



**WORKSHOP ON THE DEVELOPMENT OF THE REGIONAL ENVIRONMENTAL
MANAGEMENT PLAN FOR THE AREA OF THE NORTH-WEST PACIFIC OCEAN,
WITH A FOCUS ON PROPOSED MANAGEMENT MEASURES**

18 – 21 May, 2026

Busan, Republic of Korea

Abbreviations

ABMT	Area-based management tool ¹
APEI	Area of particular environmental interest
BPHDC	Beijing Pioneer Hi-Tech Development Corporation, China
CCZ	Clarion-Clipperton Zone
CFC	Cobalt rich ferromanganese crust
COMRA	China Ocean Mineral Resources Research and Development Association
EMP	Environmental management plan
ISA	International Seabed Authority
JOGMEC	Japan Organization for Metals and Energy Security
KIOST	Korean Institute of Ocean Science and Technology
LTC	Legal and Technical Commission, ISA
MNRE	Ministry of Natural Resources and Environment, Russian Federation
NWP	Northwest Pacific Ocean
NPIB	North Pacific inter-seamount basin
OSER	Office of Stewardship, Environment and Resources, ISA
PMN	Polymetallic nodule
POC	Particulate organic carbon
POM	Particulate organic matter
REC	Regional environmental characterization
REMP	Regional environmental management plan
RFMO	Regional Fisheries Management Organization
SPEI	Site of particular environmental interest
UNCLOS	United Nations Convention on the Law of the Sea
WCPFC	Western and Central Pacific Fisheries Commission

¹ In this report, area-based management tools (ABMTs) include areas of particular environmental interest (APEIs) and sites of particular environmental interest (SPEIs) as explained in Section IV of the Recommendations on technical guidance for the development of Regional Environmental Management Plans in support of the Standardized Procedure and Template (ISBA/29/LTC/8).

Table of Contents

Abbreviations	2
INTRODUCTION	4
ITEM 1. Opening of the workshop.....	5
ITEM 2. Workshop background, scope and expected outputs	6
ITEM 3. Proposed area-based management tools under the draft REMP	6
ITEM 4. Region-specific objectives (if applicable) and proposed non-spatial management measures	6
ITEM 5. Priorities for environmental research and regional assessment to inform future review of the REMP	7
ITEM 6. Review of workshop report.....	7
ITEM 7. Closure of the workshop	7
Annex I	8
List of Participants.....	8
Annex II.....	13
Summary of Presentations.....	13
Annex III	16
Summary of discussion under Agenda item III: proposed ABMTs under the draft REMP.....	16
A. Background	16
B. Theme 1: the proposed REMP boundary	16
C. Theme 2: design rules of proposed APEI network.....	17
D. Theme 3: the design and boundaries of the proposed APEIs	19
E. Theme 4: management measures adopted by other organizations	22
Annex IV	23
Region-specific objectives (if applicable) and proposed management measures (including spatial and non-spatial measures) as outlined in the Standardized Procedure (ISBA/30/C/21)	23
A. Region-specific objectives.....	23
B. Non-spatial measures	24
Annex V	26
Priorities for environmental research and regional assessment to inform future review of the REMP and Monitoring.....	26
A. Knowledge gaps and priority actions	26
B. Opportunities for collaboration in addressing the knowledge gaps and priorities for capacity development to support effective implementation of the REMP.....	29

INTRODUCTION

1. In accordance with the United Nations Convention on the Law of the Sea (UNCLOS) and the 1994 Agreement relating to the implementation of Part XI of the Convention, the mandate of the International Seabed Authority (ISA) is to administer the mineral resources in the Area on behalf of the States Parties to UNCLOS, and to control and organize mineral resource-related activities in the Area for the benefit of humankind as a whole. ISA's mandate also includes taking necessary measures with respect to activities in the Area to ensure effective protection of the marine environment from harmful effects which may arise from such activities. To this end, ISA is required to adopt appropriate rules, regulations and procedures for, *inter alia*, the prevention, reduction and control of pollution and other hazards to the marine environment, the protection and conservation of the natural resources of the Area, and the prevention of damage to the flora and fauna of the marine environment.
2. In pursuance of this mandate, the Council, during its seventeenth session in 2012, on the basis of the recommendation of the Legal and Technical Commission (LTC), approved an Environmental Management Plan (EMP) for the CCZ.² This included the designation of a network of nine "Areas of Particular Environmental Interest" (APEIs). In 2021, following a comprehensive review of the implementation of the EMP for the CCZ, the LTC recommended further actions to advance the implementation of the EMP. These included the establishment of four additional APEIs to enhance the effectiveness of the overall network. The Council endorsed this recommendation in December 2021.³ As a result, the network of APEIs in the CCZ now comprises 13 APEIs covering a total area of 1.97 million km² of the seabed.
3. At its twenty-fourth session, in March 2018, the Council took note of a strategy proposed by the Secretary-General for the development of regional environmental management plans (REMPs) for key provinces of the Area where there are contracts for exploration.⁴ The Council agreed with the priority areas that had been identified on a preliminary basis as the northern Mid-Atlantic Ridge (nMAR), the North-West Pacific (NWP) Ocean, as well as the combined Indian Ocean Ridges and the Central Indian Ocean Basin.⁵ The strategy was later reflected in the Authority's strategic plan and its high-level action plan for the period from 2019 to 2023 and further extended to 2024-2025.
4. The Council also noted that the strategy laid out a coherent and coordinated approach to the process and identified as essential that REMPs be developed in a transparent manner under the auspices of ISA, in light of its jurisdiction under the UNCLOS and the Agreement relating to the implementation of Part XI of the UNCLOS.⁶
5. During the thirtieth Session in July 2025, the Council, upon recommendation from the Commission, adopted the standardized procedure for the development, establishment and review of REMPs ("the standardized procedure", [ISBA/30/C/21](#)), which includes a template for all future REMPs. In its decision [ISBA/30/C/20](#), the Council requested the Commission and the Secretariat to implement the adopted standardized procedure in their future work related to the REMPs. The Council also requested the Commission to advance its work on the development, establishment and review of REMPs, with a view to recommending to the Council new REMPs for priority areas where there are currently exploration contracts, taking into account exploration or exploitation activities and the best available scientific information.
6. The LTC has developed recommendations concerning the technical approaches to the development and review of REMPs.⁷
7. In line with the above, since 2018, eight expert workshops have been convened by ISA in

² See ISBA/17/LTC/7; ISBA/17/C/19 and ISBA/18/C/22.

³ ISBA/26/C/58

⁴ See ISBA/24/C/3.

⁵ ISBA/24/C/3.

⁶ ISBA/24/C/8, para 10.

⁷ ISBA/29/LTC/8.

collaboration with various partner organizations to support the development of REMP in priority areas including the CCZ, nMAR, the NWP and the Indian Ocean.

8. With the above background, the ISA, in collaboration with the Ministry of Oceans and Fisheries of the Republic of Korea and the Korea Institute of Ocean Science and Technology (KIOST) convened an expert workshop on the development of a REMP for the Area of the Northwest Pacific Ocean, with a focus on development of proposed management measures.

9. The specific objectives as outlined in the Terms of Reference of this workshop were to evaluate:

- Proposed management goals and objectives, if necessary, to add to the overarching goal and objectives of the REMP as outlined in the standardized procedure;
- Proposed management measures for area-based management tools (ABMTs), including potential boundaries, configuration and restrictions on activities to be applied within individual ABMTs in the Area;
- Non-spatial management measures, if applicable;
- Priorities, opportunities and feasibility for marine scientific research and regional environmental assessment; and
- Strategies needed to implement the REMP, including but not limited to, collaboration in marine scientific research and capacity development.

10. Building on the results of the previous workshops in this region, this workshop will provide inputs for the LTC to formulate the draft REMP for the Area of the Northwest Pacific Ocean.

11. The workshop was co-chaired by the following members of the LTC: Mr. Se-Jong Ju and Mr. Erasmo Lara Cabrera.

12. The workshop was attended by 30 participants in their individual expert capacities. The full list of workshop participants is provided in Annex I to this report.

