access to unpublished, high quality biodiversity and/or environmental data
    e) Good experience and expertise in the scientific design of area-based management tools,
    f) Good experience in environmental management of seabed activities.

A contribution of relevant data and information from all available sources is invited and a data report is compiled. As far as known, these are predominantly compilations of published scientific information which do not provide for cumulative impact assessments, scenarios for future change and alternative action or consideration of ecosystem services, as e.g. expected from the environmental report of a Strategic Environmental Assessment (EU SEA Directive, 2001) or the 2003/2017 SEA Protocol to the UNECE Convention on Environmental Impact Assessment (EIA) in a Transboundary Context, Espoo Convention (1991)[105].

For each region, two workshops are envisaged for the purpose of

- Identifying possible elements of REMPs, including area-based management tools; and
- Seeking the views of experts and stakeholders, 'including through pre-workshop, workshop, and post-workshop processes, including the peer-review of workshop results, as appropriate' (International Seabed Authority Secretariat, 2019).

The first workshop shall focus on scientific synthesis and description of the region, the second shall identify specific management measures and implementation framework for developing the elements of the management plan (International Seabed Authority Secretariat, 2019). A post-workshop process, including peer-review, will deliver a draft REMP, however here the roles and responsibilities are unclear.

[105] Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context, https://www.unece.org/index.php?id=46020&L=0

Note:

- No agreed strategy for stakeholder engagement is applied. There is a risk that the lack of stakeholder mapping leads to an imbalance of stakeholders represented at workshops;
- The currently envisaged method of stakeholder participation is limited to one-off region-specific technical workshops with limited capacity;
- Neither an overarching advisory panel for all regions, nor region-specific advisory committees are foreseen - such mechanisms could provide for a broader representation of stakeholder groups other than scientific experts;
- There is no continuous workstream foreseen to which stakeholders could provide input, commenting will only be possible on the draft REMP document;
- Rights and duties of the REMP managing organ and stakeholders need to be defined, including a response mechanism to stakeholder comments and suggestions.

5.4 Who is a stakeholder in the context of REMPs?

Transparency and broad stakeholder engagement is expected for the development processes of regional environmental management plans (International Seabed Authority, 2019b)[106]. The Advisory Committee advising the ISA Secretariat on REMP development particularly emphasises the advantages of collaborating with the broadest possible coalition of partners (Billett *et al.*, 2019a). Relevant stakeholders are suggested to include, *inter alia*[107]:

- ISA Contractors;
- ISA Member States, in particular States bordering the respective region, developing countries, sponsoring States;
- Observers to ISA, including ocean industries organisations, e.g. International Cable Protection Committee (ICPC); inter- and non-governmental organisations, science;
- Scientific institutions, organizations and networks (e.g., GOOS, POGO, ICES, PICES, SPC, INDEEP, DOSI, GEO BON, MBON, Future Earth, GOBI, Interridge, SfDVent database, ChESs-Base, etc.)
- Intergovernmental scientific networks such as Large Marine Ecosystems in adjacent waters
- Intergovernmental Organizations with competency for management and provision of scientific and technical advice (including but not limited to the UN Food and Agriculture Organization, the International Maritime Organization, the Convention on Biological Diversity, and the Convention on Migratory Species, IUCN)
- Regional bodies and groups such as the European Union, Regional Seas Organizations, Regional Fisheries Management Organizations;
- other groups which are either potentially affected by activities or which could contribute knowledge and experience, e.g. non-governmental organisations and representatives of traditional rights.

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[106] see also: Legal and Technical Commission of the International Seabed Authority. Informal workshop n the development of regional environmental management plans in the Area, with a focus on mid-ocean ridges: Scientific tools and approaches; Kingston, Jamaica, 6 July 2019 at Section II, 11(b): The Authority is ready to work with all partners to support the work of the Commission in developing REMPs through a multi-disciplinary and multi-stakeholder approach.

[107] modified from ISBA/25/C/13; International Seabed Authority, 2019b. Developing a framework for regional environmental management plans for polymetallic sulphide deposits on mid-ocean ridges. Report of the second workshop held in Szczecin, Poland, 27-29 June 2018. International Seabed Authority, Technical Study No. 22, Kingston, Jamaika, pp. 1-32. and Billett, D., Bourrel-McKinnon, M., Cobley, A., Dunn, D., Mulsow, S., Nugent, C., Smith, S., Dover, C.L.v., Xu, X.-W., 2019a. Workplan to implement ISA´s REMP programme. Recommendations of the REMP Advisory Committee for the period 2019-2020. REMP Advisory Committee of ISA Secretariat, pp. 1-16.

This breadth of potentially affected groups highlights the need for a transparent, inclusive formal engagement process for stakeholders in the development of the respective regional environmental management plans by the ISA. It is also helpful if stakeholders have a particular role to play, such as to evaluate a draft management plan, to make choices in view of alternative development scenarios, or to provide knowledge to the table in a two-directional communication (Kraan *et al.*, 2014; Röckmann *et al.*, 2015).

Only transparency can lead to the accountability needed *vis a vis* non-state stakeholders and civil society in the broadest sense, which is the constituency on whose behalf the ISA shall act for the benefit of all mankind. In order to operationalise such a transparent and inclusive formal stakeholder engagement process, an agreed and consulted stakeholder engagement strategy is required which determines the rights and obligations of all sides in the REMP development process.

