OECMs

In marine capture fisheries

Systematic approach to identification, use and performance assessment (Version 2)

Other Effective Area-based Conservation Measures In Marine Capture Fisheries

Systematic approach to Identification, use and performance assessment (Version 2)

By

Serge. M. Garcia[1], Jake Rice[1, 2], Anthony Charles[1, 3], Daniela Diz[1, 4]

PREPARATION OF THIS DOCUMENT

About the document

This document proposes a systematic review of CBD Decision 14/8 on OECMs and a set of considerations and actions that would be needed to identify and use OECMs in the marine capture fisheries sector, organized following the list of Criteria and sub-criteria contained in the Decision. Versions if the document have been prepared as a background to be used in working groups: (1) the CBD Technical Expert Workshop on Other Effective Area based Conservation Measures for Achieving Aichi Biodiversity Target 11 (CBD, Montreal, Canada, 6-9/02/2018 (**Rice et al, 2018**) ; (2) the FAO-CBD-FEG Expert Meeting on Other Effective Area-based Conservation Measures in the Marine Capture Fishery Sector (Rome, 7-10 May 2019) (**Garcia et al, 2019** and (3) the Joint ICES/IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS), conducted virtually from 15 to 24 March 2021 (**Garcia et al, 2020**). This document is the version 2 of the WKTOPS document, modified to account for the comments and suggestions made by the experts at that meeting. Additional comments and suggestions for its improvement may be sent to Serge. M. Garcia (grcsgm@gmail.com).

Acknowledgements

The elaboration of the document was supported by the Nordic Council of Ministers, Fisheries and Oceans Canada, and the European Board of Conservation and Development (EBCD) and the Fisheries Expert Group of the IUCN Commission on Ecosystem Management (IUCN-CEM-FEG).

The authors are grateful for the numerous and valuable comments received from participants during three workshops on OECMs in which earlier versions of this document were used as background and basis for discussion. Our most grateful thanks go to the ICES staff that have contributed so much to the success of the WKTOPS workshop and particularly the co-chair of the meeting (Ellen Kenchington) and the leaders of the break out groups who, through their detailed comments, provided the incentives and many of the ideas introduced in this version: Peter Wright (for the North-western North Sea Sandeel Fishery Closure); Marty King (for the Lophelia Coral Conservation Area); Andrew Kenny (for the NAFO Sponge Closures);

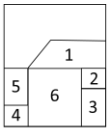
[1] Fisheries Expert Group of the IUCN Commission on Ecosystem Management (IUCN-CEM-FEG)
[2] Fisheries and Oceans (Emeritus), Canada
[3] Saint Mary's University (Canada)
[4] The Lyell Centre, Heriot-Watt University, UK

David Miller and Francis Neat (for the NEAFC Haddock Box); Daniela Diz (for the NAFO Seamount Corner Rise Closure); and Emma Sheehan and Llucia Mascorda Cabre (for the Lyme Bay Mussel Farm).

The document benefitted also from valuable contributions and comments received on draft versions from experts from the Fisheries Expert Group of the IUCN Commission on Ecosystem Management (IUCN-CEM-FEG), and from other institutions, to whom we express our most grateful thanks: Colin Atwood (South Africa); Gunnstein Bakke (Norway); Kim Friedman (FAO); Eskild Kirkegaard (Denmark, FEG): Amber Himes-Cornell (FAO), Alf Hakon Hoel (Norway); Kelvin Passfield (IUCN-CEM); and Kerry Sink (South Africa).

We remain solely responsible for any eventual errors or misinterpretations.

Credits for the cover page



1: © S. Nancy & M. Broquère. En Haut. 2: © IStock; 3 © I. Meliane; 5 © Peter Leopold. DFO. Canada.; 6 © IStock. Cover design: Genuine Romanart (Rome, Italy).

Disclaimer

The views expressed in the document are those of the authors and may not represent the views and policies of their organizations.

Permissions

Suggested citation

Garcia, S.M.; Rice, J.; Charles, A. & Diz, D. 2021. OECMs in Marine Capture Fisheries: Systematic approach to identification, use and performance assessment in marine capture fisheries (Version 2). Fisheries Expert Group of the IUCN Commission on Ecosystem Management, Gland, Switzerland. European Bureau of Conservation and Development, Brussels, Belgium: 87 p. Available at www.ebcd.org/feg.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

ABFM	Area-Based Fishery Management
ABMT	Area-Based Management Tool
BACI	Before-After-Control-Impact
BIM	Biodiversity Impact Mitigation
CBD	Convention on Biological Diversity
CCFAM	Canadian Council of Fisheries and Aquaculture Ministers
CCRF	Code of Conduct for Responsible Fisheries
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COP	Conference of the Parties to the CBD
EAF	Ecosystem Approach to Fisheries
EBSA	Ecologically and Biologically Significant Area
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EFS	Ecosystem functions and services
ES	Ecosystem Services
FAO	Food and Agriculture Organization of the United Nations
ICAM	Integrated Coastal Area Management
ILK	Indigenous and Local Knowledge
IUCN	International Union for Conservation of Nature
ICES	International Council for the Exploration of the Sea
FEG	Fisheries Expert Group of the IUCN Commission on Ecosystem Management
LME	Large Marine Ecosystem
MCS	Monitoring, Control & Surveillance
MER	Monitoring, Evaluation & Reporting
MPA	Marine Protected Area
MSP	Marine Spatial Planning
NTZ	No-Take Zone
OECM	Other Effective Area-based Conservation Measure
OSPAR	Convention for the Protection of the Marine Environment of the Northeast Atlantic
PET	Protected, Endangered or Threatened (species)
RFMO/A	Regional Fishery Management Organization/Arrangement
PSR	Pressure / State / Response Framework
SAI	Significant Adverse Impact
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SCBD	Secretariat of the Convention on Biological Diversity
SDG	UN Sustainable Development Goal
SSF	Small-scale Fishery
TURF	Territorial Use Rights in Fisheries
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNGA	United Nations General Assembly
UNEP	United Nations Environment Programme
UNFSA	United Nations Fish Stock Agreement
VME	Vulnerable Marine Ecosystem
WCC	World Conservation Congress
WCMC	World Conservation Monitoring Centre (UNEP)
WCPA	World Commission on Protected Areas
WDPA	World Database on Protected Areas

GLOSSARY

Bycatch

Part of a catch of a fishing unit taken incidentally in addition to the target species towards which fishing effort is directed. Some or all of it may be returned to the sea as discards, usually dead or dying. Such term does not include fish released alive under a recreational catch and release fishery management.

Candidate-OECM

In fisheries, an area-based fishery management measure (ABFM, closed area) that has been assessed as adequately meeting the CBD Decision 14/8 Criteria for OECMs and is submitted to the **Legitimate Authority** for final decision.

Discards

Target and non-target fish caught and returned to the sea, dead or alive, whether or not brought fully on board a fishing vessel, because of lack of market, lack of space in hull, physical damage, and legal requirement regarding *inter alia* minimum size limits or quotas or protected species.

Locally managed marine area (LMMA)

An area of nearshore waters with associated coastal and marine resources that is largely or wholly managed at a local level by the coastal communities, land-owning groups, partner organizations, and/or collaborative government representatives who reside or are based in the immediate area (http://lmmanetwork.org).

Move-on rule

A regulatory provision that requires a fishing vessel that encounters (brings on board during fishing operations) more than a maximum limit of a particular protected taxon, to move away from the point of encounter, by a minimum regulated distance.

Potential OECM

In fisheries, an existing or planned Area-Based Fishery Management measure (ABFM) that appears, after a quick check, to have the prerequisites for being fully assessed against the CBD Decision 14/8 Criteria

Protected area

A geographically defined area which is designated or regulated and managed to achieve specific conservation objectives (**CBD, Art. 2**)".

Sustainable use

The use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations (**CBD Article 2**).

Upgradable ABFM

In fisheries, an area-based fishery management measure (ABFM, closed area) that has been assessed as being able to adequately meet the CBD Definition and identification Criteria of OECMs with some modifications (e.g., in its boundaries or measures applied in it).

PREAMBLE

This document is intended to assist countries in their mainstreaming of OECMs in the marine capture fisheries sector, in line with the CBD Decision 14/8 and the OECM definition and voluntary guidance it contains. This document logically refers to Aichi Target 11 from the CBD Strategic Plan for biological Diversity 2011-2020. OECMs are also part of the Post 2020 Global Biodiversity Framework (GBF) still waiting for formal adoption at the next CBD COP, delayed by the Covid pandemic. While Targets may still be modified at the next COP, the present drafting of the GBF Target 2 indicates that: *By 2030, protect and conserve through well connected and effective system of protected areas and other effective area-based conservation measures at least 30 per cent of the planet with the focus on areas particularly important for biodiversity.* How this Target will read when finally adopted is anyone's guess at this stage but no matter what coverage target will be finally agreed, OECMs will be an integral part of such targets.

This document is not normative but explanatory. It explains the Decision and reviews its implication for the marine capture fisheries sector. When the decision is unclear, or leaves rooms for adaptation or interpretation, suggestions for a case-by-case and flexible implementation -as recommended in the Decision- are provided, from a marine capture fisheries angle. The final interpretations remain a responsibility of the State or any other Legitimate Authority established by –or recognized– by the State for OECM implementation. The information available on OECM implementation, in general as well as in fisheries, is still quite scarce and the suggestions provided in this document need to be further tested on the ground, in different ecological and socio-economic contexts, progressively leading to the emergence of best practices in this matter.

The constituting elements of this document have been mainly elaborated in successive background documents on Other Effective Area-Based conservation Measures (OECMs) in marine capture fisheries, prepared since 2018 by IUCN-CEM-FEG in collaboration with FAO. The document also benefitted from the debates conducted in several side-events on the subject organized at international conferences in collaboration between IUCN, FAO, CBD and other partners since 2018. Finally, the document also takes into account the outcomes of two scientific workshops on the subject, organized by FAO, CBD and IUCN-CEM-FEG (in 2019) and by ICES and IUCN-CEM-FEG (in 2021). The considerations and elements of guidance it contains have been organised along the main phases of the full OECM implementation process that this document outlines **(Chapter 3).**

For additional considerations on the matters addressed, the present document should be considered and used jointly with the CBD Decision 14/8 on OECMs (https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-08-en.pdf) and the UNEP-WCMC User Manual for reporting to the World Database on OECMs (**UNEP-WCMC, 2019**; http://wcmc.io/WDPA_Manual). A generic guidance on OECMs is also available in **IUCN-WCPA, 2019**).

Audience

There is a broad and diverse target audience for this document. OECMs –as defined in Decision 14/8– are a management instruments bridging sustainable uses of biodiversity with its conservation. The evidence providing the basis for selection, planning and management of OECMs includes the best science available and the knowledge of fish harvesters, and Indigenous Peoples and local Communities (IPLCs). The document should be reasonably accessible to all these audiences, including policy makers, managers, scientific advisors, fisheries and conservation scientists and sector representatives. The document intends to be used as background in regional meetings aiming at informing about OECMs in fisheries and at promoting their assessment, use and performance assessment. The document caters, therefore, for a

large readership in regions ranging from well-endowed to extremely limited in data and competences, with a particular attention to the latter. As a consequence, the information provided may sometimes appear superfluous to experts and insufficiently detailed to beginners.

1. INTRODUCTION

In 2010, in Nagoya (Japan), the 10th Conference of the Parties to the Convention on Biological Diversity (CBD COP 10) adopted a Strategic Plan for Biological Diversity 2011-2020 containing 20 targets (referred to as Aichi Targets) to be reached, in most cases by 2020. Target 11 states that: "*by 2020, at least…10 per cent 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 (OECMs[5]), and integrated into the wider … seascapes"* (emphasis added) (https://www.cbd.int/sp/targets/). In elaborating this Target, the CBD COP created *de facto* a new and undefined class of conservation instruments, the "*other effective area-based conservation measures*" (hereafter referred to as OECMs), the spatial coverage of which should be considered as incremental and complementary to that of the specific area-based instrument - Marine Protected Areas (MPAs), in the achievement of Target 11. It is the *aggregate area covered by* both MPAs and OECMs that was agreed to be considered in evaluating progress towards the overall intent of the Aichi Targets to deliver conservation and sustainable use of biodiversity, as specified in the Convention itself[6]. After a few years of discussions around the OECM concept, the CBD COP 14 adopted in November 2018 a Decision 14/8 (thereafter referred to as "The Decision") containing a formal definition of this category of instruments and providing the foundations for an effective process of implementation of OECMs (see **Chapter 3**).

In order to foster mainstreaming of OECMs in economic sectors, The Decision (§9) *Invites the International Union for Conservation of Nature, the Food and Agriculture Organization of the United Nations, and other expert bodies to continue to assist Parties in identifying other effective area-based conservation measures and in applying the scientific and technical advice.* For the same reason, The Decision (§12) *Urges Parties to facilitate mainstreaming of protected areas and other effective area-based conservation measures into key sectors, such as, inter alia, agriculture, fisheries, forestry, mining, energy, tourism and transportation, and in line with Annex I* (which deals with the integration of protected areas and OECMs into wider landscapes/seascapes and biodiversity mainstreaming across sectors).

In response to this invitation, an "Expert Meeting on Other Effective Area-Based Conservation Measures in the Marine Capture Fishery Sector" was organized by FAO, the IUCN-CEM Fisheries Expert Group (FEG), and the European Bureau for Conservation and Development (EBCD), in collaboration with the CBD Secretariat (7-10 May 2019, Rome, Italy) (**FAO, 2019**). The purpose of the expert meeting was to compile a broad range of expert advice on the identification and establishment of OECMs in the marine capture fishery sector, on the basis of CBD COP Decision 14/8. The expert meeting considered a range of topics: (1) the rationale for producing guidance for OECMs in the marine capture fishery sector; (2) definition of an OECM; (3) guiding principles and common characteristics; (4) criteria for identification and evaluation; (5) key concepts and cross-cutting issues in a fisheries context; (6) evaluating areas for inclusion in OECM reporting and management; (7) monitoring, evaluation and reporting; (8) re-evaluation of the OECM; and (9)

[5] Neitehr Target 11 nor CBD Decision 14/8 contained the OECM acronym which emerged later as the most commonly used abbreviation.

[6] E.g., in The Decision paragraph 12 and Annex I, and in accordance with the objectives of the Convention (CBD Article 1) and related obligations including those related to in-situ and ex-situ conservation (Articles 8 and 9), and sustainable use (Article 10) of biodiversity and its components.

selected governance issues. Discussions were supported by a background document addressing these issues (**Garcia et al, 2019**). A conclusion of the meeting was that other regional meetings would be necessary to pursue the reflexion in different social and economic contexts, differing in terms of data, scientific assessment, and management capacity.

A first (and virtual) regional Workshop on "Testing OECM Practices and Strategies (WKTOPS)" was organized By the International Council for the Exploration of the Sea (ICES) and the IUCN-CEM Fisheries Expert Group (FEG) (15-24 March 2021) (**ICES, 2021**). The workshop examined the elements of guidance available in a background document prepared for the purpose and focussed on the actions that might be considered to implement The Decision (**Garcia et al., 2021**), in the context of 6 ABFM case-studies (one of which on a marine aquaculture farm).

The present document draws extensively on the background document prepared for the first two expert meetings, combined, and revisited to reflect the specific comments and suggestions received at these meetings. The focus of the document is on OECMs to be identified in the marine fishery sector, mainly from existing ABFMs, also commonly referred to as "closed areas". A large range of ABFMs are used mainly for fisheries' optimization but also sometimes for habitats and biodiversity protection within the fishing ground, as in the case of vulnerable marine ecosystems (cf. **Rice and Garcia (2018)** for a detailed inventory). Areas in which fisheries are limited or prohibited by other sectors (e.g., around oil rigs or renewable energy platforms, or for conservation (e.g., in Multiple use MPAs) are not considered.

While focussing on OECMs implemented in capture fisheries, it is important to stress that an OECM is a cross-sectoral concept. Any proposal to consider an area managed by fisheries as an OECM because of its effective contribution to broader conservation will also need to be reviewed relative to other threats impacting or likely to impact the same biodiversity attributes in the same area, reducing the net-cross-sectoral benefit

The practical implementation of OECMs in marine capture fisheries requires "translation" of the generic CBD guidance into operational guidelines, using a fisheries lens. This translation should reflect the fishery sector's particular situation: technologies used, types of impacts on biodiversity, types of governance, current legal framework, jurisdictions[7] under which they operate, the specific types of area-based measures expected to contribute to conservation of biodiversity and how they interact with other non-area-based measures that may be applied etc. Existing conventional fishery closures, as well as new areas where new area-based measures may be brought in, might be considered, and assessed against OECM standards.

In line with the CBD mandate, the considerations in this document are explicitly or implicitly considered as applicable in areas under national jurisdiction. However, CBD State parties and other States can decide to consider using OECMs also under bilateral arrangements (e.g., for transboundary OECMs) or in regional organizations and arrangements of which they are Parties, such as in Regional Seas Organizations (RSOs) or Regional Fishery Management Organizations and arrangements (RFMO/As).

Structure of the paper

The document reviews the CBD Decision 14/8, its definition, Guiding Principles, Criteria for Identification and voluntary guidance, particularly on governance and integration. It describes the full OECM

[7]A "jurisdiction" is the power, right, or authority to interpret and apply the law. The term is also often used to refer to the areas in which these authorities operate. The authority having jurisdiction in fisheries and/or biodiversity management may be international, national or sub-national; public or private; exclusive or shared.

implementation cycle, from initial identification, to decision, implementation, integration, monitoring and evaluation, reporting, and eventual revisions.

2. THE CBD DECISION

Decision 14/8 was adopted by CBD Parties to allow a practical implementation of Aichi Target 11 and to clarify the nature, role, identification process and use of OECMs, at national, cross-sectoral, and sectoral levels. The nature and content of the Decision is examined below after a brief reminder on Target 11.

2.1 Target 11 properties

Target 11 was adopted in 2010 by CBD COP 10 as part of the 20 Targets contained in Strategic Plan for Biological Diversity 2011-2020 (referred to as Aichi Targets). While the pursuit of each target necessarily varies with the different ecological, economic, and social circumstances of each CBD Party, the intent of the Targets should be interpreted consistently. The language used in each target is an important guide to the intent of COP 10, when the targets were adopted. Target 11 is among the longest – "*By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent 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*".