ITEM 1. Opening of the workshop

13. Under this item, the workshop co-chairs welcomed the participants and introduced the objectives of the workshop.

14. Mr. Jose Dallo, Director, Office of Stewardship, Environment and Resources, ISA, opened the workshop at 9 a.m. (Busan; GMT+9:00) on Monday, 18 May, 2026. He thanked the Ministry of Oceans and Fisheries of the Republic of Korea and KIOST for hosting and supporting the workshop, and the Duke University, the Pacific Community and the Western and Central Pacific Fisheries Commission for their valuable inputs in the preparation of the workshop. Mr. Dallo reviewed the process of developing REMPs, as guided by the principles and objectives of UNCLOS. He stated that this workshop is an important step in developing the REMP for this region, enabling member States and other stakeholders to share views on the proposed management measures under the REMP. In closing, Mr. Dallo highlighted the importance of a balanced approach to REMP development anchored in the mandate of ISA as a regulator.

15. Mr. Minseok Lee, Director of the Marine Policy Office, the Ministry of Oceans and Fisheries of the Republic of Korea, delivered his opening remarks, expressing his appreciation to ISA and KIOST for co-organizing this workshop, and welcomed all participants to Busan. He acknowledged the importance of securing a stable supply of critical minerals, highlighting deep-sea minerals as increasingly recognized resources that can support future industries and green technologies. In parallel, he highlighted the importance of safeguarding the marine environment and committing to the shared responsibility of protecting the common heritage of mankind. He underlined the role of REMPs for building international cooperation grounded in scientific knowledge. He emphasized the commitment of the Republic of Korea as a member State of ISA to promote science-based and sustainable deep-seabed activities in accordance with international

rules and standards. Noting the unique environmental characteristics and resource potential of the Western Pacific, he stressed the importance of a balanced and responsible approach. He concluded by reaffirming the Republic of Korea's continued dedication to international collaboration to advance marine environmental protection, science and technology, and the responsible use of marine resources in a balanced and integrated manner.

16. Mr. Dong-Jin Kang, Vice President of the Korea Institute of Ocean Science and Technology (KIOST), delivered his opening remarks and expressed his gratitude to ISA, members of the LTC, and all the participants. He highlighted the important role of REMP's to promote effective assessment, monitoring, and management of potential environmental impacts associated with seabed activities. Recognizing the significant resource potential of the Western Pacific region, he underlined the importance of the work of ISA on developing a REMP for this region based on the best available science. As ISA continues to advance the development of the Mining Code, the REMP is becoming increasingly important to ensure effective environmental management of the Area. Emphasizing that sustainable development of marine resources cannot be achieved by a single nation or institution alone, he urged for stronger international cooperation, enhanced scientific collaboration, and a balanced approach to environmental protection and resource development. He underlined the increasingly important role of ISA in strengthening such cooperation and encouraged this workshop to serve as an important milestone for effective environmental management in the Western Pacific.

ITEM 2. Workshop background, scope and expected outputs

17. Under this agenda item, the following members of the LTC delivered presentations on the legal and policy, geological and environmental settings for the development of the REMP for the Area in the NWP Ocean:

- a. Ms. Michelle Walker
- b. Ms. Becky Hitchin
- c. Mr. Tomohiko Fukushima

18. Next, Mr. Malcolm Clark, member of the LTC, delivered a presentation on the structure and content of the draft REMP for the NWP Ocean.

19. The last presentation under this agenda item was delivered by Mr. SungKwon Soh, Western and Central Pacific Fisheries Commission (WCPFC), on the WCPFC Conservation and Management Measures and their relevance to the REMP Area in the NWP Ocean.

20. Summaries of the presentations above are provided in Annex II to this report.

21. Participants were then invited to ask questions and share insights on the presentations above.

ITEM 3. Proposed area-based management tools under the draft REMP

22. Under this agenda item, co-chairs introduced the relevant sections in the draft REMP, and the guiding questions for discussion as follows:

- a. Theme 1: the proposed REMP boundary
- b. Theme 2: design rules of the proposed APEI network
- c. Theme 3: the design and boundaries of the proposed APEIs
- d. Theme 4: management measures adopted by other organizations

23. Participants were divided into two groups to engage in focused discussions. Summaries of the group discussions are provided in Annex III of this report.

ITEM 4. Region-specific objectives (if applicable) and proposed non-spatial management measures

24. Under this agenda item, co-chairs introduced the relevant sections in the draft RMEP, and recalled that region-specific objectives, if appropriate, will be developed to support the overarching environmental goal and objectives identified in the Standardized Procedure (ISBA/30/C/21).

25. Participants, in their two groups, then engaged in focused discussions. Each group addressed the following topics:

- a. Non-spatial measures proposed under the draft REMP
- b. Region-specific objectives, where appropriate, beyond the overarching goal and objectives as outlined in the Standardized Procedure (ISBA/30/C/21)

26. A summary of discussion under this agenda item is provided under Annex IV of this report.

ITEM 5. Priorities for environmental research and regional assessment to inform future review of the REMP

27. Under this agenda item, co-chairs introduced the context, the relevant sections in the draft REMP, and the guiding topics for discussion as follows:

- a. Knowledge gaps and priority actions as identified under the draft REMP, and means and resources for addressing them, in order to support effective implementation of the REMP and its future review
- b. Opportunities for collaboration in addressing the knowledge gaps and supporting monitoring and other activities
- c. Priorities for capacity development to support effective implementation of the REMP.

28. Participants again broke into two groups to engage in focused discussions. A summary of discussion under this agenda item can be found in in Annex V.

ITEM 6. Review of workshop report

29. Participants reviewed the draft workshop report and provided comments and feedback. Co-chairs also invited participants to submit these comments in writing by the end of May 2026.

ITEM 7. Closure of the workshop

30. The workshop closed at 5 p.m. (Busan; GMT+9:00) on Thursday, 21 May, 2026.

Annex I

List of Participants

1. Mr. Caleb Christopher
Legal Adviser
Permanent Mission of the Republic of the Marshall Islands to the United Nations in New York Marshal Islands
Email: marshallislands@rmiunmission.org; environ.nyc@gmail.com
2. Mr. Malcolm Clark
Member of the Legal and Technical Commission of ISA
New Zealand
Email: malcolm.clark@earthsciences.nz
3. Ms. Ana Colaço
Principal Researcher
Institute of Marine Sciences – OKEANOS, University of Azores
Nominated by: the Deep-Ocean Stewardship Initiative (DOSI)
Portugal
Email: maria.aa.colaco@uac.pt
4. Ms. Danielle de Jonge
Senior Marine Management Advisor
Joint Nature Conservation Committee (JNCC)
Nominated by: the Foreign, Commonwealth and Development Office,
United Kingdom
Email: danielle.dejonge@jncc.gov.uk
5. Ms. Amanda Demopoulos
Research Ecologist
U.S. Department of the Interior, U.S. Geological Survey, Wetland and Aquatic Research Center,
Wetland and Aquatic Research Center
Nominated by: U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs
United States of America
Email: ademopoulos@usgs.gov
6. Ms. Cherisse Du Preez
Government Scientist
Fisheries and Ocean Canada
Nominated by: Government of Canada
Canada
Email: cherisse.dupreez@dfo-mpo.gc.ca
7. Ms. Livia A. Ermakova
Researcher
Gramberg All-Russia Research Institute for Geology and Mineral Resources of the World Ocean (VNIIOkeangeologia)
Nominated by: JSC Yuzhmorgeologiya
Russian Federation