5.5 Steps to ensure stakeholder engagement

5.5.1 Stakeholders in general

A first step is the compilation of an inventory of stakeholders who will then be informed on the REMP development process, requesting expressions of interest in either being kept informed, or in a more active role in advice or information provision. Some regulators keep a registry of stakeholders, which actively informs on the type of interaction desired. Based on a stakeholder analysis, and if required, an agreed set of criteria will allow for selecting transparently a representative cross-section of stakeholders to be more closely tied to the REMP development and implementation process (Pomeroy and Douvere, 2008). Consequently, a systematic, multi-layered advisory process and defined steps for interventions from all stakeholders can be designed. This may be time-consuming and involving substantial capacities.

The following steps in addressing stakeholders are recommended/part of SEA procedures

- Mapping stakeholders and their interests by use of a stakeholder analysis (Vierros *et al.*, 2006);
- Development of a strategy for cooperation, communication and participation, incl. roles and responsibilities;
- Notification of adjacent coastal states and stakeholders of the intent to develop a REMP;
- Agreement on overall purpose and objectives in line with ISA guidance/or other term;
- Agreement on steps in the process and time table.

5.5.2 Institutional stakeholders

It is apparent from the list of potential stakeholders in a region above, that different stakeholder groups may have to be addressed differently and with different expectations. All stakeholder groups expect a recognition of their input and work, and in particular either want to see eventual submissions being responded to or acknowledged in the output documents. As such, either the REMP-organising body could ensure communication and integration of the different sectoral organisations directly, cooperate with existing regional frameworks, or where these do not exist, the REMP design process as such could serve as a platform for intersectoral cooperation and conflict resolution. The latter seems to be the more common model (Rodriguez, 2017). The desired outcome is an integrated environmental management of a certain ocean region under eventually shared responsibilities.

States parties play a key role in mainstreaming commitments in the various international organisations they are a member of. So, although it is the intergovernmental organisations that would be addressed as a stakeholder of a REMP, the States are the driving force behind their commitment to inform an REMP and to eventually cooperate in its elaboration.

However, mechanisms of substantial cooperation between intergovernmental organisations are not very well developed (Gjerde, 2012; Gjerde *et al.*, 2019; Matz-Lück and Fuchs, 2014) and often empede integrated management (Stephenson *et al.*, 2019). Nor are the options explored to upgrade the currently planned ISA REMP developments to become integrated approaches to enable the conservation of the marine environment in the high seas and the Area (Gjerde *et al.*, 2019). (Gjerde *et al.*, 2019) usefully identify from the UN Fish Stocks Agreement six ways of interorganisational cooperation without *'undermining'* each others legitimacy which could be applied to the ILBI/BBNJ context.[108] They conclude, that rather than *ad hoc* mechanisms, permanent institutional mechanisms for improved consultation and cooperation including a science-policy advisory mechanism are instrumental to enabling a interorganisational exchange to ensure that marine biodiversity and ecosystems are not degraded by the actions of any one sector or regional institution.

5.5.3 Coastal States

The effects of mining activities in the Area may eventually not only reach other ISA contract areas, APEIs and the wider marine environment in the Area and in areas beyond the limits of national jurisdiction, ABNJ, but cross the outer limits of national waters of coastal States. In addition, all States have the obligation to protect and preserve the marine environment, including in ABNJ. It is therefore crucial for coastal States to be informed about how their interests might be affected and eventually be involved in the measures and actions agreed under the REMP (Singh and Pouponneau, 2018). States that are likely to be affected by activities carried out in the Area have a right to notice and consultation (Principle 19 of the Rio Declaration), as also laid down in the Espoo Convention and SEA Protocol.[109]

An REMP development process should therefore be inclusive of coastal States, communicate effectively any progress made and include a notification mechanism for concerns by the coastal State. As the envisaged REMPs will be mostly situated in ocean regions which are bordered by coastal States with very large marine areas and often very limited capacities/population to survey these waters, the REMPs may also need to address the question of monitoring support across the legal boundaries.

5.6 What a communications strategy can deliver

Participation is a two-way process. On the one hand, the public, civil society and stakeholders must be able to review and discuss the information, raise questions and concerns, and formulate views and recommendations. On the other hand, the ISA and contractors must also take time to hear, understand and reflect upon comments received and provide substantive responses. There is currently no feedback mechanism in place to communicate with respondents to public consultations, nor has an overview of stakeholder views and positions been made available. There has also be no indication made as to how the responses were weighed and influenced the revision of the document in line with Article 6 (9) of the Aarhus Convention.

Examples of communication tasks in global ISA context as well as on a regional basis include:

- Inform comprehensively on the applied stakeholder engagement strategy, including criteria for establishing mailing lists, workshop invitations, invitations to consultations etc.
- Inform comprehensively in a public register on the status of licensing overall, and allow tracking of progress made within each license area by the ISA (Council decisions, LTC recommendations, incl. uncertainties and reasoning for recommendation), contractors (contact, applications, maps, annual reports, EIAs, reports on incidents and measures, related reports and publications, and associated explanatory information).