The expression "*other effective area-based conservation measures*" (in brief, OECMs) allowed in principle a lot of areas –other than protected areas– regulated for different purposes but producing biodiversity conservation benefits, to be considered for inclusion in the Target. The properties required for such integration are (1) their importance for biodiversity and related ecosystem services; (2) their effective and equitable management; (3) their representativeness and connectivity within conservation networks, and (4) their integration in landscapes or seascapes. We will see below that these properties are reflected in Decision 14/8 definition of OECMs, the guiding principles and identification criteria, and the guidance on integration and equitable governance.

The complexity of the Targets language reflects both the inherent complexity of the conservation challenges being addressed and the need for consensus at the COP. In the case of Aichi Target 11, key complexities included: (1) the need to address the different starting conditions for coverage of terrestrial and marine conservation areas in different parts of the world; (2) the fact that the "other areas" should cover a diversity of areas, ranging from terrestrial indigenous lands under traditional agroforestry practices to various marine spatial measures other than formal Marine Protected Areas, established by conservation institutions or economic sectors; and (3) the fact that tenure conditions are different on land and at sea. On land, a range of forms of land-use and property rights exist, while in the ocean, property does not exist (except under very special conditions and in the territorial sea), and the States are granted conditional use rights in their EEZ, that they can allocate as they wish. Consequently, different approaches and measures may be needed on land and in the ocean, and under different social and economic conditions, to achieve the same aim regarding uses and conservation of ecosystem features.

Nonetheless, for the OECM concept to be applied consistently, there needed to be consistent interpretation of which area-based measures (other than MPAs) may be considered as "effective area-based conservation measures". The basis for such consistency is to be found in Decision 14/8.

2.2 Nature and content of Decision 14/8

Being a product adopted within the legal framework of the CBD by the Conference of the Parties (COP) to that Convention, Decision 14/8 is an international legal instrument. However, it can be noted that the only section drafted with some legal « strength » is paragraph 2 that *Adopts* formally the OECM definition,

and refers to the Convention itself (§2) for the definition of "biodiversity". All other paragraphs of The Decision core text are drafted more "softly", *welcoming*, *encouraging*, *inviting*, *urging* State Parties and other governments to take specific actions. The four annexes contain what is explicitly referred to as *voluntary guidance* or *scientific and technical advice* with no binding implications. The relative "softness" of the Decision is reinforced by the short preamble to The Decision Annex III which states that *the guiding principles and common characteristics and criteria for identification of OECMs are applicable across all ecosystems currently or potentially important for biodiversity, and should be applied in a flexible way and on a case-by-case basis,* confirming that a significant amount of implementation details are left to the appreciation of States and other Legitimate Authorities.

The first 2 pages contain the core of The Decision, with the formal definition of OECMs, and indicate what action is expected from State Parties, other governments, and the CBD Secretariat. The following 17 pages contain four annexes dealing respectively with integration of protected areas and OECMs in land- and seascapes and their mainstreaming across economic sectors (Annex I); effective governance models for protected areas (Annex II); scientific and technical advice on OECMs (Annex III); and considerations in achieving Target 11 in marine and coastal areas including lessons learned (Annex IV).

Altogether, the Decision appears therefore as an important international legal/policy hybrid document, reflecting a substantial policy commitment to mainstream OECMs across ecosystems and sectors, with a strong definition of OECMs, interacting with an extensive voluntary guidance for their governance, identification, and reporting. All parts of the Decision ought to be considered for its faithful implementation, but enough flexibility is left to State Parties, with the stakeholders, and in the spirit of the Decision, to adapt the process to local conditions.

In the following sections, we will consider mainly the Definition of OECMs and the scientific and technical advice contained in Annex III.

2.3 Definition of OECMs

The general definition of OECMs formally adopted by COP 14 states: *"Other effective area-based conservation measure" means a geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity[8], with associated ecosystem functions and services and where applicable, cultural, spiritual, socio–economic, and other locally relevant values (CBD/COP/DEC/14/8/Annex III) (**CBD, 2018c**)[9].*

Considering that OECMs are part of the measures to be accounted for in Target 11 global coverage, together but clearly distinct from protected areas, it is useful to compare the respective properties reflected in their definitions (**Table 2**).

[8] As defined by Article 2 of the Convention on Biological Diversity and in line with the provisions of the Convention.

[9] The IUCN definition of "protected area" is more elaborated: *"A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*" **(Dudley, 2008**). It adds to the CBD definition: (i) the need for effective management; (ii) the requirement that conservation benefits be in the long term; (iii) it specifies that the conservation target is nature; and (iv) introduces the notions of ecosystem services and cultural values. Most of these additional specifications have been also identified as important for OECMs in Decision 14/8, except that the conservation target od OECMs is "in-situ biodiversity" and not "nature" which might be understood as a more broader, all-encompassing objective *embracing geodiversity, landform and broader natural values* (**Dudley, 2008**).

Table 1 Respective properties of protected areas, Target 11 and OECMs, as mentioned in their definitions and in the OECM guidance (italics).

PROPERTIES	PROTECTED AREAS		TARGET 11	OECM DECISION
	CBD	WCPA		
OBJECTIVES	Conservation [of biodiversity]	Conservation of nature	Conservation of important biodiversity	*Sectoral sustainability*
				Conservation of in-situ biodiversity
ECOSYSTEM		Services	Services	Functions, Services
OTHER VALUES		Cultural		Cultural, Spiritual, Economic, etc.
GOVERNANCE				*Legitimate, Diverse, Inclusive, Equitable*
MANAGEMENT	Regulated	Effective	Effectively Equitably	Achieve
				Effectiveness, Equity
LEGAL STATUS	Designated	Legal, Dedicated, Recognized		Not a protected area, Identified
LOCALISATION	Geographically defined	Geographical space		Geographically defined
OUTCOMES		Long term		Positive, Long-term
REPRESENTATIVE			Ecologically	*Representativeness*
CONNECTED			Systems	*Networks, Systems*
INTEGRATION			Landscapes, Seascapes	*Landscapes, Seascapes Sectoral mainstreaming*

The OECM definition has in common with the protected areas definitions: (i) the geographically defined localisation; (ii) the conservation purpose; and (iii) the importance of effective management. The WCPA definition refers to the conservation of ”nature” which is a broader concept than that of ”biodiversity” used by the CBD definitions of protected areas and OECMs. The formal ”designation” of protected areas is replaced, for OECMs, by a less formal ”identification” and the OECM definition requires that the area should not be a protected area. The guidance on OECMs emphasises the importance of ”governance” and stresses additional properties such as ecological representativeness, connectivity across ecological networks, integration across seascape[10]. Finally, the guidance recals the likely dual role of most OECMs (regarding sector sustainability and conservation) and stresses the need to mainstream the concept of OECMs across sectors.

Many OECM properties mentioned in **Table 1** need to be carefully considered with a ”capture fishery lens”, for example: (i) Geographical definition: in tridimensional oceanic systems? In mobile pelagic systems? (ii) What does the expression ”not a protected area” really mean? (iii) Legitimate authorities? States? Authorities mandated by States? Other authorities? (iv) Effective: In terms of measures in place or/and their outcomes? In relation to all criteria? Other locally relevant values? (v) Equity: how to measure it? How to maintain it in dynamic social-ecological systems? (vi) Sustained in the long term: for how long? With what degree of garantee? (vii) Ecosystem functions and services: those for interest to fisheries? Or all of them? Where to get the information?; (viii) Other locally relevant values: What could these be? How

[10] These elements are also stressed in the general guidance on management of protected areas (e.g. Pomeroy et al., 2004; 2005)

to judge their relevance in different ecosystems and jurisdictions? These terms are clarified as much as possible in the elevant sections of this document.

The COP definition of an OECM does not specify the nature of the specific technical measures which might be needed within the delimited OECM area to produce the outcomes required from an OECM. This is understandable considering the large and complex range of measures potentially aplicable in different ecosystems and socioeconoic environments. However, without effective measures applied inside and other around them, OECMs would remain empty shells (”paper OECMs”) and the importance of such measures for OECMs effectiveness cannot be overstated

In fisheries, it is generally assumed that OECM will emerge from existing ABFMs that might already meet the definition and criteria or might be cost-effectively upgraded to do so. These measures would likely already be integrated into a fishery management plan (FMP), the strongly interconnected primary objectives of which are (i) conservation of the target resources (in reference to their MSY level of productivity) and (ii) social and economic sustainability of the fishery. This ”conventional sustainability” has always integrated additional concerns regarding bycatch (but as a waste of biological and economic resources and a threat to fishing operations in the case of bycatch of protected species) and essential habitats (vital for the target species’ productivity). Since at least UNCED (1992) and with the adoption of the FAO Code of Conduct for Responsible fisheries (CCRF) (**FAO, 1995**) and of the Ecosystem Approach to Fisheries (EAF) (**FAO, 2003**), a ”broader sustainability” is being increasingly understood as implying also compliance with broader biodiversity conservation objectives regarding ecosystem structure (including species composition), functions and services, as well as greater attention to environmental matters, including climate change (**Barange et al, 2018)**. While the existence of an ABFM is primarily justified by its performance in relation to ”conventional sustainabilty”, it eventual OECM status will depend on its performance in relation to ”broader sustainability”. .

The CBD definition of OECMs is applicable *across all ecosystems* and *a priori* to all sectors operating in these ecosystems and likely to generate significant biodiversity benefits through their spatial measures, either existing, improved, or created *ex-nihilo*. Ecosystems, and inside then, areas of particular importance for biodiversity are likely to often cross-national boundaries, calling for international collaboration. In particular, the question of the possible use of OECMs in areas beyond national jurisdiction is addressed in **Section 4.3** on the fisheries’ legal framework**.**

Unless otherwise specified in the text, when using the “OECM” acronym in this document, we refer both to the geographically delimited “area” and to the specific conservation measures taken in and possibly around it, as a complex conservation instrument.

2.4 Guiding principles and common characteristics

In Annex III of Decision 14/8, the CBD COP 14 has also proposed 13 Guiding Principles listing the common characteristics to be shared by OECMs: e.g., the biodiversity values they protect; their complementary role in MPA networks; their demonstrable positive outcomes for in-situ biodiversity; their ecological representativeness and connectivity within broader ecological networks; the use of the best information available for their identification, recognition and effective management, and the need for equitable available for their identification by a Legitimate Authority. The Principles need to be understood and considered when implementing OECMs in the bioecological, socioeconomic, and technological context of fisheries. In the following sections, the guiding principles are examined in the order in which they appear in Decision 14/8 but have been divided in two sets: (1) those specifying the role and expected outcomes of OECMs; and (2) those referring to governance of OECMs. However, for easier cross-referencing in this document, the 13 principles are identified by a single set of letters, from (a) to (m) (**Table 2**).

Table 2 Guiding principles (abbreviated label and content. See CBD (2018) for full text)

ROLES AND EXPECTED OUTCOMES	GOVERNANCE
a. Significant biodiversity value: actual or intended. b. Important complementary role c. Dual role: sustainability & conservation d. Comparable importance e. Demonstrated outcomes on biodiversity & threats. f. Representative & connected to MPAs systems	g. Consultation: stakeholders, right holders h. Legitimate authority, sustained outcomes i. Indigenous people and local communities j. Cultural and spiritual values k. Diverse governance systems and actors, incentives, empowerment l. Best available information: science, TEK, LK m. Transparency & performance evaluation

The names associated to the Principles do not come from The Decision. We created them as a short-hand expression, based on their content, for easier cross-reference in this text and in discussions on the subject.

2.4.1 Roles and expected outcomes of OECMs

The Decision (**Annex III, paragraph C2**) refers to the role of OECMs in relation to Target 11. It states that, by definition, OECMs that fulfil the criteria contained in Annex III contribute to Target 11 both in quantitative terms (i.e., the 10% coverage) and in qualitative terms (i.e., representativeness, coverage of areas important for biodiversity, connectivity and integration in wider landscapes and seascapes, management effectiveness, and equity) (**Paragraph C2a**).

The Decision also states that since OECMs are diverse in terms of purpose, design, governance, stakeholders, and management, they will often also contribute to other Aichi Biodiversity Targets, targets of the 2030 Agenda for Sustainable Development (SDGs), and the objectives or targets of other multilateral environmental agreements (**Paragraph C2b**). Other roles and expected outcomes of OECMs are addressed in the following guiding principles.

Principle (a): Significant biodiversity value

OECMs have a significant biodiversity value, or have objectives to achieve this, which is the basis for their consideration to achieve Target 11 of Strategic Goal C of the Strategic Plan for Biodiversity 2011-2020.

i. About biodiversity value

The term "biodiversity value" is not used in the CBD Criteria but is referred to in Principles (a), (c) and (f). However, the term biodiversity is clearly central to an OECM's role in in-situ biodiversity conservation in the whole guidance and in the CBD itself. In order to avoid misinterpretations of the term, the OECM definition refers to the definition of biodiversity in Article 2 of the Convention: *the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems*.

The term "biodiversity value" is not defined in the Decision but the first preambular paragraph of the Convention refers to the ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components. This definition reflects the broad range of values that should be considered in identifying and assessing OECMs. These values are linked to those of ecosystem functions and services which are discussed below, but as the IPBES regional assessments (IPBES, 2018: a, b, c; Annex II) documented in depth, the "values" of ecosystem goods and services are very different among cultures and economies, and even when considering the "value" of an ecosystem

structural property (species, habitat structural feature, etc.) depends on its role in serving various ecosystem functions, and that role can be very different for the same species when present different ecosystems. The work of IPBES is attaching high priority to developing consistent foundations for appropriately inclusive approaches to assessing biodiversity "values" taking the diversity of natural ecosystems and human cultures into account, and their major Thematic Review of "Uses of Values of Biodiversity in assessments " expected in 2020 should be useful in bringing greater standardization to this complex topic. In some cases, the biodiversity values of an area might have already been identified as part of an Ecologically and Biologically Significant Area (EBSA), like the Disko Fan OECM in Canada.

In practice, for OECMs used in fisheries, the biodiversity attributes of direct relevance are those impacted by fishing activities (beyond the target species) and about which specific action by the sector (in addition to conventional fishery management) can be expected. They include non-target species, including protected, endangered, and threatened species, accidentally taken as bycatch, as well as critical, essential, or vulnerable habitats such as seagrass and algal beds and coral and sponge reefs.

Many of these biodiversity attributes can be routinely identified and effectively monitored in a fishery management system, although for bycatch, and particularly for benthic macro-invertebrates, accurate identification of species (and often even higher taxa levels) is challenging for standard fisheries monitors. Special training and vigilance in catch monitoring is often necessary for accurate monitoring of bycatches of rare species of high conservation priority - even species of fish or seabirds. Viruses, bacteria, phytoplankton, and micro-benthos species may also be affected by fisheries (e.g., by bottom trawling) but they are usually not monitored with fishery-provided data. Where potential impacts on such taxa are a concern, monitoring and evaluation of impacts is likely to require additional funding for directed, fishery-independent, study and modelling, and may be assessed only occasionally.

Some changes in species composition of an ocean area may be practically irreversible, such as those resulting from (i) the opening of new pathways for species to enter an area (e.g. man-made canals); (ii) anthropogenic changes to the physical structure of habitats, increasingly common as coastal development and watershed runoff of land-based sediment and pollutants alters coastal ecosystems; (iii) changing oceanographic conditions linked to climate change; and (iv) voluntary or accidental introduction by navigation (fouling, ballast water), or aquaculture. Such species may become functionally significant in the reconfigured ecosystem, as predators, preys, or ecosystem engineers, and even come to provide new ecosystem services to people, e.g., supporting new fisheries, such as king crab in the Bering Sea or multispecies fisheries in the Eastern Mediterranean. As such, they may be sustainably used by fisheries and considered as part of the evolving biodiversity values in the areas concerned.

The aim of this Principle is to ensure that the positive effects of the OECM on biodiversity are measurable and large enough. The term *significant* is undefined but it can be expected that the OECM contribution should be measurable (in absolute or relative terms) compared to some baseline reflecting the state of biodiversity values on the OECM area or in the fishing ground before the OECM was introduced. A measurable impact may be low or high and the Principle does not specify how big the outcome should be in order to be considered "significant". The term "*effective"* is used elsewhere in the COP guidance (**cf. Criteria C1**) for a similar purpose and raises similar issues. The nature of the *biodiversity value* is not specified either and may refer to market and non-market values, including the value for people (e.g., provisioning services) and the value for the ecosystem maintenance (e.g., functions and support services).

The expression "*or have objectives to achieve"* associated to the expression *"or is expected to achieve"* contained in **Criteria C1** indicates that in case the evidence of a positive impact on biodiversity value is not empirically available when the candidate OECM is assessed, it may be supported by an *ex-ante*

assessment[11], and demonstrated in the subsequent recurrent performance assessments (cf. **Section 7**). This wording would allow the nomination (i) of candidate-OECMs that have been "upgraded" to the OECM level with additional measures designed to improve biodiversity outcomes and (ii) of new OECMs, created specifically as such and for which no case-specific empirical evidence is yet available. In both cases, the risk is that the OECM and the measures applied in it may not generate the expected outcome and a risk assessment would be approriate to operationalize the precautionary approach. In case of failure to deliver the outcomes as expected, the candidate OECM might be re-upgraded with better characteristics, or delisted.

ABFMs vary in terms of the degree to which they will positively benefit biodiversity. If degrees of *biodiversity value* could be defined, in each specific ABFM case, a decision would need to be made as to how significant the co-benefit must be in order to legitimize a candidate OECM in that case (cf. **Section 5.7.2**).

ii. About Primary and secondary objectives

Objectives are referred to in the core text of The Decision as well as Annexes II, III and IV, but in very general form. They are implicitly mentioned in the OECM definition, as measures aiming to achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity, with associated ecosystem functions and services and, where applicable, cultural, spiritual, socio–economic, and other locally relevant values". From that definition, it is clear that the main function of OECMs, and hence their main determining factor of the OECM status, is the conservation of biodiversity and related values. Similarly, OECMs' objectives are implicit in Criteria C1 which states that the area achieves, or is expected to achieve, positive and sustained outcomes for the in-situ conservation of biodiversity, without further specifications.