Email: livia77@inbox.ru

8. Mr. Tomohiko Fukushima
Member of the Legal and Technical Commission of ISA
Japan
Email: fukushima-tomohiko@jogmec.go.jp
9. Ms. Chihiro Hayakawa
Deputy Director
Mineral Resources Division, Manufacturing Industries Bureau
Ministry of Economy, Trade and Industry
Nominated by: the Embassy of Japan in Kingston, Jamaica
Japan
Email: hayakawa-chihiro@meti.go.jp
10. Ms. Becky Hitchin
Member of the Legal and Technical Commission of ISA
United Kingdom
Email: elegaer@gmail.com
11. Mr. Se-Jong Ju
Member of the Legal and Technical Commission of ISA
Republic of Korea
Email: sjuu@kiost.ac.kr
12. Ms. Hiroko Kamoshida
Technical Researcher
Japan Organization for Metals and Energy Security
Nominated by: the Embassy of Japan in Kingston, Jamaica
Japan
Email: kamoshida-hiroko@jogmec.go.jp
13. Mr. Won Nyon Kim
Principal Research Scientist
Ocean Georesources Research Department
Korea Institute of Ocean Science and Technology (KIOST)
Republic of Korea
Email: wkim@kiost.ac.kr
14. Mr. Young Tak Ko
Principal Research Scientist, Director
Ocean Georesources Research Department
Korea Institute of Ocean Science and Technology (KIOST)
Republic of Korea
Email: ytko@kiost.ac.kr
15. Ms. Maria V. Kruglyakova
Head of the Geological Department
JSC Yuzhmorgeologiya
Russian Federation
Email: kruglyakovamari@gmail.com

16. Mr. Colin Laqere
Acting Scientific Officer
Geological Services Division Mineral Resources Department
Nominated by: Ministry of Land & Mineral Resources
Fiji
Email: colin.laqere@mrd.gov.fj
17. Mr. Ole Larsen
Project Director & Principal Scientist
DHI group
Denmark
Email: OLA@dhigroup.com
18. Mr. Erasmo A. Lara Cabrera
Member of the Legal and Technical Commission of ISA
Mexico
Email: erasmoseabed@gmail.com
19. Mr. Gary Lee
Geotechnical adviser
Pacific Community (SPC)
Email: garyl@spc.int
20. Ms. Juliette Lee
Program Analyst, Strategic Policy and International Affairs (SPIA)
U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs
(BOEM)
United States of America
Email: juliette.lee@boem.gov
21. Mr. Youngdawng Moh
Principal Research Scientist Ocean Law Research Department
Korea Institute of Ocean Science and Technology (KIOST)
Republic of Korea
Email: ydmoh@kiost.ac.kr
22. Mr. Clement Mulalap
International law consultant
Permanent Mission of the Federated States of Micronesia to the United Nations
Federated States of Micronesia
Email: cmulalap@gmail.com
23. Mr. Adrianus Ramon
Assistant Professor of International Law
Parahyangan Catholic University in Bandung, Indonesia
Nominated by: the Permanent Mission of the Republic of Indonesia to the United Nations in New
York
Republic of Indonesia
Email: adrianus.ramon@unpar.ac.id

24. Mr. Md. Bazlar Rashid
Deputy Director (Geology) Geological Survey of Bangladesh (GSB)
Nominated by: Ministry of Power, Energy and Mineral Resources, Energy and Mineral Resources
Division
People's Republic of Bangladesh
Email: bazlarrashid@ymail.com
25. Mr. SungKwon Soh
Science Manager
Western and Central Pacific Fisheries Commission
Email: SungKwon.Soh@wcpfc.int
26. Ms. Verena Tunnicliffe
Professor Emerita,
Department of Biology and School of Earth & Ocean Sciences, University of Victoria
Nominated by: Government of Canada
Canada
Email: verenat@uvic.ca
27. Ms. Michelle Walker
Member of the Legal and Technical Commission of ISA
Jamaica
Email: mwalker@isa.org.jm
28. Ms. Zheng Wang
Official, High Seas Conservation Division,
China Deep Ocean Affairs Administration
Nominated by: China Deep Ocean Affairs Administration of the Ministry of Natural Resources
People's Republic of China
Email: wangzheng@comra.org.cn
29. Mr. Dan Zhang
Researcher, Law of the Sea Division, China Institute for Marine Affairs (CIMA), Ministry of Natural
Resources
Nominated by: China Deep Ocean Affairs Administration of the Ministry of Natural Resources
People's Republic of China
Email: dszhang@sio.org.cn
30. Mr. Dongsheng Zhang
Professor, Key Laboratory of Marine Ecosystem Dynamics,
Second Institute of Oceanography, Ministry of Natural Resources
Nominated by: China Deep Ocean Affairs Administration of the Ministry of Natural Resources
People's Republic of China
Email: dszhang@sio.org.cn

Technical Support

1. Ms. Sarah DeLand
Project Planner
Duke University Marine Geospatial Ecology Lab
United States of America
Email: sarah.deland@duke.edu

2. Mr. Jaewoo Jung
Senior Research Scientist
Korea Institute of Ocean Science and Technology (KIOST)
Republic of Korea
Email: jaewoo@kiost.ac.kr
3. Ms. Yeon Jee Suh
Senior Research Scientist
Korea Institute of Ocean Science and Technology (KIOST)
Republic of Korea
Email: yjsuh@kiost.ac.kr
4. Mr. Hyunjin Yoon
Research specialist
Korea Institute of Ocean Science and Technology (KIOST)
Republic of Korea
Email: hyunjin@kiost.ac.kr

Secretariat

1. Mr. Jose Dallo
Director
Office of Stewardship, Environment and Resources (OSER), ISA
Email: jdallo@isa.org.jm
2. Ms. Wanfei Qiu
Programme Manager (Marine Environment)
Office of Stewardship, Environment and Resources (OSER), ISA
Email: wqiu@isa.org.jm
3. Mr. Changsung Lim
Associate Programme Management
Officer Office of Stewardship, Environment and Resources (OSER), ISA
Email: clim@isa.org.jm
3. Ms. Elisabetta Menini
Research Associate Consultant
Office of Stewardship, Environment and Resources (OSER), ISA
Email: emenini@isa.org.jm

Annex II

Summary of Presentations

Introduction to the policy context

Ms. Michelle Walker (member of the LTC)

This presentation provides an introduction to the legal and policy dimensions of REMPs. Although not expressly referenced in UNCLOS, the establishment of REMPs by ISA is based on and operationalize the obligations under several articles in UNCLOS, including articles 145, 162, and 165, particularly in relation to environmental protection and the incorporation of expert advice. REMPs function as policy instruments, guided by Council decision ISBA/30/C/20, which establishes the standardized procedures for their development, adoption, and review, as well as a template for all REMPs. Unlike the binding provisions of the Mining Code, REMPs are designed to provide flexibility in implementation while complementing regulatory measures. Their role is critical in ensuring effective protection of the marine environment from harmful effects of activities in the Area, which is reinforced by binding requirements to be adopted under the exploitation regulations and environmental standards. The Council is ultimately responsible for the approval, implementation, and review of REMPs.

Introduction to the geological setting

Ms. Becky Hitchin (member of the LTC)

The presentation provides an overview of the geology and deep-sea mineral resources of the north-west Pacific Ocean, with a particular focus on seamount systems and abyssal plains relevant to REMPs. It describes the diverse geomorphology of the region, including guyots, conical seamounts, and ridge seamounts, all of which differ in morphology, age, summit depth, and geological evolution. Guyots are defined as flat-topped seamounts formed through volcanic growth followed by erosion and subsidence, whereas conical seamounts are steep volcanic forms with limited sediment cover. Ridge seamounts are elongated seamount structures. Seamount morphology influences ecological processes, mineralisation, and oceanographic conditions. Comparative information is given for the Magellan, Marcus-Wake, and Marshall seamount chains, including their age, depth ranges, and Cobalt rich ferromanganese crust (CFC) resource potential.

The second part of the document focuses on mineral resources and exploration activities regulated by the ISA under UNCLOS. It outlines the five exploration contracts present in the North-west Pacific, and provides an understanding of reserved areas, and relinquishment requirements.

Introduction to the environment and ecological setting

Mr. Tomohiko Fukushima (member of the LTC)

Under the Northwest Pacific Regional Environmental Management Plan (NWP-REMP), three workshops have been held since 2018 to clarify objectives, conduct data mining and analysis, and organize information. The initiative is now transitioning towards the information integration phase. While past efforts focused on synthesizing complex ecosystem data through conversion, categorization, and clustering, the next phase will emphasize further integration and simplification by incorporating diverse stakeholder perspectives. Given this background, this presentation aims to provide an overview of seamount ecosystems and reaffirm the complexity of the area before advancing to the next step. Seamounts are topographical elevations that obstruct water movement. Around them, inertial and Coriolis forces interact, driving the formation and variation of upwelling and Taylor columns in response to changing currents. These dynamics suggest that ecosystem characteristics vary depending on seamount conditions. Furthermore, even at the scale of a single seamount, microtopography provides diverse habitats for both suspension and deposit feeders. Addressing this inherent complexity is crucial for constructing an effective environmental management plan.