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[108] 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 (General Assembly resolution 72/249). see https://www.un.org/bbnj/

[109] see footnote

- Launch public awareness programmes in the media. The tools for providing the messages could include videos, interviews, educational scientific films and more. Ideally, an interactive forum for stakeholder engagement could be created.
- Share consultation materials to networks and mailing lists – including NGOs and CSOs.
- Install and maintain open-access to a centralized web-based information sharing system for data (CDR), an up-to-date bibliographic database and map service.
- Establish and maintain an area-based information system providing the status of contracts and works and all associated reports and assessments for each licensed area.
- Establish and maintain a directory of experts in DSM-related fields with all stakeholders.
- Establish and maintain a directory of consulting firms which have worked for the ISA, or may do so in the future, as well as corresponding contracts.
- Establish and maintain a lobby register.

A user-friendly, multilingual website which serves as a platform for all relevant information (see clearinghouse mechanism proposed in chapter 4.2.1.3) is a prerequisite for successful stakeholder communication. It must be well- structured, kept up-to-date, contain public tenders, announcements and invitations to workshops well ahead of time, as well as the documents regarding their outcomes. It is recommended to supplement the communication strategy with a dedicated participation strategy, both agreed by the Council and open for public comment.

5.7 Conclusions

Comprehensive and transparent interaction with the range of stakeholders and the public are highly valued and essential means to create legitimacy and accountability for regulatory actions. This holds particularly true for management actions with respect to the public common good, such as in the Area, which, as the common heritage of mankind, requires particular sensitivity *vis-à-vis* global and regional stakeholders. A regional management format, be it sectoral or supra-sectoral, offers the chance to enhance a new and more active form of regional governance through active collaboration among sectors in the region towards regionally determined environmental vision, goals and objectives. Due to the ever-increasing intensity of human use, the balancing of interests becomes essential. Maximising the longterm conservation of the environment, as is the objective of an ecosystem approach to management, should be the priority common interest to support overall sustainable development as envisaged by the 2030 Agenda.

6 Recommendations - key factors for the success of REMPs

The aim of this study was to develop a standardized approach applicable to all of the Regional Environmental Management Plans under development as an instrument for the International Seabed Authority to provide for effective protection of the marine environment from harmful effects of activities in the Area. As agreed globally through the ISA, this mandate is best served by implementing an ecosystem approach to management of human activities which can be operationalised in the management philosophy, decision-making, strategies, procedures of regional management plans and last-but-not-least in a transparent and open interaction with stakeholders and the public.

REMPs should be legally binding and given effect through rules, regulations and procedures of the ISA, as well as through ISA Standards. In other words, it should not be a standalone document (*i.e.* Council decision) with non-binding effect. The REMP is more than a planning document and has much greater potential. In particular, it should not only inform but also instruct the decisions of the LTC and the Council. More pertinently, in cases where an application for the approval of a plan of work appears to undermine or be inconsistent with the objectives of a REMP, the decision-making organs of the ISA can rely on the REMP to support a decision to not approve a plan of work.

REMPs have the potential to enable the ISA to function as a proper regulator. In particular, REMPs are a useful place to set environmental thresholds for 'effective protection', 'harmful effects' and 'serious harm', as well as the appropriate indicators, for the region.

The procedural requirements to develop and review REMPs are best carried out by a newly established environmental and scientific body that is responsible to carry out the environmental obligations of the ISA, supported by ISA Secretariat and a technical experts/scientific advisory group. If there is a lack of political will to establish such a permanent body, the procedural requirements for the development and review of REMPs should be led by an *et al.* independent expert body that is put together for this purpose.

It is important to ensure that all REMPs receive the same treatment not only in terms of procedural requirements, but also in their scope and contents. The use of a template that is pre-agreed by the Council, which all REMPs will be required to meet, is essential.

The most important features of a standard REMP which fully complies with these expectations are summarised in Table 3:

Table 3: Features of a standardised approach to designating and managing regional environmental management plans, REMPs, through the International Seabed Authority, which operationalises the ecosystem approach to management in order to provide for effective protection of the marine environment from harmful effects of activities in the Area.

Issue	Qualification	Further explanation
Purpose	To prevent and minimise the cumulative adverse effects from mining activites in the region, in conjunction with the effects of other activities in the region, in order to maintain and/or restore a functional, healthy regional marine environment in line with Article 145 and Part XII UNCLOS.	
Approach	An integrated comprehensive approach to management which implements precautionary systems-thinking and takes effective measures	The essence is captured in a recent IIED briefing*

Issue	Qualification	Further explanation
	Should not be pursued in isolation from other global, regional and national processes.	Need for coherence with existing regional and adjacent national environmental management, e.g. to support achievement of SDG 14; with regional management organisations, and with the global ILBI/BBNJ negotiation process.
	Should be used to build a platform to enhance mechanisms of cooperation	A clearing house mechanism, a dedicated regional expert advisory body and/or technical working groups facilitate cooperation on technical level
Design process	A standardised design process which takes account of the elements of an ecosystem approach to management and is	Existing guidelines for Strategic Environmental Assessments provide a useful basis for developing such a standard approach for ISA REMPs.
	a) Coherent	with already existing or upcoming regional and coastal governance mechanisms
	b) Holistic	*i.e.* considers all of the ecoregion, from seafloor to surface, in view of natural variability and climate-change-induced trends;
	c) Open and not preconceived	*i.e.* does not have a predetermined outcome which the process has to work towards.
	d) Transparent and accountable	acc. Aarhus Convention; a Clearing House mechanism will be helpful
	e) Participative	*i.e.* values early and continuous stakeholder contributions and encourages collaboration with regional governance mechanisms and other sectoral organisations under the common roof of ensuring the effective protection of the marine environment from harmful effects of human activities in the region.
	f) Integrative	*i.e.* addresses the needs of adjacent coastal States for prior notification of activities and impact monitoring for early identification of transboundary issues;