Other implicit qualitative objectives contained, for instance, in the Criteria for Identification include: (i) establish a Legitimate Authority; (ii) achieve equitable participation; (iii) identify threats and develop the capacity to address them, (iv) sustain management in the long-term, (v) ensure connectivity, representativeness, and other ecological properties; and (vi) establish a transparent and secure information and monitoring. Most of these pertaining to the governance sphere and appear more as conditions to achieve the main conservation objectives.

The Decision suggests that in the management of multiple sites OECM's objectives must be coordinated at seascape level, across diverse types of governance and sites (Annex II, 7, b).

These broad qualitative objective of 'conservation of biodiversity values' may be the primary or secondary objectives of OECMs (Annex III, 1c; 1d). In the case of OECMs born from existing ABFMs, fisheries' optimization is likely to remain the primary objective , generating fishery benefits while maintaining stocks size. Some ABFMs, however, may have conservation of sensitive habitats and vulnerable species as primary objective (e.g., in VMEs). Human-related wellbeing objectives are also often primary objectives in traditional protected areas. The Decision recognises that in IPLC territories, conservation objectives [are] tied to food security and access to resources., formally established …to achieve one or more intended fishery outcomes… commonly related to sustainable use of the fishery… often include

[11] The ex-ante assessment should show that the the governance needed to have a credible probability to meet the Principle, the conservation objectives and the management measures are in place, together with the monitoring ane evaluation system are in place. Ideally, and mimicking what is done in good fishery-rebuilding programmes the maximum time within which the expected outcomes could be obtained could be set and trigger a rexamination of the identification.

protection, or reduction of impact on, biodiversity, habitats, or ecosystem structure and function (Annex IV (§B, c). The Decision indicates that, in an OECM, it is desirable to identify and recognize biodiversity benefits as objectives, and to specify the measures taken to maintain or enhance them (Annex III, 1e).

These "objectives" are quite broad and little more than expected qualitative properties and no specific target and reference value for any biodiversity value is given in The Decision. This implies that the effectiveness of an ORCM and its management may be evaluated only qualitatively. However, the Legitimate authority can establish more quantitative targets and indicators, as part of their monitoring and evaluation system (cf. Section 8).

Principle (b): Conservation role

OECMs have an important role in the conservation of biodiversity and ecosystem functions and services, complementary to protected areas and contributing to the coherence and ***connectivity*** *of protected area networks, as well as in mainstreaming biodiversity into other uses in land and sea, and across sectors. OECMs should, therefore, strengthen the existing protected area networks, as appropriate.*

The aim is to ensure that the outcomes of OECMs complement existing area-based conservation networks, filling gaps in connectivity or coverage. See also **Principle (d)**.

The Global Environmental Facility's Scientific and Advisory Panel (GEF-STAP) defines mainstreaming as: "*the process of embedding biodiversity considerations into policies, strategies and practices of key public and private actors that impact or rely on biodiversity, so that it is conserved and sustainably and equitably used both locally and globally (****Huntley, 2014; Huntley and Redford, 2014****).* This simultaneous mention of "complementarity" (with protected area networks) and mainstreaming (with sectoral management) in the same Principle highlights the reciprocal intent of OECMs to facilitate conservation planning taking sectoral tools into account, and sectoral management planning to take biodiversity considerations into account from their outset.

The "complementarity" and "connectivity" issues are addressed in **Section 5.9.3** as "additional properties" to consider for OECMs, in addition to the criteria.

Principle (c): Dual role in in-situ conservation

OECMs reflect an opportunity to provide in situ conservation of biodiversity over the long-term in marine, terrestrial and freshwater ecosystems. They may allow for sustainable human activity while offering a clear benefit to biodiversity conservation. By recognizing an area, there is an incentive for sustaining existing biodiversity values and improving biodiversity conservation outcomes.

Related to Principle (a), this Principle reflects a key difference between MPAs –generally established primarily for protection purpose– and OECMs used in fisheries which are established, in most cases, for sustainable use of fishery resources and are also expected to contribute to reduce fisheries ecological footprint and to strengthen existing conservation networks.

Principle (d): Complementary conservation role:

OECMs deliver biodiversity outcomes of comparable importance to and complementary with those of protected areas; this includes their contribution to representativeness, the coverage of areas important for biodiversity and associated ecosystem functions and services, connectivity and integration in wider landscapes and seascapes, as well as management effectiveness and equity requirements.

This Principle extends Principle (b) on the complementarity of OECMs and MPAs in providing biodiversity conservation outcomes. The term "*importance"* is ambiguous as it may refer to the magnitude of the biodiversity outcome or its nature. If it refers to the magnitude, it represents a challenge in that the

biodiversity outcomes of a candidate OECM may range from low to high and there is no explicit and agreed guidance about the level required. If the term refers to the nature of the outcome, it becomes subjective and related to the biodiversity component concerned (e.g., habitat or whales), the value system used by society to measure "importance", the seriousness of the risk incurred if the OECM is not put in place, etc. Moreover, magnitude and nature inherently interact, because even a small incremental benefit may be "important" if it contributes to a serious conservation concern, whereas a larger benefit may be needed for society to consider it "important" where not specific conservation concern has been identified, and the biodiversity benefits are diffused among many species or habitat features.

In terms of *integration*, the OECMs, as ABFMs, need first to be integrated in the management plan of the fishery for which it has been designed. The fishery management plan of several fisheries may need to be coordinated to create synergy between OECMs (connectivity) or avoid one fishery that operates in an area, negating the OECM benefits expected from another carefully managed fishery in the area. In addition, both a sector-wide and cross-sectoral OECM perspective might be *integrated* in cross-sectoral "landscapes" (In inland waters) or seascapes set up by the State, optimizing *connectivity* under broader spatial planning frameworks such as Integrated Coastal Area Management (ICAM) or Marine Spatial Planning (MSP). The notion of *representativeness* is discussed in **Principle (f)**.

Principle (e): Demonstrated outcomes

OECMs, with relevant scientific and technical information and knowledge, have the potential to demonstrate positive biodiversity outcomes by successfully conserving in situ species, habitat and ecosystems and associated ecosystem functions and services and by preventing, reducing, or eliminating existing, or potential threats, and increasing resilience.

The use of the "best scientific evidence available", to manage resources and reduce fisheries footprint to increase resilience, is required by UNCLOS and when implementing the Ecosystem Approach to Fisheries (EAF). In complex and dynamic social-ecological systems, unequivocally demonstrating the impact of a single measure (be it area-based or not) is a high order challenge. Greater collaboration between conservation and fishery science would help to address this challenge. However, the reference to "*preventing, reducing or eliminating existing, or potential threats*" (cf. Annex III, A ,e) may often be easier to demonstrate, as the potential impacts of various fisheries and other sectors have been identified in many reviews. It may be feasible to assemble information on the fisheries and other sectors active (or with plans to be active) in the area of the potential OECM. Then, by combining this information with the existing knowledge of ecosystem effects of various types of fisheries and commercial sectors, the major potential threats to biodiversity may be identified. It may then be feasible to demonstrate the potential (and after implementation, the reality) of threat reduction in the OECM.

Principle (f): Representativeness and connectivity

OECMs can help deliver greater representativeness and connectivity in protected area systems and thus may help address larger and pervasive threats to the components of biodiversity and ecosystem functions and services, and enhance resilience, including with regard to climate change

This principle complements Principles (b) and (d) on the relationship between OECMs and MPAs. It specifies that OECMs may improve the *representativeness* of existing MPA networks (e.g., in terms of presence/absence of major habitat types, key natural resources and ecologically important areas and processes), while also enhancing the network *connectivity* by filling eventual gaps (cf. **Section 5.9.2**), and hence, presumably, improving ecosystem *resilience*. It is conceivable that, in some cases, OECMs may duplicate the role of neighbouring MPAs but this might be considered as a positive overlap. An individual OECM can only be representative at the level of the local ecosystem (species assemblage) affected by the

fishery. However, its contribution to *representativeness* of a *network* would be assessed at the scale of the network and could possibly be increased if several individual OECMs used in fisheries were all implemented with the scale of the network.

The ancillary role of single OECMs in addressing undefined *larger and pervasive threats* such as climate change, that are also addressed at other scales and with other and larger means may be conceptually argued (as is done for MPAs) but difficult to formally demonstrate.

2.4.2 OECMs and governance

Principle (g): Consultation

Recognition of OECMs should follow appropriate consultation with relevant governance authorities, landowners and rights owners, stakeholders, and the public.

The introduction of ABFMs as well as any other management measure, may be open to consultation in modern fisheries management set-ups. In general, the term "consultation" reflects a rather weak type of "participation". Empowerment would reflect a more decisive objective, particularly when user rights on resources are involved. It is generally agreed that in order to create a responsive and responsible management system, the management strategy, and plans (including rebuilding plans) and the precautionary decision rules[12] ought to be discussed and, ideally, agreed upon by the main stakeholders to ensure buy-in and compliance.

Principle (h): Legitimate governance capacity

Recognition of OECMs should be supported by measures to enhance the governance capacity of their legitimate authorities and secure their positive and sustained outcomes for biodiversity, including, inter alia, policy frameworks and regulations to prevent and respond to threats.

Capacity-building is in constant and increasing need as States face continuously growing and more complex challenges as they consider a growing number of dimensions and drivers. Specifically, for OECMs, a broader biodiversity-oriented capacity will be needed in fisheries management, the additional cost of which might be reduced by a stronger collaboration with the ministry, or other relevant authority, responsible for biodiversity.

Compliance is affected by the sense of *legitimacy* of the decision-making authority. While, in the ocean, the State is the only recognized legal authority, in the EEZ, and particularly in coastal waters, the central authority might be decentralized, formally devolved (e.g., to local communities, municipalities, fishing associations, right-holder groups; and municipalities) or recognized as traditionally held by such communities (e.g., in case of Indigenous People). In the end, it is up to the State to determine, in the ways it finds most appropriate, what is the most *legitimate* authority to deal with OECMs.

Principle (i) Indigenous people and local communities

Recognition of other effective area-based conservation measures in areas within the territories of indigenous peoples and local communities should be on the basis of self-identification and with their free, prior, and informed consent, as appropriate, and consistent with national policies, regulations and circumstances.

This principle refers to situations in which the governance, including management responsibility, and hence the right to establish OECMs, if so desired, has been devolved to IPLCs or recognized by the State

[12] Rules that trigger pre-agreed action in foreseen situations to avoid damaging delays in responses

under traditional or modern area-based use and management rights. An example of traditional rights might be the "locally-managed marine areas" (LMMAs) in the South Pacific. An example or modern rights may be the "territorial use rights in fisheries" (TURFs[13]). Within these areas, the competent authorities might decide whether to establish OECMs.

Principle (j): Cultural and spiritual values

Areas conserved for cultural and spiritual values, and governance and management that respect and are informed by cultural and spiritual values, often result in positive biodiversity outcomes.

The principle of accounting for values other than ecological and socio-economic ones may apply mainly in inland and coastal, small-scale, fishing communities more than offshore and in the high seas. However, in old fishing nations in the Northern Hemisphere the *cultural values* may be entrenched in centuries of fishing traditions, including in offshore areas far away from home.

Principle (k): Governance systems

OECMs recognize, promote, and make visible the roles of different governance systems and actors in biodiversity conservation; Incentives to ensure effectiveness can include a range of social and ecological benefits, including empowerment of indigenous peoples and local communities .

Multiple forms of governance may be applied in fisheries ranging from authoritative top-down management by the State to complete devolution to coastal communities, municipalities, and fisheries associations. In the marine fishery sector, OECMs may be implemented under all of these forms of governance, except perhaps "private governance" as property *sensu stricto,* is extremely limited in the ocean.

The various expected benefits (which include social and economic ones as well as other values of high local relevance (cf. **Criteria D2 below**) might hopefully be seen as incentives. Buy-in and compliance by participants in the fisheries with the OECMs, and their associated communities, is important for achieving the expected biodiversity outcomes. However, these actors will also be likely to consider themselves to be bearing many of the costs of maintaining OECMs and without their effective empowerment, they may challenge the authority, particularly if the expected benefits do not selectively accrue to the communities and fisheries bearing the costs.

An important governance issue is that OECMs intend to improve biodiversity in the OECM area but also in the whole fishery or exploited ecosystem– just as other ABFMs do in relation to their primary objectives.

Principle (l): Best available information

The best available scientific information, and indigenous and local knowledge, should be used in line with international obligations and frameworks, such as the United Nations Declaration on the Rights of Indigenous Peoples, and instruments, decisions, and guidelines of the Convention on Biological Diversity, for recognizing OECMs, delimiting their location and size, informing management approaches, and measuring performance.

[13] TURFs allocate exclusive harvesting rights for one or more marine species in a specified geographical area. Ideal TURFs are ideal for species like abalone that will not move beyond TURF boundaries, but they can be designed for more mobile species as well. TURFs may occur independently, or they may be part of a broader system of TURFs. Well-designed networks of TURFs can be used to manage more complex fisheries, including those with mobile species and multiple groups of fishermen.

The need to identify, collect and use local knowledge and best-informant stakeholders, together with scientific knowledge is progressively gaining more traction. This principle is particularly important in relation to indigenous or local ecological and technical knowledge (**Berkes, 1999; Fischer et al., 2015**) when formal scientific knowledge is unavailable or very scarce. It may also be underestimated in larger commercial fisheries in the developing world where operators' knowledge may be very precious.

Principle (m): Transparency and evaluation

It is important that OECMs be documented in a transparent manner to provide for a relevant evaluation of the effectiveness, functionality, and relevance in the context of Target 11.

Transparency would be required for data sources, assumptions used in assessments, confidence limits of such assessments, identification and evaluation of management options, decision-making, management performance, etc., to allow a credible evaluation of the performance (effectiveness) of the fishery-OECM in relation to all its objectives. One important implication of this principle is the existence of an appropriate monitoring system, a recurrent assessment (the periodicity of which depends on the biodiversity attribute being monitored) the results of which are fully made available, and some system of oversight ensuring the monitoring and evaluation quality and that adequate adaptive decisions are taken to follow up on the conclusions of the evaluation .

2.4.3 Relation between OECM and EAF principles

The guiding principles developed for OECMs, when applied to fisheries, should ideally fit within the Ecosystem Approach to Fisheries, matching, complementing, or adding specifications to it.

Annex 2 of the FAO Guidelines on EAF (**FAO, 2003: 83-88**) lists a more detailed set of relevant principles: (1) Avoiding overfishing; (2) Ensuring reversibility and rebuilding; (3) Minimizing fisheries impact; (4) Considering species interactions; (5) Ensuring compatibility of measures between jurisdictions (for shared or straddling resources); (6) Applying the precautionary approach; (7) Improving human well-being and equity; (8) Allocating user rights; (9) Promoting sectoral integration; (10) Broadening stakeholders participation; and (11) Maintaining ecosystem integrity. As one should have expected, OECM guiding principles above are in line with the above principles 2, 3, 4, 5, 6, 9, 10 and 11 with more specification regarding the differences and complementarity between OECMs and MPAs.

2.5 Criteria for identification and evaluation

The Decision also provides four Criteria for Identification (Table 3), subdivided in 10 sub-criteria (Table 3, column 1) which provide more information on the components of the Criteria. Criteria and-sub-criteria reflect many of the "properties" of the area-based conservation measures reflected in Target 11. Sub-criteria are accompanied by some "elements of evidence" to consider for a positive assessment (**Table 3, column 2**). The same Criteria will be used to assess the OECM performance during it long-term implementation. It is important to note that, when drafted, the "elements of evidence" were not intended to be mandatory or exhaustive. They are part of the "voluntary guidance" provided by The Decision, and might be flexibly interpreted, increased or enriched, nested or combined, keeping in mind the need to remain consistent with the intent of the Criteria and sub-criteria.

Table 3: Criteria for identification (From CBD, 2018). Sub-criteria (column 1) and elements of evidence (Column 2) have been labelled (e.g., B1, B2, etc., and B2a, B2b, etc.) for easier reference in the text.

Criterion A: Area is not currently recognized as a protected area

A-Not a protected area	A	The area is not currently recognized or reported as a protected area or part of a protected area; it may have been established for another function.
Criterion B: Area is governed and managed		
B1-Geog. defined space	B1a B1b	Size and area are described, including in three dimensions where necessary. Boundaries are geographically delineated.
B2-Legitimate governance authorities	B2a B2b B2c B2d	Governance has Legitimate Authority - and is appropriate for achieving in situ conservation of biodiversity within the area. Governance by indigenous peoples and local communities is self-identified in accordance with national legislation and applicable international obligations. Governance reflects the equity considerations adopted in the Convention. Governance may be by a single authority and/or organization or through collaboration among relevant authorities and provides the ability to address threats collectively.
B3-Managed	B3a B3b B3c B3d	Managed in ways that achieve positive and sustained outcomes for the conservation of biological diversity. Relevant authorities and stakeholders are identified and involved in management. A management system is in place that contributes to sustaining the *in-situ* conservation of biodiversity. Management is consistent with the ecosystem approach with the ability to adapt to achieve expected biodiversity conservation outcomes, including long-term outcomes, and including the ability to manage a new threat.
Criterion C: Achieves sustained and effective contribution to *in situ* conservation of biodiversity		
C1-Effective	C1a C1b C1c C1d	The area achieves, or is expected to achieve, positive and sustained outcomes for the *in-situ* conservation of biodiversity. Threats, existing or reasonably anticipated ones are addressed effectively by preventing, significantly reducing, or eliminating them, and by restoring degraded ecosystems. Mechanisms, such as policy frameworks and regulations, are in place to recognize and respond to new threats. To the extent relevant and possible, management inside and outside the other effective area-based conservation measure is integrated.
C2-Sustained over long term	C2a C2b	The other effective area-based conservation measures are in place for the long term or are likely to be. "Sustained" pertains to the continuity of governance and management and "long term" pertains to the biodiversity outcome.
C3-*In situ* conservation of biological diversity	C3	Recognition of other effective area-based conservation measures is expected to include the identification of the range of biodiversity attributes for which the site is considered important (e.g., communities of rare, threatened or endangered species, representative natural ecosystems, range restricted species, key biodiversity areas, areas providing critical ecosystem functions and services, areas for ecological connectivity).