Development of the Northwest Pacific Ocean REMP

Mr. Malcolm Clark (member of the LTC)

This presentation introduced the approach taken to develop the REMP to date. This was through a series of scientific workshops that examined available information, and evaluated trends and patterns in data on oceanography, geology and biology. These were then used to identify and describe potential Area-Based-Management-Tools (ABMTs) based on scientific criteria and additional design consideration factors.

The draft REMP is anchored in a core objective of protecting biodiversity and maintaining ecosystem integrity in areas potentially impacted by deep-seabed mining. It adopts a network-based approach to development of ABMTs, rather than isolated conservation sites, which are guided by widely accepted criteria (ecological importance, representativity, connectivity, replication, viability). These criteria are operationalized through practical design considerations, including spatial distribution across environmental gradients, incorporation of different types of geomorphic features (such as seamounts, guyots and abyssal plains), and preservation of entire seamounts as ecological units. Given limited biological data, environmental proxies such as productivity patterns, depth and geomorphology are applied. The proposed network of ABMTs comprises 14 APEIs, covering approximately 26.5% of the total REMP area. Further metrics on protection levels of seamount features and abyssal plains were presented. The network of proposed APEIs protects diverse habitats and resource types, including habitats where polymetallic nodule (PMN) and CFC resources are distributed. Design choices also reflect management considerations such as having simple boundaries and maintaining a distance separation where possible from nearby EEZs, ECS and contract areas.

The presentation also outlined the next steps in the REMP process. Following this workshop, the LTC will further consider the draft REMP based on the workshop discussions, before releasing it for public consultation. Then, the REMP will be reviewed by the LTC based on the outcomes of the stakeholder consultation, revised accordingly and subsequently submitted to the Council of ISA for adaptation.

The presentation finished with listing key issues for the REMP based on the scientific evaluation that needed further discussion and consideration by the present workshop.

The WCPFC conservation and management measures and the REMP Area in the Northwest Pacific Ocean

Mr. SungKwon Soh (Science Manager, WCPFC)

The WCPFC provided an overview of WCPFC fisheries and governance relevant to the International Seabed Authority (ISA) Regional Environmental Management Plan (REMP) for the Northwest Pacific. It explained the role of WCPFC in managing tuna, billfish, and sharks, and in mitigating the bycatch of seabirds, sea turtles, and cetaceans. The presentation highlighted the economic and ecological importance of WCPO fisheries, which produced about 3.06 million metric tons of tuna in 2024, representing 56% of the global tuna catch and an estimated at-sea value of USD 5.6 billion. Among other activities, longline fisheries were identified as the dominant fishing activity in the REMP area.

The presentation placed emphasis on WCPFC Conservation and Management Measures (CMMs) relevant to the Northwest Pacific REMP. Species-specific CMMs include measures for tropical tunas ([CMM 2025-02](#)), North Pacific albacore ([CMM 2019-03](#)), Pacific bluefin tuna ([CMM 2024-01](#)), NP striped marlin ([CMM 2024-06](#)), NP swordfish ([CMM 2023-03](#)), and skipjack management procedure ([CMM 2025-03](#)). These measures aim to maintain sustainable fisheries and manage fishing pressure in areas overlapping the REMP.

The presentation also highlighted ecosystem and bycatch-related CMMs addressing sharks, seabirds, sea turtles, cetaceans, marine pollution, and climate change impacts. Relevant CMMs include: [CMM 2025-05](#) (seabirds), [CMM 2025-06](#) (sharks), [CMM 2024-07](#) (cetaceans), [CMM 2018-04](#) (sea turtles), [CMM 2017-04](#) (marine pollution), and [Resolution 2019-01](#) (climate change).

Monitoring and compliance measures include boarding and inspection ([CMM 2025-07](#)), compliance monitoring ([CMM 2023-04](#)), catch and effort reporting ([CMM 2022-06](#)), IUU vessel list ([CMM 2019-07](#)), regional observer programs ([CMM 2018-05](#)), port state measures ([CMM 2017-02](#)), vessel monitoring systems ([CMM 2014-02](#)), and transshipment controls ([CMM 2009-06](#)). These frameworks supported ecosystem-based

fisheries management and monitoring of fishing activities near sensitive marine habitats and future area-based management tools.

Annex III

Summary of discussion under Agenda item III: proposed ABMTs under the draft REMP.

A. Background

1. The co-facilitators Mr. Malcolm Clark and Mr. Erasmo Lara Cabrera introduced the agenda item, and provided a brief presentation to set the scene for the discussion. Discussions on the proposed ABMTs focused on the following themes, based on sections III and V.A of the draft REMP:

- a. Theme 1: the proposed REMP boundary
- b. Theme 2: design rules of the proposed APEI network
- c. Theme 3: design and boundaries of the proposed APEIs
- d. Theme 4: management measures adopted by other organizations

2. It was clarified that the LTC considered and recognized the outcomes of the 2020 online (Republic of Korea) and 2024 Tokyo, Japan REMP workshops, as a key scientific foundation for the design of APEIs, while also carefully taking into account the practical feasibility of managing these areas once established. The approach taken by the LTC in developing the APEI network was to focus on meeting the network criteria.

3. Plenary discussions centered around the areal coverage of the proposed APEI network. Some participants referenced earlier discussions suggesting that 30% or a higher percentage of the area covered under the REMP should be protected, aligning with broader global biodiversity targets and their underlying scientific rationale. It was stressed that 30% is a global target ⁸, not a site-specific management tool to define the REMP for this region.

4. There was extensive discussion with participants expressing different views on the percentage area coverage of the proposed APEI: some commented studies showed a higher percentage of the ocean needs to be protected to conserve threatened marine species and biodiversity, and some regarded all seamounts as vulnerable. There was also note that only a limited number of such studies relevant to the deep sea, or to seamount habitats. Participants noted that for seamount habitats, the number of individual seamounts, as well as total area protected, is considered important. Modifications of proposed APEI should take into consideration characteristics of different habitats and management implications, and evaluated on a case-by-case basis.

5. It was mentioned that the proposed APEI network provides a good coverage of seamount with shallow (less than 1000m depth) summits, but lower coverage of large guyots with summits at a medium (1000-2500m) depth. It was noted that all large shallow guyots outside the contract areas have been captured in the proposed APEIs.

6. Vertical separation between CFC and PMN contract areas was discussed. The CFC areas may be a few kilometers above the abyssal plain contract areas.

7. It was also emphasized that the REMP is a living document, and future reviews may lead to changes and possible expansion of the APEI network, or include SPEIs, based on newly available scientific data and information.

B. Theme 1: the proposed REMP boundary

8. Following the standardized approach approved by the Council, the draft REMP was noted to include a geographical scope and specifies the geographical limits covered under the plan. This identifies the limits of the area covered, as well as the contract areas and reserved areas. The total area covered by the REMP is around 2.1 million km².

⁸ Decision adopted by the Conference of Parties to the Convention on Biological Diversity CBD/COP/DEC/15/4.

7 Among the factors considered for the application of the ABMT network, consideration is given to a distance separation from adjacent national maritime boundaries and contract areas. This consideration applies “except when there is a major loss in conservation features and/or loss of network viability”.

8 Generally, this concept of a distance separation was considered to be reasonable and acceptable. It was emphasized that the distance separation was not to be considered a “buffer zone”, but simply a functional separation.

9 Questions were raised as to the rationale for a 50km distance separation between APEIs and national maritime boundaries. It was explained that these distances were a planning tool used for this REMP allowing precaution to be exercised in the design of the APEI network in relation to potential future activities within national jurisdiction, and to contractor activities. An APEI boundary very close to an national maritime boundary or contract area may be at an increased level of risk if any activity in those adjacent areas has an impact that spills over into the APEI. It was suggested that removal of the hatched/shaded area currently representing this distance separation from future map images of the REMP to reduce any confusion about the distance being a formal management zone.