Issue	Qualification	Further explanation
	g) Comprehensive	*i.e.* evaluates individual and cumulative effects at a range of spatial and temporal scales, with measurable indicators and precautionary thresholds for ecological changes. Available guidance on Strategic Environmental Assessment procedures can be helpful for the design of an appropriate REMP procedure. Ideally the assessment procedure is coherent with the SEA procedures foreseen in areas beyond national jurisdiction in the ILBI/BBNJ agreement.
The resulting plan	Based on a standard template describing the plan development process and results as well as the measures agreed.	The minimum requirements, quality of information and applicable overarching goals and objectives need to be provided in a ISA guidance document;
	Based on a comprehensive environmental baseline description, identification of indicators and thresholds of harm from mining activities as a precondition for the plan to be adopted. A monitoring programme is needed to provide for the environmental background and subsequent changes due to mining activities.	A standard minimum set of parameters to be measured and monitored by each contractor will be helpful for establishing regional baseline information. ISA Guidance needed.
	Based on best available knowledge	Knowledge, experience and data from all sources are needed
	Sensitive to future developments, with regular review and adaptation of measures.	The link between the REMP and the Environmental Management Plan of the Contractors has to enable ISA to regulate approved mining activities with respect a maximum level of disturbance permitted, when new knowledge on related effects make this necessary.
	Contribute to the achievement of the sustainable development goals, in particular SDG 14.2 to *'sustainably manage, and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience and take action for their restoration, to achieve healthy and productive oceans'* and other global and regional environmental visions, goals and objectives.	This contribution corresponds to the Article 145 mandate and should be regularly evaluated and reported.
	Operates in an adaptive management cycle, with periodic review and options for adjusting the measures laid down in the plan.	

Issue	Qualification	Further explanation
	Implements measures to support the achievement of vision, goals and objectives	
	Enables the reduction or avoidance of environmental impacts from activities in the Area;	Once the residual impacts from individual mine sites are known, there may be a need to limit the number of active mine sites in a region, or increase minimum environmental standards
	Is legally effective through the exploitation regulations, contracts and therefore contractor EMMPs	
Responsible technical body	A newly established responsible permanent Environmental and Scientific body, supported by ISA Secretariat and a technical experts/scientific advisory group.	If there is a lack of political will to establish such a permanent body, the procedural requirements for the development and review of REMPs should be led by an *ad-hoc* independent expert body that is put together for this purpose.
Public consultation	To take place, as a minimum, when the drafting of a REMP begins and prior to adoption of the draft plan	The timing of consultation has to enable stakeholders and the public to provide input and participate with their contributions, with the aim to influence and improve the course of action
Decision-making criteria	A set of criteria defining a potentially successful REMP should be elaborated and, after public consultation, applied for the development and adoption of new REMPs	The criteria should reflect the above design criteria and the requirements specified for the contents below.
Recommendation by LTC	Taking into account the comments made in the public consultation process and after thoroughly checking the decision-making criteria, the LTC recommends to the Council approval or changes to be made to the REMP	
Approval/ adoption	The Council adopts a REMP if recommended by the LTC or returns it for further consideration	
Review	Periodic plan assessment and review, and consequent adaptation mechanisms, as well as criteria for triggered review have to be adopted for all REMPs	
Contents of the Plan	To be based on best available information and knowledge, including expert advice, compilation of environmental baseline	a) regional scale b) fine scale for exploration/exploitation areas and surroundings

Issue	Qualification	Further explanation
	Formulates a first comprehensive set of indicators and a first approach to respective threshold values	the development of meaningful regional ecosystem/habitat/ population health indicators and significance thresholds will be a longterm and iterative process which should be carried out by a dedicated expert group which accompanies the work of the REMP development. Without these indicators and thresholds, it will be impossible to define operational management objectives, or to control the success of measures in achieving such objectives.
	Based on indicators, the regional operational objectives and targets can be formulated	Management objectives are required at regional scale and at contractor area scale - fine scale, high resolution of data required. Regular measurement of indicators is a precondition for assessing risks and environmental change due to mining.
	Details the anticipated mining in the region	
	Identifies all human activities in the region, including potential conflicts, as well as areas that are particularly susceptible to cumulative impacts (including climate change)	
	Estimates and evaluates the risk of current and future mining activities on all or parts of the regional environment	
	Takes precautionary measures to prevent degradation of the regional ecosystem due to mining, including to protect unique, rare, sensitive, vulnerable, threatened species and habitats	This includes the full acknowledgement of designations through other organisations and authorities, including CBD
	Designates a representative network of sites (including sites that are of interest to mining) as no mining areas.	