C4-Information and monitoring	C4a	Identification of other effective area-based conservation measures should, to the extent possible, document the known biodiversity attributes, as well as, where relevant, cultural and/or spiritual values, of the area and the governance and management in place as a baseline for assessing effectiveness.
	C4b	A monitoring system informs management on the effectiveness of measures with respect to biodiversity, including the health of ecosystems.
	C4c	Processes should be in place to evaluate the effectiveness of governance and management, including with respect to equity.
	C4d	General data of the area such as boundaries, aim and governance are available information.
Criterion D: Associated ecosystem functions and services and cultural, spiritual, socio-economic and other locally relevant values		
D1-Ecosystem functions and services	D1a	Ecosystem functions and services are supported, including those of importance to indigenous peoples and local communities, for other effective area-based conservation measures concerning their territories, taking into account interactions and trade-offs among ecosystem functions and services, with a view to ensuring positive biodiversity outcomes and equity.
	D1b	Management to enhance one particular ecosystem function or service does not impact negatively on the sites overall biological diversity.
D2-Cultural, spiritual, socio-economic and other locally relevant values	D2a	Governance and management measures identify, respect and uphold the cultural, spiritual, socioeconomic, and other locally relevant values of the area, where such values exist.
	D2b	Governance and management measures respect and uphold the knowledge, practices and institutions that are fundamental for the *in situ* conservation of biodiversity.

It can be noted that the criteria are listed practically in the order in which the related property appears in the definition, except for Criteria A and B1 which are reversed. To some extent the criteria are also listed in order of importance. Criteria A is eliminatory. If A is met, Criteria B1 asks for a geographical definition, and is a condition to register an OECM in the World OECM databased managed by WCMC. Criteria B2 and B3 are respectively about the governance and management action in the OECM. Criteria C1 to C3 are about the results (outcomes) of the management measures and the wording of Criteria B3a and C1a overlap completely. Criteria C4 stresses the importance of monitoring and evaluation, a property absent from Target 11 and the definition (but extensively referred to in the other elements of guidance[14]) and hence of proper archiving of the information. Criteria D1 and D2 are about relevant values in the OECM other than biodiversity, such as ecosystem services and functions, and other locally relevant values (of importance to biodiversity conservation).

In principle, although not specified in the Decision", all criteria are to be considered in identification and performance assessment, meaning that no criterion is optional. A criterion is considered to have been "met" when the relevant available information has been duly considered and that as a minimum the area does not violate its intent. However, some Criteria might be irrelevant for a particular area e.g., traditional cultural values for areas located on a seamount of the Mid-Atlantic Ridge. This would not make the area non-eligible. The criteria would be *considered* and a rational explanation would therefore available as to why it was considered irrelevant in the case concerned.

[14] e.g., in the core Decision (§5b) as well as in Annex II (§6, 7e, 11a, 11h, 12d,), Annex III (§C1f) and Annex IV (§A1i, C1c, C2b, C3, D6h)

These criteria and sub-criteria are reviewed in more detail in **Chapter 5** about the identification process. the following sections. Short elaborations are offered for each criterion and sub-criterion.

2.5.1 The area is not currently recognized as a protected area:

The area it is not currently recognized or reported as a protected area or part of a protected area; it may have been established for another function.

Criteria A has raised some confusion in experts' meetings. It does not require to decide whether the ABFM being considered meets MPA criteria and which definition to use. It only requires knowing whether it has been already designated as an MPA, or a part of an MPA (e.g., as a buffer area), or reported as such (e.g., in the WCMC protected areas database).

The main implicit concern is apparently to avoid double counting when assessing the global coverage these areas in Global Biodiversity Frameworks, Sustainable Development Goals (SDGs), etc.

The simplest way to address Criteria A would be to clarify the legal status of the area and ensure that it has not been designated (e.g., by the national Parliament), as an MPA. One should also check whether the area is listed as MPA in the WCMC World Database on Protected Areas (WCMC-WDPA), and hence potentially used already in the global coverage accounting. However, the WPDA contains numerous areas which are not accounted in the global coverage (e.g., biosphere reserves). In addition, some areas (like Ramsar wetlands may not be considered MPAs by some States and not reported in their national PAs statistics, generating discrepancies between national and WCMC statistics. Conversely, some States report on the WPDA some Ramsar sites that do not meet the MPA management criteria. In some countries, however, designations of some types of areas (e.g., cultural areas) requires explicitly no overlap with MPAs, formally resolving the issue.

It is important to note that, according to the WCMC User Manual for the World Database on OECMs (**UNEP-WCMC, 2019**) , potential OECM areas also *encompass areas that meet the definition of a protected area, in cases where the governance authority prefers the area to be considered an OECM*.

Importantly, the criteria stresses that the area-based measure considered as a potential OECM may have been established for another function, stressing from the onset that the conservation objective of an OECM does not have to be conservation.

When dealing with existing ABFMs, established under the authority of a fishery authority, the risk that the ABFM be already designated as an MPA is rather remote. However, the risk may exist for totally closed ABFMs dedicated to biodiversity conservation. Finally, in case of overlap of a potential OECM with an MPA care will need to be taken to avoid double counting.

2.5.2 Criterion B: The area is governed and managed

The overall aim of this criterion is to avoid "paper OECMs" that would not produce the expected outcomes in the absence of good governance and effective management. Criterion B has three sub-criteria: (i) the area is geographically defined; (ii) It has legitimate governance authorities; and (iii) it is managed. These will be briefly examined below

B1: Geographically defined space:

Size and area are described, including in three dimensions where necessary; (b) Boundaries are geographically delineated.

One consequence of Sub-criterion B1 is that the OECM can be localized on a map, possibly with coordinates and its area should be stated or could be calculated to be accounted for in Target 11. A clear

geographical location is a condition for the OECM to be accepted in the world OECM database (UNEP-WCMC, 2019:16). The WCMC user manual of the OECM database[15] recognizes (i) preferably a set of geographical coordinates of the boundary, e.g., in a GIS shapefile; (ii) a single or multiple polygon; or (ii) the latitude and longitude of the centremost point of the area: The geographical location of the potential ABFM might be fixed or mobile over time, depending on the spatial dynamics of the biodiversity elements to protect and of the fishing operations. The protection of bottom habitats and low-mobility demersal species may use fixed areas that may face a need to be moved only exceptionally, e.g., because of climate change impact on resources or life stages distribution in changing ecosystems. The protection of pelagic migratory species, often related to large and medium-scale oceanographic features such as current, gyres and fronts is likely to require mobile limits that are susceptible to significant seasonal and inter-annual shifts. Logically, the ecological factors driving resources shifts may also affect the dependent and associated species and the mobile biodiversity, requiring the OECM also to be mobile. The WCMC manual does not foresee this possibility for the moment. It could be argued that such "mobile" OECMs would present significant challenges for reporting, since the potential change in size and the changes in location of the OECM changing within the year would complicate the reporting of both the location and the relevant (effective) size of the area. However, the problem might be limited for seasonal oscillations as long as the areas covered do not significantly change. In case of permanent climate-driven shifts, regular updating should take care of the problem.

In the marine realm, depth is one of the *three dimensions* mentioned in Sub-criteria B1, and it is of high biogeographic importance, both in the water mass and in determining ecological boundaries. Moreover, in the aquatic ecosystem, horizontal and vertical boundaries are often mobiles (e.g., in case of fronts, currents, thermoclines, and oxyclines) are very permeable, accentuating the importance of horizontal and vertical connectivity. The oceanographic and ecological vertical layering of the ocean, its biotopes, resources assemblages (e.g., over the extended continental shelf) leads to the need to seriously consider the possibility of vertical layering of OECMs (e.g., in benthic and pelagic OECMs with their specific relevant localisation and management measures).

An ABFM that only was applied in one layer (range of depths) of the ocean would be fully appropriate to consider as an OECM if the biodiversity in that layer received effective protection. However, having layers OECMs of different overlapping boundaries and "thickness", although justifiable from ecological and management point of views raise significant issues for enforcement and reporting.

In addition, the "geographically defined space" of relevance to both sustainable use and conservation may straddle jurisdictions, between two national jurisdictions ("shared" OECM), between the national and international jurisdictions ("straddling" OECMs) and even between two international regional jurisdictions, adjacent or not (e.g., an RFMO and an RSO). Stradling may occur both horizontally (between an EEZ and the High Sea or between two regional jurisdictions) or vertically, between the extended continental shelf of a State and the suprajacent High Sea. In such cases the effectiveness of the joint governance of the straddled area would be crucial to the likelihood of realizing biodiversity benefits, and thus to its effectiveness and status as an OECM.

B2: Legitimate governance authorities:

The evidence to be considered is: (a) Governance has legitimate authority and is appropriate for achieving in situ conservation of biodiversity within the area: (b) Governance by indigenous peoples and

[15] : http://wcmc.io/WDPA_Manual

local communities is self-identified in accordance with national legislation; (c) Governance reflects the equity considerations adopted in the Convention; and (d) Governance may be by a single authority and/or organization or through collaboration among relevant authorities and provides the ability to address threats collectively.

Fisheries, and the OECM identified in them, are expected to be formally under the responsibility of a mandated fishery authority (e.g., central, local, hybrid, or traditional). That authority should be in charge of implementing the fishery-wide management plan and of taking and enforcing the measures needed to maintain effective OECMs, ensuring the other considerations of relevance for OECMs, such as equity in the distribution of costs and benefits of the OECM, and addressing actual or potential threats to these outcomes from fishing or other sources (cf. **Sections 5.6.3, d, (iii); 5.7.2, b)** on threats and risk assessment).

B3: Managed.

OECMs are expected to be*: (a) managed in ways that achieve positive and sustained outcomes for the conservation of biological diversity. (b) Relevant authorities and stakeholders are identified and involved in management; (c) A management system is in place that contributes to sustaining the in-situ conservation of biodiversity; (d) Management is consistent with the ecosystem approach with the ability to adapt to achieve expected biodiversity conservation outcomes, including long-term outcomes, and including the ability to manage a new threat.*

This sub-criterion is particularly important and connected with the two preceding ones. The aim, in fisheries, is to ensure that OECMs be used in an active fishery management system (with objectives, plans, enforced measures, and monitoring system) in which decisions are taken and enforced in a participative and adaptive manner, consistent with the Ecosystem Approach to Fisheries (EAF). The connected meanings of *sustained* and *long-term* are addressed under **Criterion C3**. The *ability to manage threats* is discussed in **Sections 5.6.3 and 5.7.2** on threats and risk assessment).

By implications, areas important for biodiversity, rich in biodiversity values, but not used by fisheries and not covered by a formal set of management measures, cannot be claimed as OECMs. However, *Management regimes can include deliberate decisions to leave the area untouched* (e.g., as a reserve) (**IUCN-WCPA, 2019:5**).

This sub-criterion does not say anything about the specific measures that might be taken by the competent authorities inside the OECM to produce the biodiversity conservation outcomes expected from the OECM status (e.g., access rules, gear restrictions, economic incentives, and disincentives, etc.). However, their effective implementation of these measures is fundamental to avoid "paper OECMs". Little guidance has been offered in The Decision on that matter, perhaps because of the complexity and deeply contextual nature of these measures. It might be sufficient to say that all the measures already used in fisheries to reduce the ecosystem effects of fisheries (within an ecosystem approach), including in MPAs, might in principle be used inside the OECM boundaries, combined, and enhanced as needed to produce the expected biodiversity benefits.

2.5.3 Criterion C: Achieves sustained and effective contribution to in situ conservation of biodiversity.

This criterion is fundamental as it is the one really identifying the elements that indicate whether an existing ABFM, or a planned one, produces, or is likely to produce the expected in-situ biodiversity outcomes. It defines *effectiveness* in terms of obtaining sustained biodiversity conservation outcomes and outlines the conditions for leading to it. It defines the types of *in-situ* biodiversity components that need

attention. It stresses the importance of *information, monitoring, evaluation of effectiveness and communication.* These points are further clarified below.

C1: Effective.

(a) *The area achieves, or is expected to achieve, positive and sustained outcomes for the in-situ conservation of biodiversity; (b) Threats, existing or reasonably anticipated ones, are addressed effectively by preventing, significantly reducing or eliminating them, and by restoring degraded ecosystems; (c) Mechanisms, such as policy frameworks and regulations, are in place to recognize and respond to new threats; and (d) To the extent relevant and possible, management inside and outside the OECM is integrated*.

Effectiveness is expressed here in terms on biodiversity conservation outcomes, and management capacity. *Effectiveness* will be achieved if the expected biodiversity outcomes are produced and *sustained* in the long-term. Because of intense ocean dynamics and climate change, the latter requires some level of risk assessment and risk management to anticipate risks and develop contingency plans to avoid or reduce impacts or to restore biodiversity, in line with the Biodiversity Impact Mitigation (BIM) hierarchy and the precautionary approach and using decision rules in adaptive fisheries management. Effectiveness also requires dedicated institutions and frameworks (repeating elements of **sub-criterion B3**). Two expressions can be stressed: "expected to achieve" and "reasonably anticipated". The first indicates that in an OECM effectiveness will consider not only the benefits already occurring, but also those expected from the new measures introduced e.g., for their upgrading. Similarly, impending threats, should be *convincingly* determined before elaborating contingency plans or taking costly precautionary measures. In both cases, scientific support and local knowledge will be essential.

The integration of management inside and outside of the OECM is fundamental and should not be a problem if fisheries management plans are in place, because OECMs and their specific technical measures should be naturally integrated in such plans, with all other management measures.C2: Sustained over long term

(a) The OECMs are in place for the long term or are likely to be; (b) "Sustained" pertains to the continuity of governance and management and "long term" pertains to the biodiversity outcome.

Sub-criteria C2 addresses two issues related to effectiveness: (1) This need to sustain the management effort in the future and hence to ensure a good probability that the institutions supporting it will resist to the test of time; and (2) the needs to ensure that the biodiversity benefits generated by the OECM will not be eroded in time.

Sustaining OECMs requires dedicated institutions and frameworks (repeating elements of sub-criterion B3). For example: (i) Mainstreaming biodiversity considerations into fisheries management, e.g., adopting a broader concept of fisheries sustainability including human and ecosystem wellbeing; implementing the Code of Conduct for Responsible Fisheries (CCRF) and the Ecosystem Approach to fisheries (EAF), adapting the Biodiversity Impact Mitigation to the fishery sector; (ii) establishing robust cooperation mechanisms between fisheries and conservation authorities; (iii) integrating OECMs in fisheries management plans, and inside and outside outcomes. However, if threat are identified, from other fisheries, or other sectors, active in the area that could be threats to the biodiversity outcomes, the necessary integration with measures used in those fisheries or sector could still be challenging. The failure to integrate across pressures could compromise the permanence of biodiversity outcomes.

Ensuring long term resilience of management and outcomes requires a sufficient level of threat assessment to identify current threats and anticipate likely new ones (cf. C1b).

C3: In situ conservation of biological diversity.

Recognition of OECMs is expected to include the identification of the range of biodiversity attributes for which the site is considered important (e.g., communities of rare, threatened or endangered species, representative natural ecosystems, range restricted species, key biodiversity areas, areas providing critical ecosystem functions and services, areas for ecological connectivity).

This sub-criterion aims to ensure that: (i) OECMs contain and protect a broad range of biodiversity components (or values) in addition to fishery resources, which are obviously part of biodiversity. These components are "considered important" and the importance criteria are left to the States' appreciation. Some species may be formally recognized as threatened or endangered species (e.g., in the IUCN Red List) and/or emblematic (e.g., seabirds, turtles, marine mammals). The biodiversity attributes need to be identified and listed, possibly with their contribution to ecosystem functions and services (cf. **Section 5.8.1)**. Their connections with the biodiversity located outside the OECM) will help illustrating ecological representativeness and connectivity

C4: Information and monitoring.

(a) *Identification of an OECM should, to the extent possible, document the known biodiversity attributes, as well as, where relevant, cultural and/or spiritual values, of the area and the governance and management in place as a baseline for assessing effectiveness: (b) A monitoring system informs management on the effectiveness of measures with respect to biodiversity, including the health of ecosystems; (c) Processes should be in place to evaluate the effectiveness of governance and management, including with respect to equity; and (d) General data of the area such as boundaries, aim and governance are available information*

OECMs should be well described, including all their attributes and**,** when describing the biodiversity attributes inside the OECM, the "value" of those attributes on multiple value systems should be explicitly acknowledged (e.g., for ecosystem structure and function; economic benefits locally and on larger scales; and cultural and spiritual identity of nearby communities). All these values should be considered when setting targets for conservation outcomes, with**:** (i) those targets informing the development of a corresponding set of reference values (when the information is sufficient to develop them)**;** (ii) specified trends that management systems can be accountable for delivering**;** and (iii) a description of what a "healthy ecosystem" for the general area would be, to provide a general benchmark for evaluating success of the OECM at protecting the biodiversity values at risk from the fishery.

These supporting products would also provide guidance for the monitoring and evaluation system (cf. **Chapter 7**) that can be used to measure the OECM contribution to biodiversity conservation, particularly through reporting on progress towards the outcomes (i), (ii) and (iii) mentioned above**.** The latter, on "ecosystem health", will require the development of new and operational thinking, because although the concept of **"**ecosystem health**"** is widely used, there is no internationally agreed set of indicators or reference values. The concept of "health" tends to relate to maintenance of ecosystem structure and function, avoidance of Significant Adverse Impact (SAI) and conservation of biodiversity within Safe Ecosystem Level (SELs). The latter concept is used in Target 6 in relation to vulnerable ecosystems and threatened species, but international standards are still missing **(Garcia and Rice, 2019**).

2.5.4 Criterion D: Associated ecosystem functions and services and cultural, spiritual, socioeconomic, and other locally relevant values

This criterion expands the range of elements to consider when assessing the effectiveness of candidate or implemented OECMs, with considerations on human dimensions of OECMs and the interaction

between human and natural wellbeing from two perspectives: (i) ecosystem functions and services and (ii) other human values. One of the best way to ensure that the criteria is met, is to ensure a very active and equitable participation of stakeholders and to develop cooperation with social scientists when assessing OECMs.

D1: Ecosystem functions and services.

(a) Ecosystem functions and services are supported, including those of importance to indigenous peoples and local communities, for OECMs concerning their territories, taking into account interactions and trade-offs among ecosystem functions and services, with a view to ensuring positive biodiversity outcomes and equity; and (b) Management to enhance one particular ecosystem function and service does not impact negatively on the sites overall biological diversity.