10 Questions were also raised as to exceptions in applying a 25km distance separation from the contract areas. Some participants expressed concerns about the close proximity between some APEIs and nearby contract areas, in light of fair consideration of all contractors. It was also noted that this proximity may pose an increased level of risk from any activity in adjacent contract areas which may potentially undermine the effectiveness of the APEIs.

11 It was explained that each APEI has its own rationale for justifying exemptions to the separation distance based on a major loss in conservation features or network viability occurring if the exemption was not present. Thus, all APEIs are given the same treatment, and shorter distances are considered based on such rationale.

12 Further explanation was requested regarding the scientific considerations for those APEIs that would extend into the separation distance, as well as possible adjustment options. This more detailed explanation will be provided in the text, as well as in ANNEX B of the REMP document.

13 It was noted that the precise coordinates of the REMP area and of the different APEIs, as well as separation distances, will be included in the final draft and be checked against the submissions to the United Nations and the Commission on the Limits of the Continental Shelf.⁹

C. Theme 2: design rules of proposed APEI network

14 Participants generally expressed confidence in the network criteria and design rules used to guide the identification of APEIs. Participants stressed the importance of linkages between the criteria and considering them as complementary in a “package”.

15 There was a discussion regarding the provision of space for future applications for exploration contracts within the area covered under the REMP. Some participants raised concerns that this is not reflected in the standardized procedure or the guidance for REMPs, while others referenced Council decision ISBA/30/C/20, in which the LTC is requested to develop the REMPs, taking into account exploration or exploitation activities and the best available scientific information.

16 It was recognized that REMPs are intended to evolve as new scientific information becomes available. In this regard, participants emphasized the importance of incorporating future data into the review process.

17 Participants discussed the inclusion of culturally significant considerations within the network criteria. These considerations have often tended to be included at a later stage of planning. It was suggested that cultural

⁹ See https://www.un.org/depts/los/clcs_new/commission_submissions.htm

significance could be incorporated under the network criterion “ecological importance”, consistent with relevant language contained in the Indicative Criteria for Identification of Areas of Annex I of the BBNJ Agreement.¹⁰ This would incorporate their earlier consideration in the REMP planning process. Participants noted that additional wording could be developed to support this inclusion.

18 Participants supported references to cultural significance in the draft REMP. Participants emphasized that cultural and ecological significance should be afforded comparable consideration, particularly with respect to indigenous communities of Small Island States. Suggestions included incorporating culturally relevant seamount names and clearly indicating the origin and usage of naming conventions in order to ensure fairness and transparency.

19 Participants discussed the potential ways to communicate the identification of rare or unique habitats, that may warrant consideration due to their ecological importance, based on the criteria outlined in ISA recommendations. This could include discoveries made by external experts, contractors, and research programs working in the region.

20 Participants noted that, in cases where habitats shift due to climate change, including the formation of climate refugia or the contraction of habitat ranges, APEIs may need to be adapted or repositioned to ensure continued representativity and support the functional resilience of the environment.

21 Participants further highlighted the importance of addressing ecological significance whenever sufficient data are available. While representativity was considered essential for addressing uncertainty and ensuring broad habitat coverage, participants noted that areas identified as being ecologically important should also be explicitly recognized. The existing REMP design incorporates such data within APEIs, but it was also noted that the Standardized Procedure allows for identification of SPEIs which are more localized, and based largely on this criterion.

22 This issue was identified as particularly relevant for abyssal plain habitats, where data remains relatively limited. Participants observed that the current approach relies largely on environmental proxies to ensure the inclusion of a broad range of habitats.

23 Some participants expressed the view that the general seamount chain areas (rather than the abyssal plains beyond the general seamount chain area), including both seamounts and inter-seamount basin habitats, currently contains almost all contract and reserve areas for both resources. It was commented that inter-seamount basins were potentially insufficiently represented within the current APEI network. This habitat is potentially important for the distribution of PMN resources, and associated faunal communities. Other participants noted that inter-seamount basin habitats, which are represented across multiple APEIs within the area covered under the draft REMP, should be reflected in Table 3 of the Draft REMP.

24 Participants noted that the LTC would now include assessment of the coverage of inter-seamount basin habitat in the APEIs, in light of the GIS layers presented at the workshop on the seamount chain boundaries in the region. This would allow an evaluation of the coverage of the habitat within APEIs to determine whether additional coverage may be necessary.

25 Under the current draft REMP, some participants expressed concerns regarding the limited coverage of medium depth (1000-2500m) guyots. It was observed that this constitutes one of the habitat categories with the smallest proportion currently protected. Participants noted that these habitats are among those likely to be affected by future CFC mining activities on seamounts and therefore may require additional consideration within the REMP.

26 Participants further noted the need to balance considerations related to total protected area and the number of protected ecological features. One participant expressed that there are cases where multiple

¹⁰ Annex I, 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 (BBNJ Agreement)

seamount peaks are mapped as one feature in the REMP, as a function of the methods used to map a seamount around its defined basal edifice. This could influence potential APEI and SPEI options. As seamounts function as distinct ecological units, participants noted that the number of individual seamount features included within protection measures is an important consideration alongside overall spatial coverage.

27 Participants discussed the potential impacts of deep-sea mining activities on the water column and noted that the ISA does not hold management authority over the water column beyond activities directly related to the Area. A suggestion was made to encourage collaboration with other competent international organizations and frameworks, including the BBNJ process in the future, in order to address identified knowledge gaps and broader ecosystem protection objectives.

28 Participants further emphasized the importance of incorporating data from outside the immediate REMP area, particularly in relation to migratory species pathways and ecological connectivity.

29 Participants also recommended the consideration of ecological and habitat data from areas adjacent to the REMP area. It was noted that such data are also relevant for ecological connectivity assessments, which remain a knowledge gap. While some of this broader-scale information was included in the Regional Environmental Characterization and Data Report compiled to support the REMP development, there could be a region-specific operational objective focusing on building collaboration and cooperation in the region with all stakeholders to address this gap.

30 Participants suggested that the language used in the draft REMP and the tables be simplified and clarified for managers and non-scientific audiences. Suggestions included the preparation of clearer and more concise tables explaining how the network criteria were applied for individual APEIs, as well as simplifying terminology related to biodiversity hotspots and representativity.

D. Theme 3: the design and boundaries of the proposed APEIs

31 Under this theme, participants shared views and comments on the individual APEIs, with a focus on how they met the network criteria and ecological objectives that guide management. This was based on information in Section V and the Annexes of the draft REMP. The comments are summarized in Table 1 below. Participants noted that these comments, information and views will be evaluated by the LTC in the next step of the REMP development process.

32 It was explained that data used to inform the design of the APEI network included those for POC, probability of nodule occurrence, similarity in environmental characteristics compared to the nodule contract areas, actual observed nodule occurrence, and geomorphological classification of seamounts.

33 In addition to the comments and suggestions about specific APEIs as summarized in the table below, participants also made the following suggestions on the description of the proposed APEIs in the draft REMP:

- a. Appendix B to be revised to provide more detailed description on how each APEI contributes to the network criteria, including information on the closest distances between each APEIs and nearby contract areas and reserved areas. Maps need to be arranged in the right proportion in latitude and longitude. It was noted this was already on the LTC list to be actioned.
- b. Table 3 of the Draft REMP to be revised to describe more clearly characteristics related to the network criteria, and to clarify whether occurrences of PMN were based on field observation, or on the model on nodule similarity.
- c. Provide more details in paragraph 86 of the draft REMP to further summarize the exceptions to applying the separation distances in specific APEIs. Such exceptions should be documented clearly and consistently in the draft REMP along with sufficient justification.

Table 1. Comments on, and suggested modifications to, the proposed APEIs.