* Towards ecosystem-based governance of the high seas. July 2020 https://pubs.iied.org/pdfs/17757IIED.pdf

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8 Annex 1:

Annex 1: ISA Guidance Annex II. Existing scientific criteria for describing/identifying marine areas in need of enhanced management and protection, and their relevance to environmental characteristics relating to the need for protection of marine environment, as referred to in the Convention

Ecosystem characteristics referred to in UNCLOS Art 145, 194(5)	Existing scientific criteria for describing/identifying marine areas in need of enhanced management and protection	Examples of habitats/ecosystem features in the Area where these criteria may apply
Rarity	FAO VME: "**Uniqueness Or Rarity** - an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by similar areas or ecosystems. these include: • habitats that contain endemic species • habitats of rare, threatened or endangered species that occur only in discrete areas • nurseries or discrete feeding, breeding, or spawning areas"	*Reliance on obligate chemosynthetic symbioses constrains many vent species to living in environmental patches that emit hydrothermal effluents. This means they are vent "endemics", so endemic at the habitat scale. At a finer scale, some vent species are also endemic at the individual vent scale (Vrijenhoek, 2010).*
	CBD EBSA: "**Uniqueness Or Rarity**: area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features".	*Hydrothermal vents contain many "rare" species. However, their "rarity" is not limited to the species they host. Globally, the active vent ecosystem is a "rare habitat", comprising an estimated 50km2, or <0.00001% of the surface area of the planet. Scarcity of the vent habitat places vent ecosystems at risk (Van dover et al, 2018).*
Fragility	FAO VME: "**Fragility** : an ecosystem that is highly susceptible to degradation by anthropogenic activities".	*Deep-water bottom trawling is particularly destructive for cold-water coral reefs, as they are "fragile" and "slow growing" (Huvenne et al, 2016).*
	CBD EBSA: "**Vulnerability, Fragility, Sensitivity Or Slow Recovery**: areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery".	*At nodule habitats, there are many species considered "nodule-endemic". For example, in the UK Seabed Resources Ltd. exploration contract area (UK-1) in the CCZ, approximately half of the megafauna morphotypes found during the ABYSSLINE project occurred only on polymetallic nodules. These organisms were mostly sessile and therefore are particularly at risk from mining activities*

		as they are unable to seek refuge elsewhere; hard-substrate obligate i.e. those that live on polymetallic nodules will be the most at risk as the substrate they inhabit will be harvested (Amon et al, 2016).
	FAO VMES: "**Life-History Traits Of Component Species That Make Recovery Difficult** : ecosystems that are characterized by populations or assemblages of species with one or more of the following characteristics; slow growth rates; late age of maturity; low or unpredictable recruitment; long-lived".	*Cold-water corals are very "long-lived". For example, specimens of Paramuricea biscaya sampled after the Deep Water Horizon oil spill were found to be 600 years old. The extreme longevity and "slow growth-rates" of these corals highlights their vulnerability to disturbance and difficulty to recover (Prouty et al, 2016).*
	CBD EBSAS: "**Special importance for life history stages of species**: areas required for a population to survive and thrive".	*Deep-sea cold-water coral reefs (e.g. Lophelia pertusa) act as breeding grounds for commercial species such as redfish (Sebastes spp.) to "survive and thrive". Early "life-history stages" of Sebastes spp. hide amongst the complex 3-dimensional structure (Baillon et al, 2012).*
Habitat of depleted, threatened or endangered species and other forms of marine life	CBD EBSA: "**Importance for threatened, endangered or declining species and/or habitats**: Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species".	*Some seamounts form habitat for species that are already "threatened" by human activities (e.g., sharks, deep-sea stony corals), and that can occur on seamounts in relatively high numbers (Clark et al, 2014).*
	FAO VME: "**Functional Significance Of The Habitat** : discrete areas or habitats that are necessary for the survival, function, spawning/reproduction or recovery of fish stocks, particular life history stages (e.g. nursery grounds or rearing areas), or of rare, threatened or endangered marine species".	*Cold water coral reefs are important "habitat"-forming organisms in the deep-sea. They also act as "nursery grounds" and adult habitat for fish stocks (Huvenne et al, 2016)*
Ecological balance	CBD EBSA: "**Biological Diversity**: area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity".	*Seamounts with varying levels of "biological diversity" are valuable where they add species or complement larger-scale biodiversity pools in the deep ocean (Clark et al, 2014).*
	CBD EBSA **Biological productivity**: area containing species, populations or communities with comparatively higher natural biological productivity.	*Deep-sea ecosystems such as seamounts or cold-water corals have an increased "biological productivity" and are also known to be found within potential REMP regions (e.g. UK-1 claim area CCZ, Amon et al, 2016). Productivity is increased through specific physical processes, such as topographic modification of currents and enhanced transport of particles and detrital matter (Ramirez-Llodra et al, 2010).*

9 Annex 2:

Annex 2: Template with minimum requirements for regional environmental management plans. ISBA/26/C/7 Annex

International Seabed Authority ISBA/26/C/7

Council

Distr.: General
6 January 2020

Original: English

Twenty-sixth session
Council session, part I
Kingston, 17–21 February 2020
Item 12 of the provisional agenda*
Draft regulations for exploitation of mineral resources in the Area

Proposal for a template with minimum requirements for regional environmental management plans: a proposal for a standardized approach

Submitted by the delegations of Germany and the Netherlands, with co-sponsorship by Costa Rica

Introduction

1. Regional environmental management plans have been interpreted as essential tools to ensure effective protection of the marine environment according to article 145 of the United Nations Convention on the Law of the Sea.[1] During the consultation process on the draft exploitation regulations, many States parties stressed that, in principle, a plan of work for exploitation should not be approved by the Council unless a regional environmental management plan were in place for the relevant area.