Element (a) of the sub-criterion indicates that the maintenance of ecosystem services and their sustainable use, is a valid contribution to –and a condition of– successful biodiversity conservation. It adds to that common goal explicit prioritization for uses by people depending directly on those services (in particular by IPLCs). The criterion also calls for accounting for trade-offs and interaction between services and functions. Element (a) also implicitly reminds that use of provisioning ecosystem services, such as by seafood harvesting, has an impact on biodiversity, but those impact can be kept sustainable for the harvested species, the ecosystem, and dependent communities. Element (b) reinforces this point, stressing that when considering trade-offs, priority should be given to the OECM biodiversity.

D2: Cultural, spiritual, socioeconomic, and other locally relevant values.

Addressing relevant values requires that*: (a) Governance and management measures identify, respect, and uphold the cultural, spiritual, socioeconomic, and other locally relevant values of the area, where such values exist; and (b) Governance and management measures respect and uphold the knowledge, practices and institutions that are fundamental for the in-situ conservation of biodiversity*.

The criterion is clear, and it indicates that the establishment of OECMs should not only account for ecological values but also for the human dimensions of relevance in the area, including social, cultural, spiritual, and economic values. This is in line with the CBD concern equitable sharing of benefits, as well as with the CCRF (**FAO 1995**), the guidelines on human dimensions of EAF (**De Young, Charles and Hjort, 2008**) and the Code of Ethics for fisheries (**FAO, 2005**).

3. OECM IMPLEMENTATION CYCLE

The CBD Decision 14/8 contains important guidance on OECMs, their identification and governance but does not consider in detail the complete cycle of identification, integration, use, management, performance assessment, reporting and eventual revision of OECMs that is needed to effectively use OECMs as explicitly and implicitly intended in the Decision. This cycle emerges progressively as one tries to translate The Decision into practical actions and it is useful to also consider it from the onset, to have a first overall view of the multiple implications of The Decision.

Thinking about this implementation cycle in a fisheries context is important as an OECM needs to be integrated in existing fisheries management plans and cycle. This cycle is well known for adaptive fisheries and conservation management and involves (i) determination of policy and management objectives; (ii) identification of indicators and reference values; (iii) elaboration of implementation strategies, plans and selection of measures; (v) implementation and enforcement; (v) fisheries and resources monitoring; (vi) performance evaluation and, based on its results, (vi) advice to adjust the management or the policy itself. The integration process is addressed in detail in **Chapter 6**.

Figure 1 describes the different phases of the complete OECM identification and management process that will be "grafted" on the existing management plan irrespective of how formal it may be. The process starts from the knowledge-based identification of potential OECMs among the existing ABFMs using the broad range of knowledge available following the list of criteria. Potential "new" potential OECMs, other than "old" ABFMs, may also be tentatively identified as areas, within the fishing grounds, that have suffered limited impact from fishing, might be considered as "quasi pristine" (e.g., VMEs), and formally considered with a specific set of regulations. Those potential OECMs that adequately meet The Decision criteria become candidate-OECMs that are proposed for formal recognition as OECMs by the Legitimate Authority. The OECMs are then integrated in the fisheries management plan which is updated for that purpose.

The monitoring and evaluation activities needed in the OECM are integrated in the Monitoring, Evaluation, and reporting system of the fishery. Reports will be produced to allow adaptive management and archived. Auditing of the process is not required by The Decision but is an important good practice of modern effective management. To be effective, and in line with The Decision, the process calls *inter alia* for proper enabling and coordinating frameworks, the use of the best scientific and local knowledge available, a clearly defined Legitimate Authority with an equitable governance approach, and accounting for other (than biodiversity) locally relevant values.

Figure 1 also illustrates the fact that the effective implementation of the OECM implementation process requires: (i) a Legitimate Authority (legitimated in law and policy, and recognized as such by its constituency); (ii) an equitable governance process (as defined in CBD Annex II, B); (iii) the use of the best scientific and local knowledge available; and (iv) recognition and accounting of ecological, economic, social, and other locally relevant values. The process also calls for involvement of key institutions of the fishery management system –such as the statistical service (for fishery data) or the Coast Guards (for compliance data) not addressed in this document. The process also involves the Monitoring, Evaluation, and Reporting (MER) system addressed in **Chapter 7**). The process also call for collaborations with the conservation agencies, for specialized information and technical and scientific competences.

The implementation process requires resources to: (i) Assess and identify potential OECMs among existing or planned ABFMs; (ii) Evaluate the extent of such benefits, existing or potential, on complex biodiversity components; (iii) Assess potential interactions (conflicts or synergies) with other existing spatial or non-

spatial measures, to ensure management coherence; (iv) Integrate the OECMs and their updated conservation objectives into the existing management plans or develop such plans; and (v) Take actions necessary to ensure the measures are secure for long enough for the biodiversity benefits to have a high likelihood of being realized. Ways in which these tasks can be conducted are addressed in the following sections, particularly **Chapters 5, 6 and 7.**

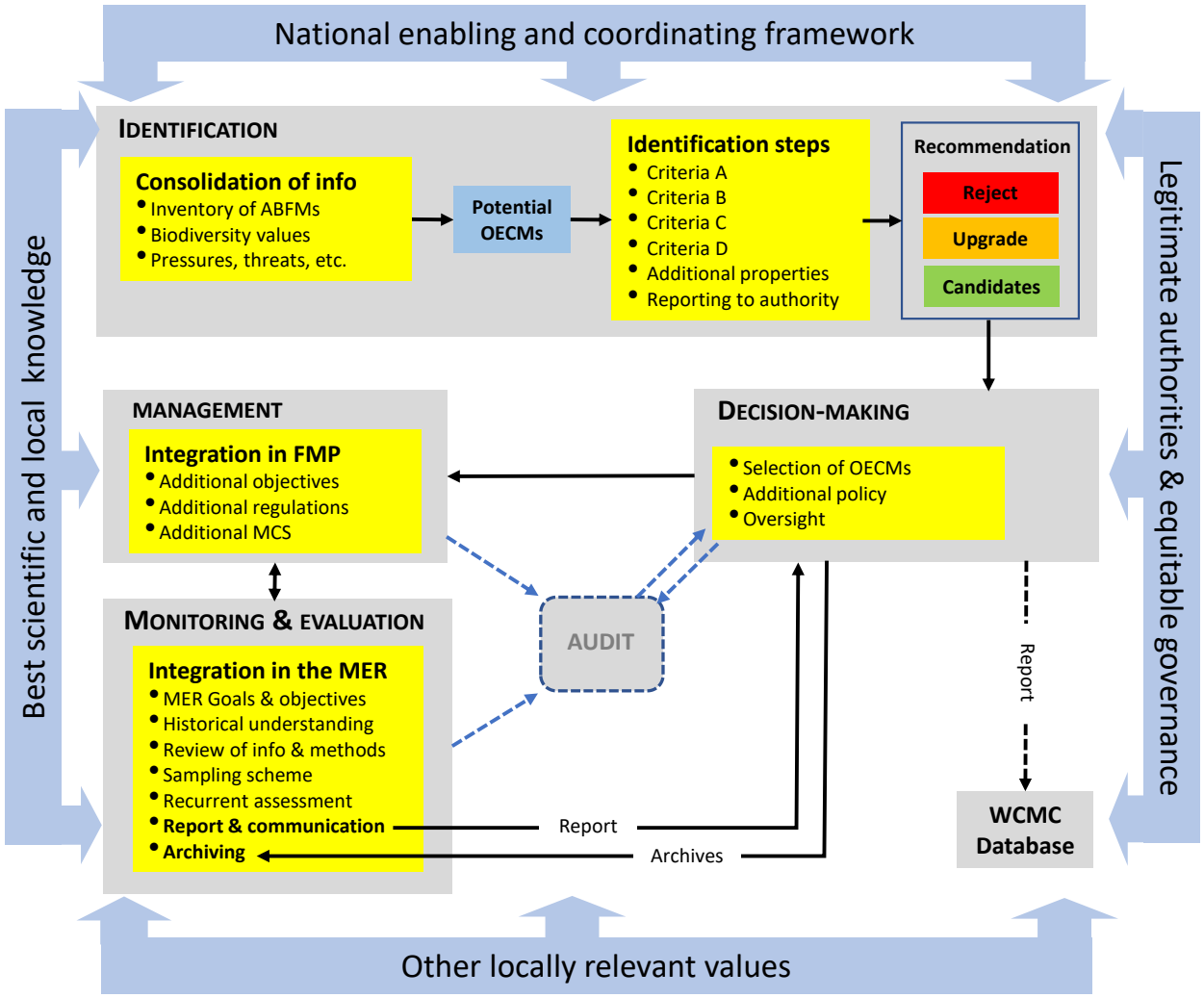


Figure 1: Suggested process for OECM identification, decision-making, management, and monitoring, evaluation, and reporting. The enabling context for the process requires a Legitimate Authority ensuring equitable governance, the use of the best scientific and local knowledge available, recognition and accounting of ecological, economic, social, and other locally relevant values, and a national enabling

and coordinating framework. The audit is not mentioned in The Decision but is part of good management practices (Modified from Garcia et al., 2019).

Table 4: Main activities needed for the OECM identification and management process, and their correspondence with The Decision Criteria, Sub-Criteria, and Principles

Implementation steps proposed in this document	Related guidance from Decision 14/8	
	Criteria	Principles
Premises:	All	All
Identification		
1. Consolidation of information	Not addressed in The Decision	
2. Establish ABFMs eligibility: Quick screening	A; B1; B2; B3; C1; C2	a; b; h; i
3. Criteria A		a; b; g; i
4. Criteria B		
5. Criteria C		a; b; e
6. Criteria D		l
7. Initial report to Legitimate Authority	C4	k;
8. Decision of legitimate authority & first report	C4	h; j; m
Integration of OECM management		
Integrate the OECM in the FMP	B3; C1; C2	b; c; g; k
Integrate OECMs within the fishery sector	B3; C1; C2	b; c; g; k
Integrate OECMs in MPA networks & seascapes	B3; C1, C2	c; f; g; j
Monitoring, evaluation and recurrent reporting (MER)		
Strategically plan and coordinate	C4;	g; h; i; k; l
Monitor and evaluate performance	C1; C4	a; e; g; h
Report to fisheries management/Legitimate Authority	C4	m;
Data & Information management	C4	m;
Revision		
Regular or ad hoc revisions	Not addressed in The Decision	
Auditing		
Regular auditing of the OECM, FMP and MER	Not addressed in The Decision	

4. ENABLING FRAMEWORKS

The implementation of OECMs at regional, national, local, or sectoral levels will be facilitated and indeed enabled by the overarching policy, legal, and financial, and collaborative frameworks, necessary to ensure, and improve as appropriate, the overall political will, legal support, financial back-up, and cross sectoral and institutional collaboration e.g., between conservation and sectoral authorities. These enabling factors determine the quality of governance. In many cases, the existing governance frameworks may already be adequate. In others, capacity building might be required both for cross-sectoral and sectoral OECMs, to ensure the needed empowerment, coordination, effectiveness, efficiency, and consistency in their identification and management. The enabling needs are referred to in The Decision, in relation to the policy and finance environments (**Annex I, II, B, e, f**), diverse and equitable governance (**Annex I, II, §9, §12**), effective measures for in-situ biodiversity conservation (**Annex III, C,1,e**), and capacity-building (Core text, **§ 10**).

The following sections refer briefly to the overarching national governance framework within which the use of OECMs is necessarily nested, before focusing on the fishery governance and legal frameworks.

4.1 National governance framework

This document does not intend to analyse in any detail the national framework eventually put in place or strengthened to deal effectively with OECMs across all sectors and jurisdictions. However, the elements of importance for mainstreaming OECMs in fisheries will be briefly mentioned below.

Governance has been defined in many ways. A synthetic definition is: *a systemic concept relating to the exercise of economic, political, and administrative authority. It encompasses: (i) the guiding principles and goals of the sector, both conceptual and operational; (ii) the ways and means of organisation and coordination of the action; (iii) the infrastructure of socio-political, economic, and legal instruments; (iv) the nature and modus operandi of the processes; and (v) the policies, plans and measures* (**Garcia, 2009**). The "governance" term is often used to cover two interconnected and partially overlapping levels of administration (e.g., in **Kooiman, 2005**): (1) at strategic level, the institutions, processes, policies, strategies, laws, overarching rules, and oversight; and (2) at operational level, the regulations, measures, implementation means, monitoring control and surveillance (MCS), and performance assessment. This operational level is usually referred to as "management" and distinguished from policy and planning. The definition applies across jurisdictions, at global, regional, national, local/community, cross-sectoral and sectoral levels.

The success or failure of the OECM mainstreaming process in the fishery sector, in any jurisdiction (EEZ, RFMO/A, TURF, LMMA) will depend, to a large extent, on the overarching governance system in such jurisdiction. The governance processes that would affect OECMs implementation and their biodiversity outcomes are likely to depend *inter alia* on: (i) The political system in place with its economic development and biodiversity conservation policies; (ii) The mechanisms in place to facilitate collaboration between sectoral and environmental institutions and among sectors; (iii) The degree of decentralization and inclusiveness of decision-making power, in fisheries and in conservation; (iv) The implementation capacity available to the Legitimate Authority; (v) The history of the relations among sectors and between them and the conservation agencies and interests; and (vi) the willingness to make decisions for the greater

public good rather than more selfish reasons. These factors are potentially relevant both in central and local governance systems but may be approached differently[16].

In The Decision, governance is addressed in many different places, implicitly in the definition of OECMs, the Guiding Principles and the Criteria and, explicitly, in the Annexes. Annex I of The Decision provides voluntary guidance on the integration of OECMs into wider landscapes and seascapes and their mainstreaming in economic sectors, *inter alia* to contribute to SDGs. Annex II provides voluntary guidance on governance models for protected areas, addressing issues related to: (i) Legitimate authorities; (ii) Free and Prior Informed Consent (FPIC) and inclusiveness of Indigenous People and Local Communities (IPLCs[17]); (iii) Diversity of State and non-State governance models; (iv) Recognition of stakeholders' rights (including tenure rights) and responsibilities; (v) The broad range of ecological, economic, social and spiritual values to consider; (vi) Effectiveness achieving the expected long-term outcomes; (vii) Equity in representation, procedures and distribution of costs and benefits; and (viii) Flexibility for context sensitive implementation.

Most of these issues relate to the "good governance**"** principles that emerged in the mid-1990s in sustainable development strategies, at the United Nations level (cf. **Graham, Amos, Plumtre, 2003**) and have gained momentum. They are not new to fisheries management and biodiversity conservation but their degree of implementation is highly variable.

Assuming there is an overarching decision at the highest level of governance to start a process of identification and use of OECMs in all relevant economic sectors, key actions taken at that high level, consistent with The Decision Annex II, would facilitate the identification of OECMs and their coherent and consistent implementation in fisheries.

The overarching activities that would facilitate the OECM mainstreaming in the capture fisheries sectors include: (1) **Developing of a vision** or policy statement for the OECM initiative to support implementation at the appropriate governance level(s), in a highly participative process, to frame sectoral initiatives; (2) **Reviewing and strengthening of the sectoral policy, legal and regulatory frameworks** (gap analysis), particularly for empowerment of sub-national governance system and improvement of cross-sectoral coordination; (3) **Mandating the "Legitimate Authority" and clarifying responsibilities** in OECMs, e.g., for decision-making, identification; management; monitoring, evaluation, and reporting (MER); as well as mechanisms for cross-sectoral collaboration, conflict resolution, and comprehensive reporting to the Legitimate Authorities and, as appropriate to WCMC.; (4) **Developing or strengthening the collaborative processes** among jurisdictions, economic sectors and at seascape level when relevant; In particular, coordinating the fishery-MER systems, including those covering large-scale and small-scale fisheries, and integrating them, as needed, with those of other sectoral management and biodiversity conservation agencies operating in the same area or in surrounding or functionally connected areas; (5) **Providing oversight and auditing** to check the effective contribution of OECMs (cf. **Section 7.6**)

Additional complementary activities that may be considered such as: (1) **Diffusing, the generic guidelines on OECMs** that are available (e.g., in IUCN WCPA, 2019) in national and local languages, adapting and translating them as needed for local use; (2) **Creating or updating of a national database** of all protected areas including MPAs, OECMs, LMMAs and other community-managed areas and sector-managed areas

[16] For LMMAs, see for example Govan et al. (2008)

[17] The Convention on Biological Diversity does not define the terms "indigenous peoples and local communities." . The United Nations Declaration on the Rights of Indigenous Peoples does not adopt a universal definition for "indigenous peoples", and a definition is not recommended (cf. the 2018 CBD COP Decision 14/13).

producing or likely to produce biodiversity benefits and co-benefits[18]. (3) **Establishing accessible sources of funds** and other implementation means, including for capacity-building at local level; (4) **Adopting of a strategy and plan** and a reasonable timetable for sectoral submissions of OECMs proposals by the various sectors to the Government or the Legitimate Authority, if the OECM implementation process is deconcentrated at various levels; (5) **Communicating on –and promoting– OECMs** across the relevant economic sectors, as conservation mechanism that are complementary to other conservation measures, compatible with sustainable use, and that bridges and helps unify fishery and biodiversity conservation frameworks.

These actions require an implementation capacity which might be limited in many places, both centrally and locally, and cooperation may need to be developed or enhanced, at bilateral and regional levels. Following The Decision, all these actions and all the actions referred to in the following sections of this guide are intended to be taken and implemented in multi-stakeholder processes involving all Legitimate Authorities, including Indigenous People and local communities, with due consideration of their rights, responsibilities, institutions, and set of values.