APEI	Comments on and suggestions for the proposed APEI
APEI 1	A suggestion was made to extend this APEI to include the small seamounts located to the north of this APEI, as well as an area with documented PMN occurrence to the east. The description of this APEI should reflect that this area is characterized by relatively higher levels of POC.
APEI 2	This APEI is located approximately 1.9 km from the nearest contract area, which raised a concern regarding risk from potential impacts from the activities in the nearby PMN contract area. Several options were suggested to modify this APEI, including removing the southern seamount from the APEI thus shifting the southern boundary northward, and replacing the southern seamount with one of similar ecological characteristics. Suggestions were also made to split the southern seamount to increase the separation distance from the nearest contract area. It was noted that these suggestions would involve evaluation of changes in either the design considerations (e.g., whole seamount as a unit), or in the number/area of particular types/depth of seamount features captured in the network.
APEI 3	There was a suggestion to extend this APEI further north to include the ridge at the north east of the site, hence enhancing connectivity of the seamounts and deeper ridge features with the abyssal plains, and extending the POC gradient coverage. In its current configuration, APEI 3 already contributes to the representation of inter-seamount basin habitats, which should be explicitly reflected in its description.
APEI 4	No comment.
APEI 5	In Table 3 of the Draft REMP, for APEI 5, a legend or further explanation could be added to explain similarity to the contract area. It was clarified that this APEI shares a similar depth profile as nearby PMN contract areas.
APEI 6	The importance of the seamount at the eastern edge of the APEI was emphasized. Participants suggested that APEIs 6 and 13 could be merged to improve potential ecological connectivity. It was further suggested that the combined area could be extended eastward to incorporate additional seamounts and additional inter-seamount habitats in the Marshall seamount chain.
APEI 7	A suggestion was made to extend this APEI further east in order to include a nearby deep seamount on the east side, thereby improving habitat representation and enlarging the coverage of inter-seamount basin habitat. Participants noted that while the APEI is currently proposed to cover the seamount, it also includes a small portion of inter-seamount basin habitat. Participants discussed the classification of the seamount in this APEI, currently included in the ridge category, according to the Harris 2014 model, it seems to resemble characteristics of a guyot. Further clarifications with a higher resolution bathymetry may be needed to confirm its geomorphology.

	Participants noted that these seamounts could potentially be a connectivity link with the environment present in the adjacent coastal State.
APEI 8	There was discussion on expanding the APEI northward to include Magellan seamount chain inter-seamount basin areas with documented PMN occurrence. There was a general opinion that encompassing the inter-seamount basin habitat to the north of the APEI would increase the representativity of multiple habitat types and known PMN habitat in the network. There was a discussion that the APEI could be either shifted, or alternatively expanded, and that it could be done so while maintaining adequate distance from surrounding contract and reserved areas.
APEI 9	Participants suggested extending this APEI either / both southward and northward to include nearby seamounts located close to EEZ limits, which would enhance connectivity within the APEI and increase coverage of the POC gradient in the APEI. It was noted that the seamount located to the south has a summit depth comparable to those found in CFC contract areas. It was also stated that including nearby seamounts needs ecological justification, not just proximity to the APEI. It was also indicated that there is a low possibility for activities within national jurisdictions to impact this APEI if these extensions were to occur since there are ongoing discussions to establish a protected area in an adjacent EEZ to the south. It was noted that there are ecological connectivity benefits for collocating APEI closer to pre-existing protected areas in adjacent national jurisdiction .
APEI 10	The importance of the guyot located in the northern part of this APEI was highlighted during the discussion.
APEI 11	There was a suggestion to increase its coverage northwards.
APEI 12	Concerns were raised regarding the proximity of this APEI to nearby contract areas, with the minimum distance estimated at approximately 2.6 km from a PMN contract area. There was a suggestion to remove the two southern seamounts from this APEI, or to split the southern-most seamounts. This APEI is also situated near a CFC contract area.
APEI 13	Participants suggested that APEIs 6 and 13 could be merged to enhance ecological connectivity and better meet the network design criteria. It was further proposed that the combined area could be extended eastward to incorporate additional seamounts. Description of the APEI could include its inter-seamount basin habitat.
APEI 14	A suggestion was made to extend the southern boundary of this APEI to capture deeper seamounts.

- 34 A participant offered that there is a small central seamount (155°21'24"E 18°29'44"N) that summits above 800 m depth, east of the PMN contract area, that was identified in Tokyo as a potential APEI as there is science indicating it is important for connectivity, and that may be considered for future SPEIs. It was noted the ISA would look for data indicating its importance for connectivity.

E. Theme 4: management measures adopted by other organizations

35 Under this theme, participants shared views and information on management measures under other organizations or instruments in the REMP region, to allow discussion of potential implications and opportunities for collaboration in support of effective management of the APEIs.

36 Participants stressed the importance of collaboration with other competent regional, subregional, and global organizations, especially since the integrity of the seamount ecosystem and its connectivity through the water column is essential to ensure the efficacy of the APEIs. Such collaboration is important for understanding and managing impacts of other activities in the region, and for coordinating management measures, in complementarity with legal and policy frameworks of other relevant organizations and instruments, while respecting their mandates.

37 Participants also highlighted the importance of data exchange with relevant organizations in the region, including WCPFC, ISC, ICPC and NPFC, as well as adjacent States with marine protected areas and monitoring programmes in proximity to the REMP. This will support effective monitoring and adaptive management of the REMP, improving understanding of the environment, effects from future mining activities, as well as cumulative effects of various activities in the region.

38 Close collaboration with the International Maritime Organization (IMO), the secretariat of the BBNJ Agreement and regional fisheries management organizations in this region was emphasized as a key step forward for implementing complementary management measures to maximize the effectiveness of the ABMTs. Region-specific objectives of the REMP are useful to identify scope, modalities, and priority areas of such collaboration. It is important for the REMP's review process to consider new relevant measures that may become established in the REMP area.

39 Participants discussed possible forms of collaboration between ISA and other relevant organizations on promoting research and sharing data and information. Memorandum of Understandings (MoUs) between ISA and other organizations were suggested to formalize collaboration on sharing data and information, while sharing of confidential information should be in line with the mandate and legal framework of respective organization. It was also highlighted that formal collaboration, such as through MoUs, is not the only means available for sharing data with ISA. The ISA secretariat has the mandate to facilitate collaboration with other organizations, which has been implementing various collaborative activities with regional and global organizations and scientific institutions to facilitate sharing of data and improve scientific understanding.

40 Clear communication on objectives, management measures, and implications of the REMP was highlighted as key for effective collaboration and to ensure relevant stakeholders are adequately informed and engaged throughout the development, establishment, and review of the REMP. It was recommended to recognize the ongoing use of traditional navigation routes by indigenous peoples in the region.

Annex IV

Region-specific objectives (if applicable) and proposed management measures (including spatial and non-spatial measures) as outlined in the Standardized Procedure (ISBA/30/C/21)

1. Under this agenda item, discussions focused on the following themes, based on Sections II and V.B of the draft REMP:
 - a) Region-specific objectives, where appropriate, beyond the overarching goal and objectives
 - b) Non-spatial measures proposed under the draft REMP

A. Region-specific objectives

2. The standardized procedure for the development, establishment and review of REMP (ISBA/30/C/21) notes that any region-specific objectives relate to the overarching environmental goal and objectives (included in Section II of the draft REMP). It was mentioned that the Council had previously requested the inclusion of the possibility of regional objectives under the standardized procedure.
3. Participants agreed that any region-specific objectives needed should be derived from, and aligned with, the overarching environmental goal and objectives.
4. There was, however, recognition that the region has distinct characteristics, including its enclosure by EEZs and extended continental shelf, presence of two intertwining mineral resource types, unique geological features and complex ecological and oceanographic settings. These characteristics may warrant some degree of regional specificity.
5. It was recognised that region-specific objectives could be important. Suggestions included maintenance of environmental elements significant to cultural characteristics, values and human uses, striving for collaboration with coastal states, contractors and other regional, subregional, and international organizations, and fostering collaborative approaches for addressing gaps, data needs and understanding connectivity and network pathways.
6. Views were expressed on how cultural interests might be reflected in either the regional objectives and the wider REMP goals and objectives framework, and it was generally considered that cultural aspects would need to be linked to the agreed environmental objectives. Suggestions included using wording related to facilitation of co-operation in understanding traditional ecological knowledge, and using wording similar to that already expressed in similar regulatory situations, such as maintenance of environmental elements significant to cultural characteristics, values and human uses. Participants also mentioned that there were already references to cultural heritage in the draft REMP, as well as considerations for cultural values and significance in the description of APEIs.
7. Climate change was recognized as an important issue to encompass in the REMP goals and objectives framework. While participants agreed it was implicitly covered under environmental objectives, there was some support for clarifying this explicitly in the text.
8. Studies have been carried out in the areas adjacent to the REMP boundaries, including those within national jurisdictions. Such studies could contribute to the development of regional-scale models of biodiversity, as seamount chains and other geological features may extend into the REMP area. This could be an activity to be pursued to implement the region-specific objectives during the review of the REMP after its adoption.
9. Participants also discussed the consideration of cumulative impacts under regional objectives, while recognizing that ISA does not have the mandate for managing shipping, fishing or other activities within or beyond national jurisdictions. It was also suggested that an objective to consider cumulative impacts could also satisfy capturing the unique region-specific conditions the REMP needs to contend with: (i) two mineral resources in overlapping spatial distribution, (ii) surrounding EEZs, (iii) the anticipated rate of climate change

impacts, etc. Suggestions were made to have a process-derived regional objective related to collaboration with other competent organizations and surrounding member States in data sharing, data processing and availability, capacity development and addressing cumulative impacts.