2. A regional environmental management plan provides region-specific information that facilitates the decision-making process for exploitation activities in the relevant areas. Region-specific objectives, taking into account the carrying capacity of the region, cumulative effects and conflicts with other legitimate uses, can only be considered appropriately through regional environmental management plans. The plans furthermore provide for long-term planning reliability and a level playing field for contractors, in particular when shifting from exploration to exploitation.

3. The International Seabed Authority has already approved the environmental management plan for the Clarion-Clipperton Fracture Zone region. Regional environmental management plans for polymetallic sulphides along the northern Mid-Atlantic Ridge and cobalt-rich ferromanganese crusts in the north-west Pacific are under development. Furthermore, the Authority has determined several specific

* ISBA/26/C/L.1.

[1] See, for example, the adoption of the environmental management plan for the Clarion-Clipperton Zone (ISBA/17/LTC/7 and ISBA/18/C/22), the submission of the Netherlands in 2014 (ISBA/20/C/13) and the International Seabed Authority's strategic plan 2019–2023.

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regions as priority areas for the development of regional environmental management plans (see ISBA/24/C/3 and ISBA/25/C/13).

Background

4. According to the strategic plan adopted by the Assembly in 2018 (ISBA/24/A/4), a regional environmental management plan is a means to protect the marine environment. As indicated under strategic direction 3 – protection of the marine environment – a regional environmental management plan should be developed, implemented and kept under review.

5. The draft regulations on exploitation of mineral resources in the Area – in the current version – require that a contractor's environmental impact statement (draft regulation 47), environmental management and monitoring plan (draft regulation 48) and closure plan (annex VIII) be in accordance with the relevant regional environmental management plan.

6. In November 2019, the secretariat of the Authority, having consulted the Legal and Technical Commission, issued a document on guidance to facilitate the development of regional environmental management plans.[2]

7. The required contents of regional environmental management plans, the procedure for the development, approval and review of such plans, as well as the relationship between the plans and activities in the Area, have so far not been explicitly clarified and agreed.

8. During the consultation process on the draft exploitation regulations, many States parties expressed the view that a standardized approach concerning the development and the contents of regional environmental management plans was required.

9. To this end, Germany and the Netherlands, with co-sponsorship by Costa Rica, hereby submit a proposal for a template (see annex) that contains a standardized approach and a structured way forward regarding the content of regional environmental management plans and their relationship with activities in the Area.

10. A document on the procedure for the development, approval and review of regional environmental management plans is dealt with in a separate submission by Germany and the Netherlands, with co-sponsorship by Costa Rica.

11. Both documents reflect the outcome of the international workshop held on the theme "Towards a standardized approach for regional environmental management plans in the Area", which was organized by Germany, the Netherlands and the Pew Charitable Trusts in Hamburg, Germany, from 11 to 13 November 2019. The workshop was attended by more than 80 experts, as well as by members of the Council, organs of the Authority and other international bodies, reflecting broad regional representation and a variety of stakeholder perspectives.

12. The need for a standardized approach as well as for defined minimum requirements and contents for all regional environmental management plans and the need for a specified procedure were strongly supported by the workshop participants.

13. The report on the workshop will be submitted to the Council during the first part of the twenty-sixth session of the Authority.

[2] See www.isa.org.jm/workshop/workshop-regional-environmental-management-plan-area-northern-mid-atlantic-ridge.

Rationale for a standardized approach

14. Many environmental management challenges, such as region-specific aspects, the carrying capacity of a region, the cumulative effects of multiple mining operations and conflicts between mining and other marine uses, can only be addressed at the regional level. Thus, regional environmental management plans are essential tools for ensuring effective protection of the marine environment. To this end, a regional environmental management plan must be in place before any exploitation activity is approved in a relevant area, and exploitation activities must be conducted in a way that does not conflict with the objectives and management measures of such a plan.

15. A standardized approach for the development of regional environmental management plans (a template) is essential for several reasons. First, a standardized approach facilitates the identification and determination of the necessary management measures based on an appropriate assessment scheme and can thus ensure that the plans are as effective as possible with regard to protecting the marine environment. Second, a standardized approach is required for good governance and should ensure the high quality of each regional environmental management plan; provide for consistency and comparability between respective plans; ensure the involvement of all stakeholders, including scientists and other international bodies; and promote accountability and transparency, reliability and acceptability, the clarification of standards of environmental protection and a level playing field for contractors.

16. This proposal is in line with the overall environmental policy of the Authority as outlined in the strategic plan of 2019–2023. In the strategic plan, the Authority called for the application of regional environmental management plans as means to protect the marine environment. By adopting a standardized approach for the development of the plans, this goal in the strategic plan could be implemented more effectively.

17. According to the draft exploitation regulations, a contractor's environmental impact statement, environmental management and monitoring plan and closure plan will be in accordance with the relevant regional environmental management plan. This proposal is in line with these requirements.

18. There is a sense of urgency with regard to developing regional environmental management plans in view of the ongoing progress of drafting the exploitation regulations. This sense of urgency is reflected in the document on guidance to facilitate the development of regional environmental management plans as well as in the many workshops that are being convened to address the development of the plans.

