Frameworks for Regional Environmental Management Plans

The CCZ Example

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Environmental Management Plan for the Clarion-Clipperton Zone

I. Introduction

A. Legal framework related to the powers of the International Seabed Authority on the protection of the marine environment

1. Under the 1982 United Nations Convention on the Law of the Sea (the Convention), States parties have a general obligation to protect and preserve the marine environment. This overarching obligation encompasses responsibilities to prevent, reduce and control pollution of the marine environment from any source, to
CCZ EMP
Some Key Management Elements

<table>
<thead>
<tr>
<th>Evaluate environmental risks</th>
<th>Environmental impact assessment</th>
<th>Taxonomic workshops</th>
<th>Baseline assessments</th>
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<tr>
<td>Training</td>
<td>Intercalibration and standardization</td>
<td>Establish an environmental database</td>
<td>Contractor EMPs including recovery plans</td>
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<tr>
<td>Monitoring</td>
<td>Retention of environmental experts</td>
<td>ABMT to protect 30-50% of area</td>
<td>Use CBD and FAO guidelines</td>
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</table>
Clarion-Clipperton Zone REMP

design principles codified by ISA/LTC

applicable to REMPs in the ABNJ

APEIs

1) protect 30-50% of the management area

2) fit into existing legal frameworks

3) minimize socioeconomic impacts

4) maintain sustainable, intact and healthy marine populations

5) take into account biophysical gradients that affect the biogeography of marine biodiversity
6) protect a full range of habitat types found within each subregion

7) ensure maintenance of minimum viable population sizes for species potentially restricted to a sub-region (2 x dispersal distance)
Dispersal Distances

new estimates for deep-sea invertebrates based on slopes of genetic Isolation by Distance measures

"scales of dispersal and connectivity of reserve design in the deep sea might be comparable to or slightly larger than those in shallow water"
Clarion-Clipperton Zone REMP

*design principles*

6) protect a full range of habitat types found within each subregion

7) ensure maintenance of minimum viable population sizes for species potentially restricted to a sub-region (2 x dispersal distance) = 2 x 100 km (core area)

8) use a buffer zone to ensure that biota and habitats in the protected area are not affected by anthropogenic threats occurring outside the MPA = 100 km

9) straight-line boundaries

Wedding et al. 2013
Network Design

Based on CBD Decision IX/20 Annex III:

Four initial steps to be considered in the development of representative networks of marine protected areas:

1. use a biogeographical approach
2. identify important areas
3. iterative site selection to build a network
4. consider ecological coherence (e.g., ecological connectivity and viability)
IMPORTANT AREAS

Vulnerable Marine Ecosystems (FAO)

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

Ecologically and Biologically Significant Areas (CBD) plus

- Biological diversity
- Biological productivity
- Naturalness

+ Scientifically & Culturally Important Areas
Evaluation of Network Design

1) Important Areas
2) Representativity
3) Connectivity
4) Replication
5) Adequacy & Viability including under ocean climate change

See Dunn et al. in press, *Science Advances* (due out in July) for an implementation of such an evaluation scheme.
SHADING
Light:  100 km core length
Medium:  200 km core length
Dark:  300 km core length
MPA Networks
Target Effective Area

30-50%

O’Leary et al. 2016
Mid-Atlantic Ridge Scientific Case Study

Area-Based Management Tool Framework for REMP's on Mid-Ocean Ridges

Science Data Report
(T Morato, U Azores)

Lisbon Working Group
(Design Principles, Scenarios)

Manuscript
(in review, Science Advances)

Horta Workshop
(Scientific Community)

Sintra Workshop
(Refinement, Endorsement of Design Principles, Scenarios)

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

- Biogeographic transitions
- Genetic hybrid zones
- Major transform faults
Conservation Goal

to contribute to:

“the protection of the natural diversity, ecosystem structure, function, connectivity, and resilience of deep-sea communities in the context of seabed mining in the region.”
SEMPiA Study Area
Biogeographic Context & Important Areas
Exploration contracts awarded by the ISA
APEI
Dimensions: Length

2X median larval dispersal distance
(best estimate: 100 km)
APEI
Dimensions: Width
Proposal for APEI Size

Core width extends 500 km on either side of the average ridge centerline.
POC Flux

Management Units

200 km core APEIs
SHADING
Light:  100 km core length
Medium:  200 km core length
Dark:  300 km core length

Metrics

- Major Transform Faults
- Genetic Hybrid Zones
- Active vents
- Inactive vents
- Fracture zones
- Seamounts
- Spreading Ridge
- Depth
- Slopes
- POC Flux to the Seafloor
- Regional Connectivity
- Network Population Persistence
- Number of APEIs
- Within APEI Population Viability
- CC: Absolute Similarity
- CC: Relative Local Change
- Percent Management Unit Conserved

Conservation Target
Key Points

• Final design and placement of APEIs is the purview of member States of the ISA
• Design principles allow for a robust framework based on inter-governmentally agreed criteria
• Quantitative metrics allow for network design options to be evaluated against conservation goals
• Design principles may be applied to other mid-ocean ridges
• APEIs (no-mine areas) are only one part of a Regional Environmental Management Plan
  • Regional conservation targets may be met by multiple management measures (e.g., protection of active vents, temporal planning, mitigation efforts, etc)

Thank You!
Preliminary strategy for the development of regional environmental management plans for the Area

ISA OBJECTIVES

• Proactive, area-based management tool to support informed decision-making that balances resource development with conservation

• 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 provide those areas with appropriate levels of protection

ISBA/24/C/3 (16 January 2018)
APEI Key Points

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Thank You!
1. Assess environmental impact of the activity and determine which are significant
2. Identify all legal obligations and other requirements
3. Assess stakeholder views
4. Prepare an environmental policy
5. Define key roles and responsibilities
6. Establish environmental management objectives and targets
7. Develop environmental management programs, identify operational controls, monitoring, and measurement needs
8. Establish corrective action, document control, and records management processes

etc

https://www.epa.gov/ems/guide-developing-environmental-management-system-do
I. INTRODUCTION
A. Legal Framework
B. Other international organizations and processes related to the protection of the marine environment
C. Guiding principles
D. Definition of the Clarion-Clipperton Zone area and other relevant terms
E. Description of mining operations, vulnerability and potential impacts
II. Environmental Management*
   A. Spatial Variation
   B. Size of areas of particular environmental interest
   C. Scientific design
   D. Flexibility

III. Vision

IV. Goals

V. Strategic Aims

* Is spatial management sufficient?
VI. Operational objectives
   A. Entire Clarion-Clipperton Zone
   B. Contract Areas
   C. Areas of Particular Environmental Interest

VII. Management Objectives
   A. Entire Clarion-Clipperton Zone
   B. Contract Areas
   C. Areas of Particular Environmental Interest

VIII. Implementation

IX. Review

X. Recommended priority action
important areas
e.g., active hydrothermal vents

• Active hydrothermal vent ecosystems are extremely rare.

• Mineral resources at active vents would not contribute significantly to the global metal supply.

• Effective networks that protect representative active vents cannot be ensured.

• Avoiding impacts to active hydrothermal vents would be consistent with their recognition as vulnerable by international organizations.

see Van Dover et al. 2018, *Marine Policy*