10. There were discussions about a potential region-specific objective that could address “Maintaining regional features of *ecological importance*” and that these ecological features of importance could be developed with improved data and knowledge over time. Relevant guidance could be further developed by the LTC.

B. Non-spatial measures

11. Participants discussed the role of non-spatial measures under the draft REMP, and how they could complement spatial measures such as APEIs. There was general agreement that non-spatial measures are important for addressing impacts that cannot be managed spatially, particularly those occurring temporally.

12. There was also both recognition about limitations of the REMP, especially regarding activities regulated by other competent organizations, and requirements under the Mining Code, in particular those related to the Environmental Impact Assessment (EIA) process and reporting. As a result, participants emphasized the need to clearly distinguish between measures adopted under the REMP and those handled through contractor-level EIAs. There is general agreement that the REMP should not impose requirements beyond its mandate, while providing guidance and coordination at a regional level.

13. There was discussion on temporal measures, particularly the idea of temporary suspension or modification of activities. It was noted that the term “suspension” has legal implications and is linked to emergency orders and penalties under UNCLOS, thus requiring careful consideration. Suspension may also have significant economic implications for contractors, so strong scientific evidence, thresholds and legal advice would be needed to define when activities would be suspended. In some cases, full suspension may not be necessary; alternative mitigation measures could be applied instead.

14. Participants considered the pressures that could potentially be addressed through non-spatial measures, such as noise and light, plume dispersal, vessel-related ballast water discharge, marine debris, and wastewater. Impacts and effects from a number of these pressures are the responsibilities of contractors or other competent international organizations. It was suggested that coordination with other competent international organizations, such as the International Maritime Organization (IMO) or RFMOs (e.g., WCPFC, NPFC) is necessary. In addition, voluntary measures or recommendations could be made, with an example of having no-discharge zones near sensitive seamounts.

15. Participants recognized the ecological role of midwater ecosystems which remain poorly understood but are critical to achieving the goal and objectives of the REMP, given the importance of seamounts throughout the region. Participants also stressed the importance of protecting migratory species, including, but not limited to, marine mammals, tuna, turtles and seabirds. A key challenge identified was to manage impacts on non-benthic and mobile species, which may require innovative approaches beyond traditional spatial protection.

16. Regarding non-spatial measures related to connectivity and larval dispersal, limited understanding of spawning times, larval dispersal, species essential habitats and connectivity was identified as a key constraint. This emphasizes the need for certain baseline studies, and potentially predictive habitat/species suitability modelling.

17. Overall, participants noted that some measures (e.g., seasonal closures) may not yet be feasible due to insufficient data, and these should be identified as research priorities within the REMP. There was also a suggestion of including supplementary materials or annexes to provide accessible ecological information for contractors and other interested parties. It is noted the Data Report and Regional Environmental Characterization reports fulfill some of this suggestion.

18. A recurring theme was the need for coordination with competent international organizations and frameworks, including WCPFC, IMO, NPFC, Convention on Migratory Species, and scientific and conservation organizations. The REMP should promote data sharing and alignment of measures across different sectors, and function as part of a broader regional management framework, even where direct control is limited.
19. It was also emphasized that contractors need clear guidance at an early stage of planning, related to when and how non-spatial measures would apply.
20. The discussion highlighted that non-spatial measures are potentially an important complement to spatial protection, particularly for managing dynamic ecological processes, mobile species, and cross-sectoral and cumulative impacts.
21. Participants noted that the formulation of non-spatial measures must consider scientific evidence and uncertainty, legal and institutional constraints, and practical feasibility for contractors, if they relate to their activities. Overall, participants supported a flexible, evidence-based, and collaborative approach to integrating non-spatial measures into the REMP.
22. Participants also made the following suggestions:
- Refining terminology (especially around “suspension”)
 - Developing adaptive measures
 - Addressing critical knowledge gaps

Annex V

Priorities for environmental research and regional assessment to inform future review of the REMP and Monitoring

1. Under this agenda item, Co-Chairs provided an introduction to agenda item 5, guiding questions and expected outputs.
2. Group discussion focused on the following themes (see Section VI of the draft REMP):
 - Knowledge gaps and priority actions to support effective implementation of the REMP and its future review.
 - Opportunities for collaboration in addressing the knowledge gaps and priorities for capacity development to support effective implementation of the REMP.

A. Knowledge gaps and priority actions

3. Discussions were structured to focus on the five priorities identified in Section VI of the draft REMP designed to ensure effective implementation of the management measures in achieving the goal and objectives of the REMP.
- a) Risk analyses and cumulative impact assessments at the regional scale should be carried out to identify and confirm that risks are adequately managed by the existing APEI design**
4. Participants noted the challenges and the importance of conducting regional-scale risk analyses and cumulative impact assessments. It was noted, however, that the starting point should be limited as first-cut coarse level analysis.
 5. Participants noted the possibility of improvement in comparison to the CCZ EMP, where efforts focused primarily on identifying risk factors within contract areas rather than undertaking a regional assessment. Participants suggested that future REMPs should improve upon this approach by developing more coordinated and regionally integrated assessments.
 6. Discussion highlighted that cumulative impact assessment at the regional scale will require substantial coordination, data integration, and institutional capacity. Questions were raised regarding which entity or mechanism would be responsible for managing regional datasets, conducting analyses, and identifying emerging risks. While contractor data are increasingly available through DeepData, participants noted that cumulative impact assessments require broader synthesis and interpretation across multiple activities and environmental processes.
 7. Several participants noted the ongoing effort at the ISA with cumulative impact assessment workshops, which include both quantitative and qualitative modelling approaches and is developed in close collaboration with the LTC and other stakeholders. Workshops and collaborative scientific processes were identified as useful mechanisms for refining assumptions made during REMP development and improving regional-scale analyses.
 8. Participants also noted that more efficient and coordinated sampling strategies could reduce duplication of efforts among contractors and facilitate regional understanding without imposing unnecessary burdens.
 9. The importance of standardized methodologies and data-sharing mechanisms was repeatedly emphasized, particularly for parameters such as hydrodynamics, productivity, and connectivity, for which eDNA analysis could be extremely useful. The need to encourage the contractor in improving efforts with this technique was noted.
 10. Participants highlighted the need for coordinated monitoring efforts that could support improved understanding of cumulative impacts once multiple mining operations are active.

11. Climate change was identified as an important consideration within regional risk assessments. Participants emphasized that climate-driven changes in temperature, circulation, habitat distribution, and species migration may significantly affect deep-sea ecosystems and could alter the effectiveness or representativity of management measures over time. It was noted that climate change considerations are integrated into most risk and cumulative impact assessment by default.

12. Some suggestions were made to integrate uncertainty assessments with explicit consideration of confidence levels associated with available data, models, and assumptions.

b) The spatial distribution of habitats, including PMN and CFC habitats, should be further investigated to ensure management measures are appropriate for both habitat and resource types, particularly where the two are closely associated.

10. Participants supported the need for improved understanding of the spatial distribution of habitats, including the relationships between nodule-rich habitats and cobalt-rich crust habitats. Clarifications were made that “nodule-rich habitats” should not be considered synonymous with abyssal plain habitats, given the ecological variability within these two systems.