Recommendations

19. The Council is invited to take note of the above issues when considering the annex to the present document.

20. The Council is further invited to adopt the template in the annex with the aim of ensuring that all future regional environmental management plans comply with a jointly agreed standardized approach.

Annex

Template with minimum requirements for regional environmental management plans

Introduction

A standardized approach in the development of regional environmental management plans is required in order to ensure consistency and comprehensiveness in their development, application and implementation in all regions.

The template is a standardized format – a blueprint – to be used when developing future International Seabed Authority regional environmental management plans.

Sections 1, 2 and 3 of the template are to be reproduced as drafted, for each regional environmental management plan. Sections 4 to 8 contain region-specific requirements to be completed with region-specific information under each heading.

1. Purpose of the regional environmental management plan

The purpose of the regional environmental management plan is to provide region-specific information, measures and procedures to ensure effective protection of the marine environment in accordance with article 145 of the United Nations Convention on the Law of the Sea. To this end, it sets overarching goals and objectives, is guided by principles, establishes environmental management measures (including area-based management tools), with cumulative and synergistic effects taken into account, and serves to manage potential conflicts between different human activities occurring in the same region.

The regional environmental management plan is used by the Authority, sponsoring States and contractors as a framework for their decision-making.

2. Overarching goals

The regional environmental management plans include assessment, management and monitoring measures, aimed at facilitating seabed mining activities as well as:

- Protecting and preserving the marine environment, in particular, in order to:
  - Maintain biodiversity, connectivity, ecosystem structure, ecosystem service and resilience
  - Preserve unique marine ecosystems
  - Prevent species extinctions
  - Prevent impacts on benthic and pelagic ecosystems, including on mid-water fish stocks
  - Prevent exacerbation of vulnerable ecosystems that are under particular risk from projected climate change effects
- Applying precaution in management decisions corresponding to the level of knowledge gap and risk, in particular by:
  - Using all available environmental data to inform management decisions
  - Monitoring and assessing the state of the environment before, during and after any activities in the Area
  - Identifying and taking into account uncertainties
  - Applying adaptive management

- Identifying and mitigating conflicts in different uses by avoiding overlap between contract areas, reserved areas, areas of particular environmental interest, marine protected areas and areas designated for other legitimate uses (such as fisheries, submarine cables)
- Promoting marine scientific research and capacity-building in the Area
- Promoting cooperation between States, contractors and other stakeholders of the Authority, with particular regard to the interests and needs of developing States

3. Principles

The regional environmental management plan is guided by the following principles:

- Common heritage of humankind
- Precautionary approach
- Integrated ecosystem-based management for the whole region
- Accountability through transparent decision-making and public participation
- Use of best available science techniques
- Use of relevant traditional knowledge of indigenous peoples and local communities
- Use of best environmental practices and technologies
- International cooperation

4. Technical and scientific information

4.1. Identification and definition of the spatial scope of application of the specific regional environmental management plan

[Insert geographic maps (preferably three-dimensional) that contain the coordinates and depths of the specific regional environmental management plan and indicate the:

- Mineral resources of the specific regional environmental management plan region;
- Benthic and pelagic biogeographic areas in the specific regional environmental management plan region (with reference to International Seabed Authority guidelines on how to define boundaries of ocean regions, where available), and taking into account cross-boundary biogeographic and oceanographic areas
- Maritime boundaries (e.g., exclusive economic zones)
- International Seabed Authority contract areas, reserved areas and relinquished areas.]

4.2. Environmental baseline information

4.2.1. Description of the marine environment [Insert description of environmental baseline data and results of data analyses in the region, gathered through contractor reports to the Authority, the DeepData platform, as well as other global and regional databases (see document issued in November 2019 by the secretariat of the Authority on guidance to facilitate the development of regional environmental management plans, pp. 26–29[1]) and scientific literature, supported by

[1] Available at www.isa.org.jm/workshop/workshop-regional-environmental-management-plan-area-northern-mid-atlantic-ridge.

geographic information system (GIS) maps and layers, where appropriate, and including the following categories:

4.2.1.1. Geophysical and chemical features:

- Physical properties (ISBA/25/LTC/6, para. 15(a)), including advection and eddy diffusion measurements
- Chemical properties (ISBA/25/LTC/6, para. 15(b))
- Geological properties (ISBA/25/LTC/6, para. 15(c)), including mineral resources

4.2.1.2. Biological features (ISBA/25/LTC/6, paras. 15(d)–(f), 17, 18) and associated biogeographic areas:

- Maps of the most recent applicable biogeographic classification of benthic and pelagic realms
- Biogeographic ranges of characteristic benthic and pelagic species, including transient and migratory species
- Habitat and abundance models derived from species occurrence data
- Analysis of species communities through ordination approaches or other techniques to assess species groupings
- Identification of representative species, taking into account variability of habitats
- Genetic connectivity of representative species, including source and sink dynamics within a metapopulation
- Connectivity of migratory species, including those of cultural significance to indigenous peoples and local communities
- Identification of food-web structure of benthic and pelagic habitats
- Ecosystem functioning, including the identification of key species
- Identification of rare and fragile, or otherwise ecologically important, or sensitive or vulnerable ecosystems, or communities
- Identification of main ecosystem services (e.g., natural carbon capture by biological pump)

4.2.1.3. Identification of natural stressors in the region, including climate change.]

4.2.2. Description of uncertainties [Insert details, using descriptive methods and GIS maps, on the identification of existing data gaps and uncertainties (due to data quality or quantity) with regard to environmental information.]