4.2 Fishery governance framework

Many of the actions considered below "echo" at sector and sub-sector levels the actions listed above in the overarching national governance framework, which should incentivise and facilitate them. Because an OECM identified in a fishery sector by the Legitimate Authority would usually have been established earlier as ABFM, it has in many cases the sustainability of the target species fishery as primary objective[19], including the protection of habitats essential for that fishery. It is identified as OECM because it generates also broader conservation benefits, e.g., for non-target species including threatened species and the broader biodiversity. For mobile species, these benefits will spill-over to the outside ecosystem. Consequently, the set of measures taken within an OECM will affect the sustainability and conservation performance of management not only within the OECM but also in the whole fishing ground and possibly ecosystem. Conversely, the measures and activities around OECMs should not negatively affect the expected OECM conservation performance, as reflected for example in the fishery management plan). Consequently, appropriate measures applied within and around OECMs will need to be complementary, coherent with both fisheries and conservation objectives, and integrated in the fisheries management plans. Such OECMs should also be integrated with the relevant biodiversity conservation networks and strategies, at local, national, regional or seascape levels, as appropriate. The issue is addressed in **Section 6.4.**

The following actions expected from the fishery sector would allow a review and strengthening of the fishery policy, regulatory frameworks as needed, at the appropriate governance levels (the legal framework is examined in **Section 4.3**). The actions appear in an order that is as logical as possible, but the need for such actions, and the order in which they may be taken, strongly depends on the present level of development and sophistication of the fishery governance and management systems, justifying the implementation "flexibility" recommended in The Decision:

[18] Following The Decision (Page 14) "benefits" are *intended* (hence related to explicit objctives) while "co-benefits" are *unintended,* i.e. ie obtained incidentally, while persuing another objective or simply not considered as objectives.

[19] Some ABFMs are used to regulate access, allocating space to sub-sectors, to allocate resources or reduce sources of conflicts and accidents, e.g., separating artisanal from industrial fisheries or set gears from mobile ones. In VMEs, the biodiversity conservation objective is particularly prominent, but the link between that protection and the productivity of the target species is present.

a. **Mainstreaming OECMs in the fishery sector:** (i) Review and revise, as necessary, the existing legal, policy and budgetary frameworks of the sector to facilitate mainstreaming. This would be facilitated if a cross-sectoral enabling national framework (**Section 4.1**) is developed; (ii) Encourage the sector (economic and other incentives) to identify new opportunities and recognize the contribution of existing OECMs to sustain or improve ecosystem functions and services; (iii) Facilitate building-up of the capacities required to improve mainstreaming of OECMs, including in assessment and management, and under the diverse modes of governance of the sector.

b. **Establishing or identifying an auditing authority and process.** Independent auditing of management performance is not yet as widespread a practice for most national fishery management regimes as it is for most RFMO/As. However, systematic, and regular performance evaluation improves performance of adaptive fishery management systems, and formal auditing (whether internal or third party) would add credibility to reports on OECMs performance. The use of OECMs is therefore an opportunity and incentive to establish or strengthen performance assessment for the fisheries and the sector and not only for OECMs (cf. **Section 7.3**).

c. **Operationalizing equitable governance.** In line with the well accepted principles of "good governance" (cf. **Section 5.6.2,c**), The Decision recognizes the need for equity at three levels: (1) Recognition of the Legitimate Authority and stakeholders, with their gender, identity, rights, values, knowledge systems, and institutions; (2) Procedures, giving effect to the "recognition" by ensuring inclusive institutions and mechanisms from data collection to decision-making and implementation; and (3) Distribution of costs and benefits (of the OECM and of the fisheries) among stakeholders. The Ecosystem Approach to Fisheries (FAO, 2003a) and the FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (**FAO, 2015**: Chapter 5B) are good sources of guidance in that respect, stressing the link between the right to access resources and the responsibility to manage them and conserve biodiversity[20]. Particular attention will be needed to ensure equity in participation and distribution (of opportunities, costs, and benefits) among stakeholders with main interest respectively in sustainable use or in conservation of biodiversity. The main reason for this is that the values they attach to specific biodiversity attributes and benefits may be different.

d. **Facilitating coordination/integration to improve performance.** Consider the needs, cost, and benefits of integration of sustainable use and conservation of biodiversity into the vision, goals and targets of fisheries and conservation policies and regulations at national and regional scale[21] It is important to note that parties to the 1995 United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stocks Agreement or UNFSA) have the obligation to

[20] This is also consistent with CBD Decisions V/6 (2000) and VII/11 (2004) on the ecosystem approach and respective guidance for implementation.

[21] It is important to note that Parties to the 1995 United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stocks Agreement or UNFSA) have the obligation to protect marine biodiversity in areas within and beyond national jurisdiction (Articles 3, 5g).

protect marine biodiversity (UNFSA, Art. 5 (g)). This provision is applicable in areas within and beyond national jurisdiction as per Article 3 of UNFSA. Foster integration of OECMs and their management: (1) within the fishery in which they are established, integrating them into its fishery management plan (FMP); (2) within the fishery sector, across the different fisheries using a given ecosystem; (3) between economic sectors potentially impacting the same OECM (e.g., fisheries, navigation, oil and gas, mining, tourism and renewable energy), e.g., through Marine Spatial Planning; (4) in national poverty eradication and sustainable development strategies (SDGs etc.), in relation to provisioning ecosystem services (food security, livelihoods); (5) across jurisdictional boundaries (e.g., for shared or straddling OECMs); and (6) at ecosystem or ecoregional level, in existing seascapes, Ecologically and Biologically Significant Areas (EBSAs), etc. Levels of integration (1) and (2) are achievable within the fishery sector. Levels (3) and (4) require action by the State. Levels (5) and (6) require international collaboration.

e. **Identifying negative impacts of other sectors** on fisheries and OECM outcomes in these fisheries. Seabed mining, oil and gas industries, land-based pollution, and navigation are examples of such threats. The best way to deal with such issues is within a cross-sectoral framework at an appropriate spatial scale, like integrated coastal zone management (ICZM), Marine Spatial Planning (MSP) or equivalents, to harmonize OECMs with spatial measures (and sometimes non-spatial measures) applied by other sectors or biodiversity conservation agencies in the same area, increase synergy and reduce conflict. However, such efforts are not yet widespread and, in their absence, the fishery sector could take the initiative towards improved sector-based conservation and be an example that other sectors might follow. In many instances, a bilateral collaboration between two sectors (encouraged by the State) may be enough to make an OECM operational and even to establish cross-sectoral OECM outcomes.

f. **Ensuring that an effective fishery management system is in place.** In the fishery sector, the management of medium to large scale fisheries (e.g., access rules, gear regulations, and effort and catch limits) is usually undertaken fishery by fishery and can vary greatly in sophistication and effectiveness. The small-scale fishery sector, with its complex set of fishing targets, gears and strategies, tends to be considered "as a whole" (as a multispecies multi-gear fishery), particularly in developing nations. Its management can then be centralised in the capital, decentralised in regions or municipalities, or devolved to Indigenous People and local Communities (IPLCs) under various forms of co-management. The explicit integration of the biodiversity conservation objectives and expected outcomes of the OECMs in the fishery management plan (FMP) or practices with small-scale fisheries is a significant move forward in mainstreaming. The capacity of the sector or fishery-specific management capacity of OECMs must be ascertained.

g. **Adopting or strengthening the Ecosystem Approach to Fisheries (EAF)** as the operational framework for managing fisheries and OECMs. EAF has already been adopted in FAO (since 2001) and all advanced countries and RFMO/As, recognizing the need to consider and limit the impact on non-target resources and habitats. The identification and inclusion of OECMs in EAF-based management plans should facilitate their expanded use in fisheries and this, in turn would strengthen EAF implementation, the priority given and the performance expected on biodiversity outcomes. The FAO Guidelines on EAF (FAO, 2003a) could be amended or supplemented to address the conservation aspects of OECMs explicitly.

h. **Strengthening the monitoring and evaluation capacity.** Advanced systems that have scientific capacity for stocks assessment (e.g., in national fishery research laboratories), can be tasked and enhanced if needed to monitor and assess OECMs. Collaborative monitoring, research and assessment programmes between fisheries and biodiversity conservation agencies ought to be established or strengthened, at national and regional levels, and would be an enabling factor. In particular, the competence currently tasked with assessing and managing MPAs networks could be encompassed within these collaborations. Coordinating the different fishery-MER processes, including those covering large-scale and small-scale fisheries, and integrating them with those of other sectoral management and biodiversity conservation agencies operating in the same area or in surrounding or functionally connected areas might help mobilizing the additional resources needed.

i. **Identifying the need for international collaboration** in the case of transboundary OECMs. Using the stocks-based terminology, OECMs might be "shared" (adopted in areas overlapping neighbouring EEZs), "straddling" (overlapping one or more EEZs and the High Sea), or implemented entirely in the High Sea. Effectiveness would benefit from collaborative action for assessment and management. Examples of formal shared stocks agreements (like between EU Member States, Norway and Russia, and USA and Canada) are relative rare, however, and OECMs may be an opportunity to improve the situation. At regional level, Regional Seas Organizations (RSOs) as well as RFMO/As and seascapes, are good examples of effective collaboration and channels that might be used to promote effective OECMs.

j. **Matching implementation capacity to commitments** and vice-versa. The institutional, scientific, and management capacity-building required to deal with OECMs within fisheries may call for additional means in a sector where management is often chronically under-funded. In many cases, ambitions will need to be tailored to means available, e.g., using a stacked approach to mainstreaming; using pilot phases to learn by doing; using local knowledge and expert knowledge instead of costly scientific programmes. However, the weaker the evidence available, the greater the risk aversion necessary in decision-making.

4.3 Fisheries legal framework

The international framework enabling the identification and implementation of OECMs in all ecosystems has been established by The Decision which encourages governments to... *identify other effective area-based conservation measures and their diverse options within their jurisdiction* (§ 5a). It also recognizes the *potentially different legal regimes for different portions of the same marine areas (e.g., seabed and water column in marine areas beyond national jurisdiction*) (**Annex IV,A,1,j**). According to the Convention CBD provisions and COP Decisions, apply only to CBD Parties, within areas under their jurisdiction, when referring to biodiversity components (**Art. 4a**), and within and beyond the area of its national jurisdiction when referring to processes and activities (**Art. 4b**). In addition, under UNCLOS, States may, as members of a RFMO/A, adopt area-based management tools (ABMTs) such as closed areas, for the sustainable use of the resources or the protection of the environment (such as VMEs). Nothing, therefore, impedes a CBD Party which is also Party to a RFMO, to propose to the RFMO Parties to adopt OECMs in line with the CBD guidance. The ongoing United Nations process for the adoption of an international legally binding under UNCLOS implementation agreement on the conservation and sustainable use of biodiversity of areas

beyond national jurisdiction (BBNJ agreement) will be relevant for the way ABMTs, including MPAs and OECMs, may be used in the future by any sector in the High Sea and the Area[22].

To become fully operational in fisheries, the actions explicitly expected or implied in The Decision would need to consistent or reconciled with the existing fisheries regulatory framework, at national level (e.g., in the Fisheries Act) and at sub-national level (e.g., by IPLCs' traditional management systems) and regional level, in RFMO/As. Updating of these frameworks might include the recognition of the concept of OECMs in both fisheries and conservation. Under existing frameworks, area-based management measures have been used for centuries (e.g., **Hindson et al., 2005; Die, 2009; Cochrane and Garcia, 2009; NOAA, 2017; Rice et al, 2018)**. Their purpose can be narrowly contributing to ensuring long-term conventional sustainability of the target species. However, under the ecosystem approach to fisheries, they are also established to reduce or avoid bycatches of unwanted or protected species, and protect sensitive[23] and essential[24] habitats. ABFMs meeting The Decision criteria may therefore be identified –or upgraded– as OECMs and implemented in fisheries with little modification, if any, of their present regulatory frames. Complementary actions to further solidify the intended outcomes of OECMs may include:

a. **Mandating the legitimate fisheries management authorities[25]**. For marine capture fisheries, the mandated authorities with the right to adopt and enforce measures (including area-based measures) are usually already defined in countries with some sort of Fisheries Act, either at central State level (Ministry, Department) or other levels (federal States, indigenous people, local communities, associations, etc.). In the High Sea, flag States, individually, of collectively through RFMO/As, jointly, have the required competence.

b. **Including OECMs as management instruments in the Fisheries Acts (if needed),** with the related concepts such as "sustained management" and "long-term biodiversity outcomes" which intend to signal the formal intent to use OECMs and produce their expected biodiversity outcomes in the long-term (as long as needed). Although the concept of "long term" has not been specified in The Decision, the long-term intention of a fisheries OECM should be clearly stated. Simple and universal standards of management "sustenance" cannot be defined but evidence could be provided by, e.g.: (1) The nomination of a legitimate management authority with a long-term mandate; (2) A formal policy or legal provision stating the "long-term" intention and clarifying the process and conditions needed to change the OECM area or measures and the likelihood that this would happen; (3) Clearly long-term objectives; (4) Formal adoption of a management plan of traditional equivalent form in each fishery; (5) Showing that necessary financial and human resources are adequate and planned for the long-term; (6) Establishment of a MER system demonstrating the long-term monitoring and assessment capacities; (7) coordination of the OECM management with other conservation efforts of agencies with authority for biodiversity conservation. As an example, in Canada (CCFAM, 2017:20, §4), *the measures identified as OEABCM* [herein referred to as OECM] *will*

[22] "Area" means the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction (UNCLOS Article 1.1)

[23] Sensitive habitats are habitats that are vulnerable to fishing activities and important for ecosystem functions and services

[24] Essential habitats are habitats that are needed to maintain the productivity of the fishery target species

[25] For coordination with the CBD, the legitimate authority is usually already established as a focal point in the Ministry in charge of biodiversity.

be managed using a long-term adaptive management approach and are expected to be in place year-round for a minimum of 25 years to support long-term biodiversity conservation benefits. This criterion should not be considered an expiry date for OEABCM. The underlying aim is for all reported OEABCM to be in place indefinitely and ideally in perpetuity. The long-term intent of an OECM may be clearly stated in the form of a long-term management objective documented in an official publication from the Legitimate Authority.

c. **Elaborating additional regulation on OECMs** that could protect fishery-OECMs from negative impacts on biodiversity from other human activities, or establish rules for elaborating cross-sectoral OECMs.

5. IDENTIFICATION OF OECMS

5.1 Reflections on the identification process

The identification process imbedded in the OECM implementation cycle given in **Figure 1** is intended to elaborate the advice that the Legitimate Authority needs to decide which of the existing ABFMs, and eventually which new area, would meet the CBD OECM definition. This may be achieved by going through a series of steps represented in **Figure 2**: (i) data compilation; (ii) quick screening; (iii) full identification; (iv) elaboration of advice; and (v) decision-making. The list of criteria and sub-criteria provided **in Annex III** and **Table 3** is central to the quick-screening and full identification steps.

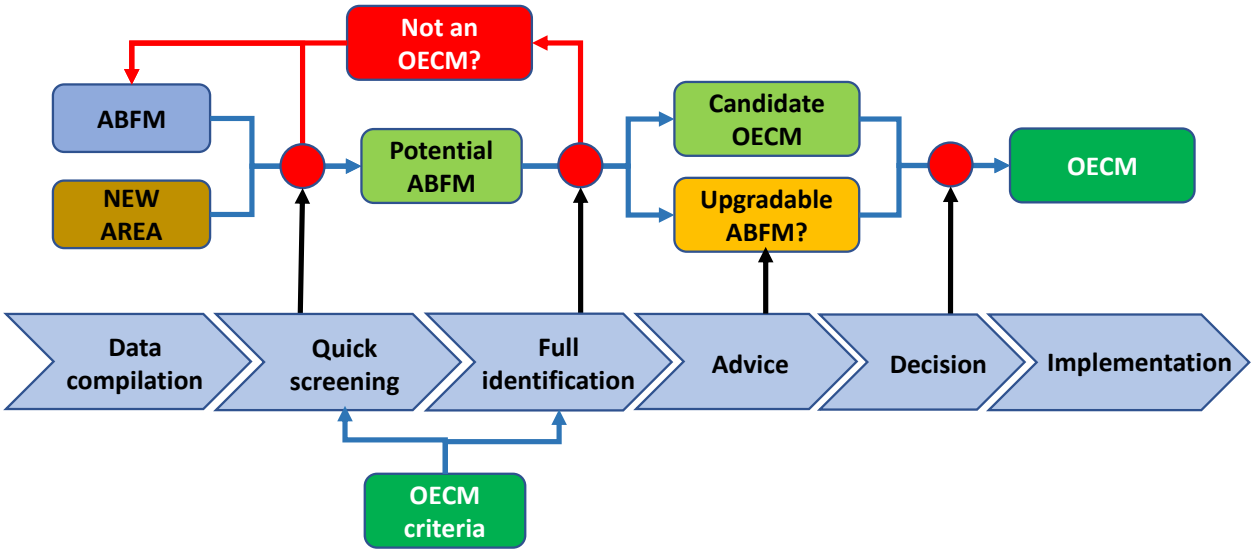


Figure 2: OECM Identification process, from data compilation to decision by the Legitimate Authority

In the identification process, ABFM passing the quick-screening test will be considered potential OECMs and submitted to a full assessment. Those satisfactorily meeting the Criteria will be considered candidate-OECMs that will be presented to the Legitimate Authority for decision and formal identification as OECMs. Those ABFMs which satisfactorily meet many but not all requirements might be considered as upgradable ABFMs and also presented to the Legitimate Authority for decision regarding their possible upgrading, considering both biodiversity attributes, feasibility, and costs and benefits. In addition, new area-based measures may be established directly as OECMs, following the same identification process. At the end of the identification process, OECMs will have been formally identified by the Legitimate Authority and, if so decided, will be integrated in the fisheries management to be implemented.

Such implementation, and particularly the management activities will be addressed in **Chapters 6 and 7.** An essential part of the implementation is not addressed in this document and that is the one undertaken by the sector itself with its potential adjustments (if any) of fishing strategies, gears and practices, to integrate (or in some cases to circumvent) the new regulations. This is a usual process in fisheries management and it is usually agreed that full participation in the process from the onset is a good omen for future compliance.

The detailed identification process suggested below follows the order of the Criteria for Identification contained in Decision 14/8 (Annex III) and reproduced in **Table 3** of the present document. The list of criteria is used both as: (i) a roadmap to follow for the identification process; and (ii) a check-list of properties essential to OECMs to be "ticked" at the end of the process, when synthetizing the overall process conclusion for final decision by the Legitimate Authority.