11. Discussion emphasized that current APEI design approaches rely heavily on geomorphological classifications and environmental proxies. While these provide a reasonable basis for regional planning, participants agreed that further empirical validation and ground-truthing are required to confirm ecological patterns and improve habitat characterization.

12. Participants highlighted that significant knowledge gaps remain regarding abyssal plain habitats, nodule habitats, seamount ecosystems, and also areas outside contract blocks. Improved habitat suitability modelling, informed by additional biological and environmental data, was identified as an important future priority. It was also noted that existing bathymetric datasets contain some inaccuracies, so these would need to be checked for use in regional analyses and management decisions.

13. It was acknowledged that comprehensive ground-truthing efforts would require substantial resources and coordination. Contractors were identified as likely contributors to these efforts, although collaboration with scientific institutions and regional initiatives would also be necessary.

C) Biogeographic studies and habitat/species mapping using empirical environmental and biodiversity data are needed to validate the assumptions made in the network design based on environmental “proxies” and to inform future review of the APEI network.

14. Participants agreed that additional biogeographic studies and habitat/species mapping are needed to validate assumptions made during network design and to support future reviews of the APEI network.

15. Discussion highlighted the need for improved empirical biodiversity and environmental datasets, including higher-resolution habitat mapping, improved bathymetric coverage, and better integration of contractor-collected baseline data.

16. Participants noted that while environmental baseline studies conducted within contract areas may provide valuable information, they may not provide sufficient regional coverage to fully support broader ecosystem assessments.

17. Habitat suitability modelling was discussed as a promising tool for identifying ecologically important areas both within and outside existing APEIs. Participants also highlighted the potential value of integrating biogeochemical and water-column models to better understand ecosystem patterns, including the influence of features such as oxygen barriers on species distributions.

18. The importance of incorporating fine-scale habitat features, including vulnerable marine ecosystems (VMEs) associated with seamounts, was also discussed. Participants emphasized that regional-scale planning should remain compatible with the use of finer-scale data to inform adaptive management and future revisions of management measures.

d) The APEI network uses a combination of sources to inform decisions about connectivity and the spatial scale of protection (either large self-sustaining areas or links between seamounts). Connectivity at the population level needs to be better determined based on further studies in this region to validate the design rules applied.

19. Participants emphasized that improving understanding of ecological connectivity remains a key priority for validating the assumptions underpinning the APEI network design. Existing design rules were recognized as relying on a combination of available scientific evidence and environmental proxies; however, participants noted that additional empirical studies are needed to better understand population-level connectivity within the region.

20. Current contractor-led and academic studies on connectivity were acknowledged, including research using genetic techniques, larval dispersal modelling, and hydrodynamic analyses. Participants stressed that connectivity studies and regional circulation models should be developed in parallel, given that accurate connectivity assessments depend heavily on improved understanding of current systems, especially in deep water.

21. The importance of standardized regional hydrodynamic data collection and collaborative approaches among contractors was highlighted. Participants noted that variability in current regimes, depth, and larval duration complicates modelling efforts and requires regionally coordinated monitoring programmes.

22. Discussion also noted that connectivity should not be interpreted solely in terms of widespread species, stressing the importance of understanding connectivity among more spatially restricted or potentially vulnerable species, including those associated with seamount habitats.

23. In addition to population connectivity, participants suggested that broader concepts of ecological and functional connectivity could also be considered, including trophic interactions, ecosystem functioning, recovery processes, and maintenance of self-sustaining habitats and communities.

e) Technology will play an important role in future environmental management and monitoring. The Authority should monitor technology development to understand, the impacts of new technologies, and how this might either affect the APEI design, or the ability to monitor the marine environment.

24. Participants emphasized that technological development will play a central role in future environmental management and monitoring. Discussions focused both on the potential impacts of emerging mining technologies and on opportunities to improve environmental observation and monitoring capabilities.

25. Adaptive management was repeatedly identified as an important framework for incorporating technological advances into future REMP implementation. Participants noted that ISA should monitor technological developments to assess whether new approaches may affect the appropriateness of current APEI designs or the ability to monitor environmental conditions and impacts.

26. Several participants emphasized the value of non-destructive or minimally invasive monitoring techniques wherever possible, alongside the need for standardized sampling methodologies and ethical monitoring practices. Technologies such as habitat suitability mapping, artificial intelligence, advanced genomic analyses, and autonomous monitoring systems were identified as promising areas for future development.

27. Collaboration and data-sharing were also highlighted as critical enablers of technological advancement and regional monitoring. Participants stressed the importance of strengthening partnerships among contractors, scientific institutions, coastal States, and philanthropic organizations to support technology development.

Monitoring considerations

28. Participants discussed the importance of linking high-level REMP objectives with operational monitoring objectives and measurable management targets and indicators.

29. Participants emphasized that monitoring frameworks should clearly articulate how monitoring results would inform future management decisions, adaptive management processes, and potential revisions of the REMP or APEI network.

30. The need for clearly defined reporting mechanisms and reporting frequency was also highlighted. Participants noted that reporting intervals may need to vary over time, with potentially more frequent reporting during early implementation phases.

31. Participants further emphasized that monitoring plans should maintain clear links to the original network design criteria; include climate change monitoring and differentiation of climate-driven versus mining-related impacts; incorporate monitoring beyond contract areas where appropriate; harmonize with monitoring initiatives undertaken by other regional organizations and adjacent coastal States; and strengthen collaboration mechanisms for hydrodynamic, genomic, and ecosystem-scale monitoring. Consideration of monitoring frequency and temporal scope was also highlighted to allow decoupling of natural variability from impacts.

32. Discussions also highlighted the importance of defining management responses associated with monitoring outcomes, including how cumulative impacts and adaptive management actions would be addressed if significant environmental changes are detected.

B. Opportunities for collaboration in addressing the knowledge gaps and priorities for capacity development to support effective implementation of the REMP

33. While acknowledging contractors' contributions to increasing knowledge and data in the Area, participants highlighted the need for further scientific collaboration and data sharing to address knowledge gaps beyond contract areas. Various options to incentivize such efforts, including through collaboration among contractors, should be further explored. ISA contractors could be encouraged to conduct baseline studies outside their contract areas. Scientists and researchers not working with the contractors could also be encouraged to submit relevant data collected to DeepData.

34. A major challenge is the availability of research vessels to conduct deep-sea research. It was noted that some contractors invite other scientists to join their research activities or share ship time for further research, and further efforts for such collaboration were encouraged.

35. It was suggested that ISA collaborate with various scientific institutions to conduct research and facilitate efforts by sharing information on funding opportunities. Collaboration with the BBNJ Agreement and its stakeholders was also suggested, as a means to identifying and addressing common knowledge and capacity gaps.

36. Participants were informed of the ISA Action Plan for Marine Scientific Research adopted by the ISA Assembly. This aims to provide a global framework for deep-sea research. The ISA Secretariat implements scientific initiatives and commissions consultancies to address priority knowledge gaps in support of informed decision-making. Future capacity development activities should build on existing efforts, including the Deep Dive e-learning programme which provides a cost-effective platform to on REMP-related training, among other aspects.

37. It was also proposed that adjacent coastal States, as well as other States, be invited to conduct research in APEIs close to their EEZ or ECS, as well as to share data collected in areas near the REMP to maximize the available data that may provide additional knowledge of the broader environment. This could provide a better understanding of environmental characteristics of the region and connectivity.

38. Building capacity of the developing States on the implementation and monitoring of the REMP is important. This is to ensure that the REMP is well understood, and knowledge is enhanced on the potential risks of transboundary effects from the REMP to the adjacent coastal States and vice versa. To this end, collaboration with relevant regional and subregional organizations should be encouraged for effective and efficient use of existing efforts.

39. ISA could recognize different research priorities related to the REMP as a basis for scientists and scientific institutions to request research grants from national funding agencies. Various options to incentivize researchers to follow the research-oriented standard operating procedures of ISA, such as that on sampling, processing, and sharing of deep-sea biological samples and genetic data, should be explored, so that the data generated from different research efforts can be easily used and shared with ISA.