4.3. Information on human activities and limitations in the region

4.3.1. Activities in the Area [Insert details, using descriptive methods and GIS maps, of seabed mineral activities, including exploration and exploitation contracts, applications for contracts received, other spatial information from contracted areas such as preservation reference zones and impact reference zones in the region]

4.3.2. Activities in areas beyond the limits of national jurisdiction and in adjacent waters under national jurisdiction [Insert details, using descriptive methods and GIS maps, of identified descriptions, designations, management systems or standards by other international organizations or agreements (e.g., Convention on Biological Diversity, Food and Agriculture Organization of the United Nations,

regional fisheries management organizations, International Maritime Organization (IMO), International Finance Corporation, regional seas conventions, marine biological diversity of areas beyond national jurisdiction, ecologically or biologically significant marine areas, traditional marine management areas and measures) relevant to the region]

4.3.3. Freedom of the high seas activities [Insert details, using descriptive methods and GIS maps, of other legitimate marine uses in the region (e.g., shipping, fishing, laying of submarine cables, marine scientific research projects)]

4.3.4. Dumpsites [Insert details, using descriptive methods and GIS maps, on identification of underwater munition, weapons, radioactive substances, or other spoil, if applicable]

4.3.5. Cultural heritage and interests [Insert details, using descriptive methods and GIS maps, of any cultural heritage and interests in the region (e.g., sunken ships, fossils, human remains, routes and marine features used by indigenous peoples and local communities for traditional instrument-free navigation)]

5. Established area-based management tools

Provide information on all existing area-based management tools, using descriptive methods and GIS maps, including the size and location of, and measures applicable, for example, in designated marine protected areas, in IMO-designated particularly sensitive sea areas, in special areas established by the International Convention for the Prevention of Pollution from Ships and in areas with restrictions established by regional fisheries management organizations.

6. Scenarios for mining activities and forecast of possible effects at the regional level

Provide a forecast of the possible effects of various mining scenarios (extent, duration, frequency of exploitation), taking into account cumulative impacts and climate change, potential stress from outside the region, using modelling that follows the best available scientific techniques and comparisons against the baseline established above.

7. Region-specific objectives, targets and indicators

The region-specific objectives of the regional environmental management plan are as follows: [Insert region-specific objectives for each regional environmental management plan, based on the content of the section on technical and scientific details.]

The region-specific targets and indicators of the regional environmental management plan are as follows: [Insert region-specific targets and indicators that are measurable, based on the content of the section on technical and scientific details.]

8. Management measures

[To be developed based on the overarching goals, principles and information in sections 4, 5 and 6, taking into account their socioeconomic feasibility.]

8.1 Area-based management

[Provide proposals for the establishment of area-based management tools, including:

8.1.1. Size and location of, and restrictions imposed by, International Seabed Authority areas of particular environmental interest,[2] *as well as, if appropriate, marine protected areas, including a map*

8.1.2. Guidance on how the size and location of impact and preservation reference zones within contract areas in the region are established, consistent with relevant rules, regulations or procedures of the Authority

8.1.3. Sites in need of protection (with buffer zones) (this relates to the fine-scale approach as described in the guidance issued by the secretariat of the Authority in 2019. These sites are particularly at risk from mining activities)

8.1.4. Areas of increased sensitivity and/or areas requiring precaution, including existing ecologically or biologically significant marine areas, as recognized by the Convention on Biodiversity, and vulnerable marine ecosystems, as designated by the relevant regional fisheries management organizations]

8.2. Designation of mining areas within contract areas

[Provide details on the number, size and locations of designated mining areas within currently licensed contract areas.]

8.3. Seasonal or temporal restrictions

[Provide details of any seasonal or temporal restrictions that should be applied to seabed mineral activities (e.g., to take into account breeding seasons, migration of cetaceans and other marine species, including culturally significant migratory species).]

8.4. Restrictions of impacts on specific biota

[Provide details of any measures designed to prevent or minimize impacts on specific biota (including, for example, habitats, areas of scientific value and/or interest, areas of cultural, social importance).]

8.5. Measures to deal with potential conflicts with other legitimate uses

The purpose of this section is to address measures to avoid potential conflicts with other legitimate uses, in accordance with article 147 of the Convention and draft regulation 31.

[Provide details, including how potential conflicts will be addressed by procedural arrangements with other international bodies.]

8.6. Strategy for enhancing knowledge and cooperation

[Provide details for each of the following items below:

8.6.1. Future research plans, sampling methodologies, data analyses, to minimize current data gaps (see 4.2.2.)

8.6.2. Measures to promote and incentivise test mining (and impact monitoring) projects

8.6.3. Measures to incentivise marine scientific research, through international cooperation

[2] Areas of particular environmental interest are defined as sectoral, non-permanent closures to mining activities under the auspices of the International Seabed Authority.

8.6.4. Measures for capacity-building, training and technology transfer

8.6.5. Communication and public information strategy

8.7. Regional monitoring plan

8.7.1. Provide a regional monitoring plan, taking into account the overarching goals and regional objectives of the regional environmental management plan, in particular with regard to the effectiveness of the management measures

8.7.2. Indicate how the regional monitoring plan can enhance knowledge and cooperation (see 7.5 above).