Following **Table 3,** The identification logic is to check successively that: (1) The area is not an MPA (Criteria A); (2) The area is geographically defined (Sub-criteria B1); (3) The area is governed equitably, by a legitimate authority (Sub-criteria B2) ; (4) The area is actively and effectively managed (Sub-criteria B3); (4) The managed area produces significant intended positive biodiversity outcomes (Criteria C3), and (5) , due attention is paid, in the process, to ecosystem services and functions, local knowledge, and other locally relevant values (Criteria D). For each Criterion, it will be necessary to figure out if enough unequivocal information is available to decide whether the criteria is met. This process is facilitated by the fact that the criteria given in The Decision are subdivided into more homogenous sub-criteria, each of which accompanied by a short list of elements of information (or qualitative indicators) that can guide the evaluation (cf. **Table 3**). Two important issues will be met in the process:

1. The response on whether each criterion is met, will rarely by a simple yes or no, but in most cases a level of performance within a range from poor to excellent. Some qualitative or quantitative scoring system will be needed, for which The Decision gives no guidance. This point is discussed when elaborating on the synthesis of the assessment conclusions (**Section 5.10)**.
2. In reality, the identification process will rarely be as linear as implied above and in **Table 3**. This point is discussed below

The identification process cannot be as linear as presented above as information and conclusions need to be shared between criteria and sub-criteria as the assessment progresses stepwise from A to D, but not always in the order implied. Because of the obvious functional interaction between threats, biodiversity, and management[26] it is difficult to conduct the assessments regarding Criteria B to D purely sequentially, as they appear in **Table 3**. Moving back and forth between the criteria and the different elements of evidence is unavoidable. For example, information on threats needed implicitly in B3 is only elaborated in C1, and information on biodiversity attributes needed in B1 would only be available in principle after having conducted C3.

This illustrates the fact that **Table 3** provides a check-list of criteria against which potential OECMs need to be assessed, but may not be the most logical stepwise assessment roadmap, most efficiently mobilizing the data and competences available. An example was elaborated in **Garcia et al. (2020)**. However, the interactions are such, that it is difficult if not impossible to design a completely linear process that could be generally agreed and pertinent in all cases. Each assessment team may, after consideration of the guidance available and of the local conditions, develop its own identification process plan. The only important requirement in all cases is to have, at the end of the process, the best available information needed, criteria by criteria, to inform the decision to be made by the Legitimate Authority about the potential OECM.

This being the case, using a stepwise process following the agreed list of criteria of Decision 14/8 may be a good way of maintaining some consistency across OECM, countries, and regions. Doing so, however,

[26] As in the classical Pressure-State-Response (PSR) framework) (**Moldan et al., 1997; Chesson, 2013**),

will confront the assessing team with the overlaps and inter-connections between Criteria and elements of evidence (cf. **Figure 3**).

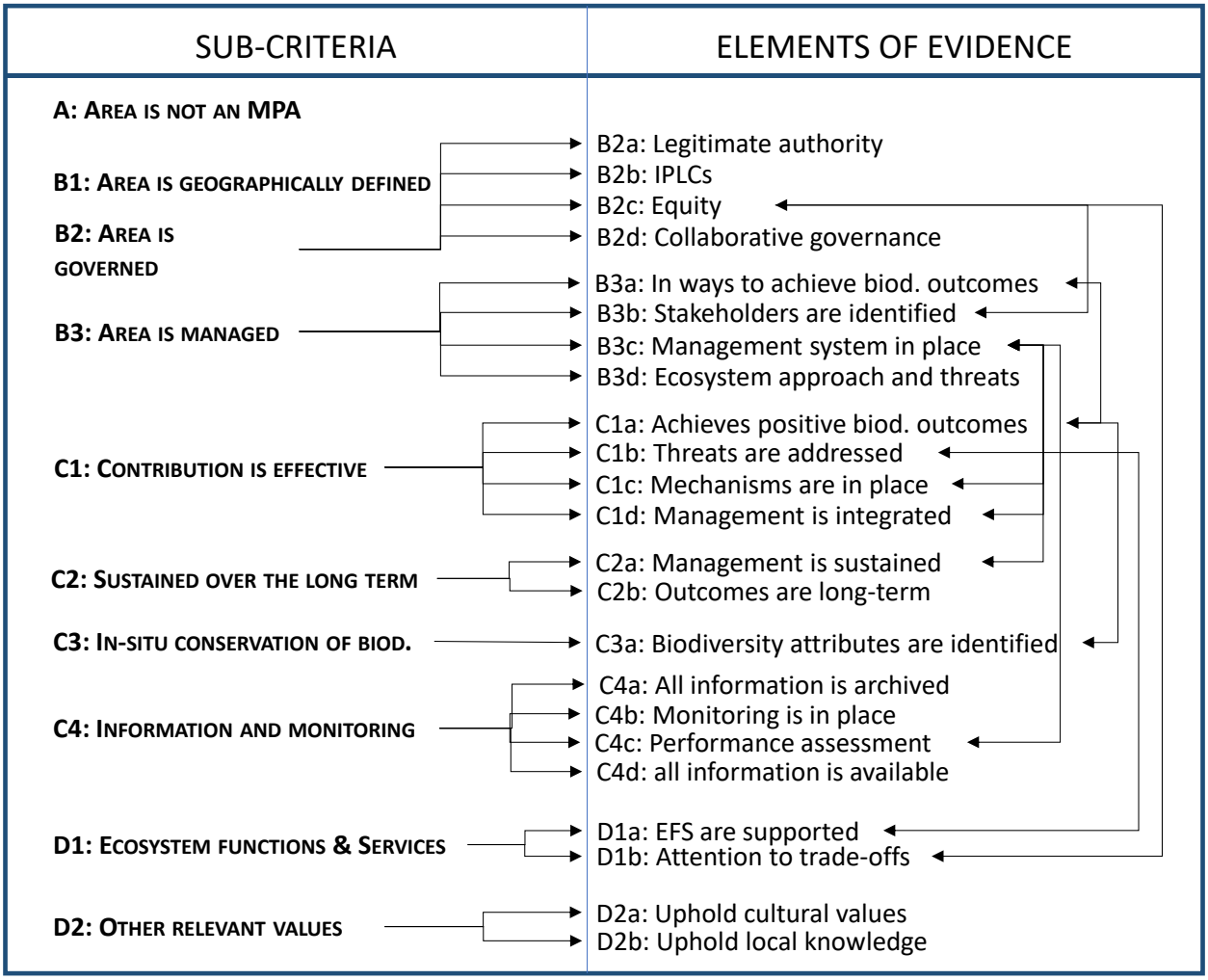


Figure 3: Some relationships between sub-criteria (left) and elements of evidence (Right). The overlaps and partial duplications between elements of evidence "belonging" to different criteria, particularly between Criteria B and C, indicate that: (i) these criteria are objectively connected; (ii) the list of elements of evidence is an important check-list but not a linear assessment roadmap; and (iii) efforts to streamline the identification process may lead to improved efficiency in the use of the information and sets of competence.

The interaction between the criteria (in terms of the elements of evidence that call for) suggests that tit would be useful to assess the criteria, particularly Criteria (B) and (C), in parallel, if not jointly, sharing the information and multidisciplinary competence available, in quasi real-time. As an illustration of the connection between measures and their expected outcomes, in the ICES-FEG meeting (ICES, 2021), the experts argued that, in some cases, clearly effective enforcement of the measures (e.g., a ban on bottom-contacting gear) could be a good enough indicator that the expected positive biodiversity outcome (bottom habitat protection) is highly likely to be produced.

The stepwise process followed below contains steps additional to the list of criteria, that are needed to prepare and complete the criteria-based process: (i) before addressing the criteria, to prepare the

information and undertake a preliminary quick-screening; and (ii) after having gone through the criteria, to assess "additional properties" of OECMs (not explicitly referred to in the Criteria but stressed in the Principles or voluntary guidance), and also to address the issue of synthesis and reporting of the assessment, and to underline the importance of the final decisions by the Legitimate Authority.

The suggested identification process described below, is guided by some premises that stem mainly from The Decision Principles and are examined first.

5.2 Premises

The identification process requires a good understanding of the concepts and terminology used in The Decision and in this document. It is therefore strongly advised to familiarise oneself with the terminology before proceeding. When organizing workshops of experts on OECM identification and use, it would also be advisable to start with a session intended to provide such clarifications.

The identification process aims to examine the extent to which the Potential OECM meets the definition and the guidance contained in The Decision. The core text of The Decision (pages 1 and 2) qualifies the guidance contained in the Annexes of The Decision as "*voluntary"* (§1) to be applied in a *flexible way* and *case-by-case* (cf. §3)**.** These terms imply that (1) the decision on whether and how to apply the voluntary guidance rests on States[27], and (2) the guidance may be adapted by States to their specific circumstances and these of the areas concerned. In the process, States are expected to remain faithful to the intent of The Decision and *consistent with the convention* (§4). This "flexibility" is particularly important considering the large range of implementation capacity available in the world fisheries. However, no matter what resources are available, all criteria need to be considered, even though the data and methods used can only be the "best available", including through adequate collaborations at national and regional levels.

The following considerations could be made before starting the identification process to facilitate and guide the assessment:

5.2.1 Comprehensive versus incremental approaches

The Decision has practical, scientific, economic, and political implications. The identification process may require significant resources and may therefore be undertaken using a "comprehensive" or an "incremental" approach.

A comprehensive approach would be developed across the entire sector (and hence all the waters under national jurisdiction, or major portions of them), cataloguing all existing ABFMs in the EEZ or in a large region. The process will search for those likely to produce significant biodiversity benefits (potential OECMs), listing all of them, and fully assessing them against the Criteria for Identification. This systematic approach may generate economies of scale and improve coherence within and across fisheries and at ecosystem level. However, it may overburden resource availability in a short time. The entire process may also require too much time when rapid demonstrations may be needed to ensure fast buy-in by the sector or environmental critics. A comprehensive approach would probably be advisable also for RFMO/As managing only one target resource –such as International Pacific Halibut Commission (IPHC) or the

[27] The voluntary guidance is not binding, but it has collectively agreed and has therefore an important moral "weight". While there is no mechanism of enforcement of the Decision by States, their consensual agreement to report regularly on progress made, in the Post 2020 Global Biodiversity Framework, the WCMC global OECMs database and, likely in the near future, in the implementation of the BBNG agreement is both a commitment and a social pressure to comply.

Commission for the Conservation of Southern Bluefin Tuna (CCSBT)- ensuring integration of OECMs across the life cycle and large-scale fishery.

An incremental approach might be appropriate, selecting one or a few fisheries at a time, with high sustainability and biodiversity conservation stakes, that are using (or could use) ABFMs reasonably likely to meet the standards for OECMs, and for which necessary information is more readily available. This or these areas may be used as "pilots" in a learning-by-doing process , progressively developing the capacity needed to fully mainstream OECMs in the sector. The process might be slower to upscale to the whole sector but it might be more feasible in capacity-limited fishing nations, or in RFMO/As dealing with many fisheries and several species. Under both approaches, the participation of fishers' organisations and committees might be essential for buy-in.

5.2.2 Case-by-case evaluation

In line with The Decision (§3), the Introduction of Annex III, and Annex IV, D, d, and irrespective of the approach selected (comprehensive or incremental), ABFMs should be evaluated individually, case by case, against, mainly, the Criteria for Identification, but accounting also for the Guiding Principles and the voluntary guidance contained in The Decision. The reason is that the effectiveness of the different types of area-based measures at delivering biodiversity conservation outcomes –and hence their likelihood to meet OECM standards– depend on too many factors to be simply attributed *a priori* to categories of measures, or types of areas (**Rice and Garcia, 2018**). The same consideration advocates against generalizing the results obtained in any single context to other contexts.

A *case-by-case* approach is recommended to check, for example, for each potential OECM: the application of the ecosystem and precautionary approaches; the integration of the OECM with other measures; the use of the best information available; the specific threats in the area and outside it when relevant; and the governance processes (including assessment and decision-making). In fisheries, the high variability in performance of the various types of ABFMs due to intrinsic and contextual performance factors does not allow any reliable generalization regarding the probability of any ABFM type to be an OECM reinforcing the need of a case-by-case evaluation (**Rice and Garcia, 2018**).

5.2.3 Flexible way

The need to apply the Guiding Principles and the identification criteria in a flexible way is stressed in the introduction of Annex III (cf. also Annex IV, Df). It is an important indication to enable the design of context-specific measures that address more than one outcome objective, in significantly diverse ecological, social, technological, and economic contexts rather than relying on prescriptive input requirements. The expression entitles States to adapt the CBD guidance to their own implementation conditions, and allows necessarily a degree of interpretation by the Legitimate Authority. The advantage is obvious. The risk is in the possible emergence of different interpretations in different countries and sectors and it can be hoped that best practices will emerge with time. An important implication is that all the guidelines produced nationally or by sectors to better specify implementation of Decision 14/8 (including this present document) are necessarily interpretative but cannot override the Decision itself.

Flexibility does not mean, however, that it is possible to select what criteria or principles to consider when identifying or managing OECMs. All of them are relevant and should be considered

5.2.4 All criteria are relevant

All the guidance available in The Decision is relevant and, in particular, all Criteria for Identification must be considered. The Criteria require that the area: (A) has not been formally designated as an MPA; (B) is well defined and sustainably managed by legitimate authorities, using, *inter alia*, area-based management

measure(s) ; (C) produces long-term in-situ biodiversity conservation outcomes; and (D) maintains ecosystem functions and services, and upholds locally relevant values. Criteria (A) is absolute and, if not met, it is enough to disqualify the area. Criteria (B), (C) and (D) are inherently relative and thus open to a range of responses. The challenge is to determine what level of positive outcome the ABFM is generating or may generate, and which level of response is necessary or sufficient for identification of the area as OECM in Target 11. Some common characteristics mentioned in the Guiding Principles, such as "connectivity" and "representativeness" are desirable qualities of all biodiversity conservation areas, but their absence is not sufficient to disqualify an area if Criteria B to D are met, just as their absence is not a justification to exclude an MPA from Target 11 reporting.

5.2.5 Multidisciplinary evaluation team

Multidisciplinary competences need to be assembled to address all the bio-ecological, socio-economic, cultural, spiritual, and other locally relevant issues involved in assessing OECMs and their potential outcomes. The team composition neds therefore to be inclusive, with fishery and biodiversity conservation scientists, management practitioners and representatives of other stakeholders, with appropriate roles in the different phases of the process, to be clarified from the onset, based on the background and expertise of the individuals. The potential institutional sources of expertise might be identified first, and specific people and experts be called in as needed for each case being examined.

5.2.6 Broadest possible information base

The preferred source of information is empirical data collected from the area being assessed (e.g., in the case of ABFMs that have been in use for years), including scientific data (from natural and social sciences), expert views, and local and traditional knowledge. When local information is not available for some properties relevant to the assessment, empirical information from other "comparable" areas may be used, taking into consideration the proximity to the site of concern and the similarity of ecological, socioeconomic and governance conditions, of fishery and other anthropogenic stresses, and of management regimes. For additional biodiversity benefits not previously considered for an existing ABFM and for which data are not available, or for a newly implemented OECM, the "evidence" may be produced *ex-ante* through modelling and simulations. The evidence available may vary greatly in quality and quantity. Its costs are context-specific and depend on the ecosystem, the biodiversity attributes of concern, the complexity of the matter, the precision required, and the periodicity of the performance assessments. A large part of the information needed may already be archived in the recurrent MER system of the fishery or of the fishery research centre, and in the archives of potential collaborating agencies. It is therefore advisable to identify early in the process the possible sources of information and to establish the cooperation needed to access them. The specific information needed for each case may then be acquired incrementally, as the identification proceeds orderly, and specific questions are addressed by the experts.

5.2.7 Accounting for uncertainty in social-ecological systems

Social-ecological systems like fishery sectors are complex systems of interacting resources and people, under large-scale driving forces. The result is that, usually, only a partial understanding of the fisheries, their resources and the ecosystem is available, resulting in uncertainty, both in the identification of OECMs, assessment of their performance and forecasts of their evolution in a fishery context.

This calls for risk assessment and precaution in decision-making as well as adaptive implementation in fisheries (e.g., **Hilborn & Walters, 1992**) and biodiversity conservation (e.g., **Halpern et al., 2005; Keith et al. 2011; Ouananian et al, 2018; Kenny et al., 2018**). As the OECM has both fisheries and biodiversity objectives, hybrid approaches that emerged in both scientific fields might be needed (see **Section 5.2.8**

on available methodology). Tools such as Multi-Criteria Decision Analysis (MCDA) and Risk Assessment approaches (see **Section 5.2.8**) can contribute to addressing these difficulties, but are highly dependent of availability of the necessary information. Approaches to Ecological Risk Assessment for the Effects of Fishing (ERAEF) are reviewed by **Smith et al. (2007**)**.** The challenges posed by inherent uncertainties in OECM assessments will increase as evaluations progress from identifying and the prioritizing potential threats, to assessing risks associated with particular fisheries and biodiversity attributes, to estimating the potential of alternative options to mitigate the risks associated with the fisheries, and to the more inclusive assessments of "safe ecosystem levels" (SEL) and "significant adverse impacts (SAIs) (**Section 7.5.2, (v) and (vi)**.

When assessments may only be available with a high level of uncertainty (confidence limits), the assessment of risk entailed in choosing between uncertain options would assist decision-makers in making the best- informed decision. This would entail:

- Identification of the source of risk (e.g., the environment; the fishery; other economic activities); product risk, management risk, environmental risk vis-à-vis human health risk);
- The identification of the element at risk (e.g., biodiversity components; ecosystem services; fisheries; coastal communities);
- Assessment of the risk characters (e.g., duration, extent, amplitude, cost, probability to occur);
- The risks, both socio-economic and environmental associated with alternative decisions, including no action; and
- The communication of risks to recipients of the advice and other stakeholders.

5.2.8 Available methodology

In well studied and managed fisheries and ecosystems, most of the information needed to test an ABFM against the criteria be readily available in national reports and scientific publications, for the experts to proceed. In other systems, part of the information needed, particularly but not only on non-target species, broader biodiversity, ecosystem services, and socio-economic values might require some additional data collection and analyses. In this case, the methodologies that might be available locally (including manuals, software, etc.) could usefully be identified from the onset. It is likely that the multi-disciplinary team of experts solicited for the assessment process will carry "their methodology" with them. The potential toolbox of fishery and conservation science methods and approaches is large and cannot be reviewed in this and possibly any single document.

The methods used for the initial assessment for identification of OECMs and the recurrent assessments of their performance in the MER programme will be largely similar (cf. **Chapter 7**). Scores of methods, conventional or non-conventional, depending or not on fishery data, simple or sophisticated, have been developed in fishery, conservation, and social sciences, for monitoring and assessing biodiversity components, ecosystem services and broader social and economic values. Methods keep evolving as technology improves and the potential toolbox is too rich to be described here. Complex ecological models may be used for simulations and scenario analyses when the data and the capacity to use them are available (**Fulton, Smith and Punt, 2005; Trenkel, Rochet and Mesnil, 2007; Smith et al., 2007; Plagàgnyi, 2007; Shin et al., 2010; Zhou et al., 2011; Collie et al., 2014; Fulton et al., 2015; Bayley and Mogg, 2019**). Alternatively, in data and capacity-limited situations –particularly in highly participatory assessment and management systems, using multiples sources of knowledge, discussion groups, expert views, questionnaires and qualitative indicators are practical and their use may be sufficiently reliable to provide management advice (**Pomeroy et al., 2004; 2005; Fox et al., 2014**; **Marnevick et al., 2019; Ivanic**

et al., 2020). In some extreme cases, the assessment may be simple, e.g., if bottom-contacting fishing has been banned, it can be assumed that the biodiversity benefit is obtained, as long as the measure is effectively enforced. Management strategies based on the advice derived from these approaches might be tested, using both qualitative and quantitative methods, modelling, indicators, and expert opinion, using the Management Strategy Evaluations (MSE) (**Smith at al., 2007**). An abundant literature is also available on environmental and biodiversity impact assessment, in general (e.g., **Bagri & Vorhies, 1997; SCBD and NCEA, 2006; CBD, 2012; Watkins et al., 2015; Butsic et al., 2017; Mascia et al., 2017; Larsen et al., 2019)**) and in fisheries **(e.g., Chuenpagdee et al, 2003; FAO, 2009; Coll et al., 2014; Langlois et al, 2014**). In data/resources-limited areas, the review of available literature on such impacts and the use expert opinion (as in **Petza et al, 2019**), possibly using Delphi techniques, and local knowledge (as in **Coll et al., 2014**) might represent a reasonable burden that could be shared through collaboration with the agency in charge of biodiversity conservation in the area of concern.

Evidence of benefits may be based on empirical data or simulations and scenario analyses, including Management Strategy Evaluation (MSE) in data- and competence-rich areas.

5.2.9 Burden and level of proof

The identification of an OECM, contrary to an MPA, is strongly based on providing evidence regarding (i) the biodiversity values that benefit or are expected to benefit from the OECM measures; and (ii) the type of governance and quality of the management measures; and (iii) the probability for both to be sustained in the long term.

The burden of proof is obviously on the State and the Legitimate Authority in charge of the OECM. The level of proof, however, is not addressed anywhere and is therefore left to the appreciation of the Parties and probably intended to suit the range of assessment and management capacity encountered on more or less endowed countries. Perhaps because of the need to be globally applicable, The Decision contains only qualitative elements of "proof". The biodiversity values should be *important* and *complementary.* The ecosystem services must be *essential.* Overall, the OECMs must be *effective.* The changes in the indicators should be *positive and sustained.* However, The Decision says also that Indicators should be *measurable…for assessing the effectiveness…*and that assessment approaches should be standardized (**Annex IV, C,4, c, d**) It also refers the *degree of protection that the measure offers to the biodiversity components of high priority*, but does not indicate how would such "degree" be defined and measured (**Annex IV, D, 6,f, (iii)**.

The implication is that the assessment will use the best information available, be it quantitative or qualitative and the level of "performance" is left to the appreciation of the State.

5.2.10 Comparable importance

Principle (d) refers to OECMs *biodiversity outcomes of comparable importance…with those of protected areas…*

Some of the biodiversity outcomes relate to components of ecosystem structure and function, and more integrated properties of species, habitats, and ecosystems, such as representativeness, provision of specific ecosystem services, and ability to integrate the OECM biodiversity outcomes into larger-scale conservation frameworks. Even in these contexts, the Principle does not seem to refer to the absolute or relative size of this outcome, but to how the outcome from the OECM complements and contributes to overall health of the larger associated ecosystems. This, already, becomes an elusive factor to assess empirically and consistently, given the lack of an operational definition of ecosystem health referred to in **Section 3.5.3, Sub-criterion C4a**. In addition, the challenges with measuring the "value" of biodiversity

attributes discussed in **Section 2.4.1** mean that there is no quantitative standard on the "importance" of the conservation outcomes which, in addition can be highly variable. The same should be expected of OECMs depending on how well they are sited, managed, etc.

Nonetheless, this criterion could be interpreted as saying that the parameters on which MPAs' contribution to seascapes in terms of representativeness, relative coverage, ecosystem services, and integration/connectivity, when available, could be at least a starting point for assessing of the contributions of OECMs. Assessments producing similar results would be reassuring, although if there were differences, they would be hard to interpret because undoubtedly even different MPAs, similar in some features such as extension and location in a special habitat, might make different contributions to seascapes, however those contributions were measured.

5.2.11 The potential role of the Monitoring Evaluation and Reporting system

Because of the importance of the Monitoring Evaluation and Reporting system (MER) in implementing the recommendations of the identification process in case the ABFM is identified as OECM, it would be very advisable, and in many cases, indispensable, is important to ensure its full participation if not leadership in the process, from the onset.

5.3 Consolidating information

The purpose of this step is to facilitate the following ones by identifying , upfront, the information and competences that will be needed for the identification process.

The need to use the broadest source of information is discussed in **Section 5.2.6**. As shown by the ICES-FEG meeting on OECMs in the North Atlantic (ICES, 2021) an extensive preparation of the information already available, at the onset of the identification process is highly beneficial. The information potentially useful for the OECM identification process might relate to: species distribution; fleets size and composition; fishing gears; target and non-target species; stock assessment; governance types; key stakeholders and participation processes; legal frames; management measures; compliance; catch; socio-economic parameters; biodiversity attributes of concern; ecosystem services (including food and livelihoods support) and other relevant values affecting conservation; possible current and future threats; existing MPAs (networks, seascapes) and other conservation measures. Data and information management are addressed in **Section 7.5**.

This preliminary step is not explicit in The Decision but is a logical start of a pretty complex process of assessment. The step intends to clarify : (i) the sort of information already available for the area; (ii) the source of such information; (iii) its format (e.g., paper, digital, in databases, or publications); (iv) its degree of accessibility (or confidentiality); (v) the competences needed for its analysis: and (vi) the potential source of such competence.

The importance of that step for the whole multi-stakeholder and multi-disciplinary process cannot be overstated and may be easier in well-endowed and structured systems than in data- and competence-limited areas where no relevant data and competence may be overlooked.

When a large amount of ABFMs might be considered (e.g., in countries with large EEZs) tracing all the information available on all the possible ABFMs may be an overwhelming job, possibly unduly delaying the identification process. As a consequence, Step 1 and 2 might be conducted in parallel, quick-screening the total set of areas and compiling the information on the most promising ones).

The types of information that might be collated includes:

5.3.1 Baselines, thresholds, and indicators

It is important to identify pre-agreed available reference values (baselines or thresholds) of indicators to be used for performance assessments. The Decision does not rank explicitly the criteria. If these criteria were to be ranked or weighted in the overall assessment, the priorities and relative weights should be agreed from the onset. While these pre-agreements would greatly facilitate the assessment process, such values may very well need to emerge from the assessment itself, in which case they will need to be also submitted with their rationale to the Legitimate Authority, for endorsement or otherwise.

5.3.2 Biodiversity and other relevant values

The Decision advises to consider also cultural, spiritual, socio-economic, and other regionally or locally relevant values in addition to biodiversity values. Biodiversity values include *the ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components* (Preamble of the CBD). These values can be identified through a participatory process, focusing on those that could be compromised by an OECM or would support its implementation. The importance of accounting for these values and incorporating them into management discussions is as important in OECMs as it is in MPAs or in fisheries management. It should be noted that some values may be of low priority locally but of high priority at larger scales… and vice-versa.

5.3.3 Information on the ecosystem

The ecosystem within which the OECM operates should be identified to evaluate or get a sense of connectivity with other area-based conservation tools in that ecosystem. This would also help identifying proxies , in similar ecosystems, for information missing in the area being considered as potential OECM. for comparative purposes. Elements of importance are: (i) key biodiversity attributes; (ii) the other area-based management measures (e.g., MPAs) with which the OECM might develop synergy; (iii) the specific fishery within which the OECM would operate; (iv) the other fisheries with which its contribution to biodiversity conservation might have to be integrated; and (iv) the seascape or other regional framework within which the fishery operates and the OECM might have to be integrated (cf. **Section 6.4**).

5.3.4 Information on governance

It is important to check whether the governance process can be sustained in the long term and is also effectively participative, and likely to all that is realistically feasible to keep the OECMs in place and ensure its positive outcomes for the long-term. This important requirement might be satisfied by formal commitments, e.g., in fisheries conservation policies, Fisheries Acts, and official communications.

5.3.5 Expected outcomes

The outcomes expected from an OECM may be already observed or expected to occur in a foreseeable future[28]. For existing ABFMs, demonstrating *actual biodiversity outcomes* should be possible if relevant empirical local or scientific information has already been accumulated. For existing or newly planned ABFMs in which this information needed is not available yet, the claim about *future outcomes* may be supported by (in growing order of quality): (i) Formal statements of the Legitimate Authority (policies and strategies) regarding the intended biodiversity outcomes; (ii) Explicit objectives, targets and measures in

[28] The Decision uses an implict typology of outcomes related to: (i) their nature (biodiversity conservation, social economic, livelihoods), their direction (positive implicitly opposed to negative), their timing (actual/present, implicitly opposed to past or future), their relation to policy and management (intended versus unintended), and the way they are identified and, implicitly, their degree of ”certainty” (e.g., actual, presumably observed and measured versus predicted by modelling based on various sources of knowledge and expert views),

the FMP and other marine spatial plan for the area, following an ecosystem approach[29], and accounting for current or reasonably foreseeable threats[30]; (iii) Information from other areas (proxies) in which such outcomes were obtained in similar ecosystem with similar measures; and (iv) Results of ecosystem modelling, including Management Strategy Evaluations. The claim would also gain strength if it clear that a recurrent monitoring and evaluation system is in place to verify the intended outcomes during implementation.

5.3.6 Expertise needed

As stated in **Section 5.3.6**, the identification requires multidisciplinary expertise and may benefit from multiple forms of knowledge, in order to assess the fisheries, the ecosystem, the biodiversity attributes of the OECM and particularly those of concern, the external threats, the ecological, social, cultural, and economic values, etc. Some of the expertise needed will exist already in the fishery agency. However, collaborations typically will be needed: (i) with agencies in charge of biodiversity, to get additional expertise and/or to recognize their jurisdiction on the biodiversity attribute expected to benefit; and (ii) with social scientists to address human dimensions, particularly but not exclusively in small-scale fisheries. Many knowledge holders may wish to know the broad sequence of types of information that will be considered, both so they understand the context in which they will be asked to contribute their knowledge, and because they may wish to participate in key steps creating the context for or uses of the knowledge they contribute. This expertise can be used for the next two actions.

5.4 Quick screening to determine eligibility

The purpose of this step is increase the efficiency of the identification process, avoiding losing time and resources on ABFMs with low probability to be identified as OECMs.

Just like a scanner will run a fast, low-resolution scan before undertaking the full scan, this step, which is also non-explicit in The Decision, intends to figure out: (i) which set of ABFMs might be close enough to meet OECMs requirement to justify its fuller assessment (low-hanging fruits); and (ii) whether there is enough information available already to allow a fuller assessment?

Some repetition between this step and the following ones is therefore unavoidable. In practice however, the information gained in this step will help prepare, and greatly facilitate, the ensuing ones. The step might involve only a small team of expert with broad knowledge on fisheries and biodiversity assessment and on human and ecological dimensions of fisheries.

When undertaking a comprehensive assessment, the places where (ABFMs)[31] are in use may be very numerous in an EEZ (e.g., >1000 in Canada) and all can *a priori* all be considered in the identification process. However, only a small proportion of them is likely to satisfactorily meet the OECM criteria, as shown by **Petza et al. (2019)** in Greece, and by **Aften and Fuller (2019)** in Canada. Consequently, undertaking a full assessment on all of them would result in a loss of time and assessment resources. A preliminary quick screening considering the most "differentiating" criteria and basic or mandatory

[29] The Decision (Annex III, Criterion B). Guidance for implemeting the ecosystem approach under the CBD is found in Decisions V/6 (2000) and VII/11 (2004), and with respect to the ecosystem approach to fisheries, guidance is provided by FAO (2003a).

[30] CBD Decision 14/8 (2018), Annex III, Criterion C.

[31] See the CBD COP definition of ABFM in the Introduction. When referring to ABFMs in this document, depending on context, we may refer to their spatial definition (the area) or to the specific management measures applying within them such as access rules, catch and effort limitations, gear specifications, and special bycatch regulations.

properties of OECMs, intends to eliminate from the process the ABFMs less likely to be positively assessed, focusing available means on the full assessment of ABFMs with the highest potential to meet OECMs criteria (referred hereafter as "potential OECMs". Similarly, when considering an incremental approach, the selection of the "pilot" area is likely to emerge from a quick screening process.

The quick screening would check whether useful information, likely to be positive, is available for each Criterion and sub-criterion listed in **Table 3** and should stop when it is clear that (i) a mandatory criteria need is not fulfilled; or (2) key information is unavailable anywhere. It also offers an opportunity to set-up and experiment with the cooperation among scientists and other knowledge holders, identify key issues to be considered in the full assessment, identify useful sources of information and of additional expertise.

The quick screening process follows therefore the same pathway as the full assessment (criteria by criteria) but in much less detail, proceeding rapidly through Criteria A to C looking for a likelihood that the ABFM, under a deeper assessment would probably meet them. Failing to meet Criteria A (not being an MPA) stops the identification process. Failing to meet Criteria B1 (geographically defined) would impede the registration in the WCMC database but the problem should be easily corrected (eventually with the help of the WCMC Secretariat. For Criteria B2, B3 (on current and future threats), and Criteria C (on biodiversity values including ecosystem services), it would be sufficient to find out that there is enough positive information to assume that a fuller assessment is worthwhile. Steps 4 and 5, dealing with governance and management (Criteria B2 and B3) and with the nature and state of biodiversity attributes (Criteria C1 to C3) are fundamental as the OECM needs to be both rich in biodiversity and managed.

In well-endowed research and management environments, the quick screening could turn into a rapid full evaluation based on convergent expert(s) opinions, without the need to undertake any additional assessment (cf. examples in **ICES, 2021**). Comprehensive and rich sets of information (collated in Step 1) will greatly facilitate the Quick screening process (**Section 5.4**). Indeed, if the experts involved in the assessment are well informed about the requirements of OECMs, it is likely that steps 1 and 2 be undertaken interactively, as the amount of information found, or missing, points to the quick assessment conclusion.

When undertaking the quick-screening step, it is important to keep in mind what ABFMs are and what types of ABFMs are being used.

Decision 14/8 recognizes the potential role of area-based fisheries management measures (ABFMs) as potential OECMs and defines them as formally established, spatially defined fishery management and/or conservation measures, implemented to achieve one or more intended fishery outcomes (CBD 2018, Annex IV, B,2,c). Such intended outcomes are commonly primarily related to sustainable use of the target species of the fishery, such as the protection of their vulnerable life-stages or essential habitats, or to allocation of space and resources among fishing communities or sub-sectors. However, increasingly the intended outcomes can include protection or reduction of impact on biodiversity components, habitats, or ecosystem structure and function, such as closures of Vulnerable Marine Ecosystem (VMEs) or exclusion of small-mesh fisheries within the foraging range of seabird colonies.

The characteristics of ABFMs have three main dimensions: (1) Time, as the measures may be permanent, temporary, seasonal, real time); (2) Space, as they are usually precisely geo-localized but may also be mobile and dynamic, or redefined o moved as required by climate change; (3) Gears and practices which are regulated within the area to obtain the expected benefit for the target stocks or the non-target resources and habitat (cf. Rice and Garcia (2018) for details).

Some ABFMs may be considered as OECMs if they fulfil the requirements contained in Decision 14/8 regarding in-situ conservation objectives. Fisheries management agencies are increasingly specifying the objectives of their management plans explicitly (Mardle et al 2004, Hilborn 2007), but the practice is far from universal. Moreover, in such plans, specific objectives are usually referred to the fishery as a whole and not to the individual measures. Even when there are objectives for individual measures, these may not cover all the outcomes of such measures, and that are usually not retrospectively revised to cover all the additional contributions the measure may be making to conservation of biodiversity and sustainable use. Consequently, the ABFMs objectives alone are an incomplete guide to determine which ones could be considered as OECMs, without a careful evaluation, case-by-case.

5.5 Criterion A: The area is not currently recognized as a protected area

Criteria A indicates that (i) *the area it is not currently recognized or reported as a protected area or part of a protected area; and (ii) it may have been established for another function*.

The purpose of Criteria A is not explicitly stated in the Decision but could be: (i) to avoid adding confusion in the global MPAs database which already contains areas of uncertain status, and possible further divergence between national and international MPAs databases (see for example **Spalding et al, 2016**) ; and (ii) to avoid double counting when assessing the global coverage these areas in international instruments such as the Post 2020 Global Biodiversity Framework and the Sustainable Development Goals (SDGs).

5.5.1 The area is not an MPA (Aa)

This part of Criteria A has raised some unexpected confusion in experts' meetings. Contrary to what has been sometimes assumed, the assessors are not expected to assess whether the ABFM being considered as potential OECM meets MPA criteria and which MPA definition and guidance to use for such assessment. It only requires finding whether the ABFM has been already designated as an MPA, or a part of an MPA (e.g., as a buffer area), or whether it overlaps in part with an MPA and, most importantly, whether the whole or part of the potential OECM is already reported as an MPA in the WCMC protected areas database and accounted for in global area coverage figures.

It is important to note that, according to the WCMC User Manual for the World Database on OECMs (**UNEP-WCMC, 2019**) , potential OECM areas also *encompass areas that meet the definition of a protected area, in cases where the governance authority prefers the area to be considered an OECM [rather than an MPA]*.

The simplest way to address Criteria A would be to clarify the legal status of the area with the Legitimate Authority which has established it, ensuring that it has not been formally designated (e.g., by the Parliament), as an MPA. One should also check whether the area is listed as MPA in the WCMC World Database on Protected Areas (WCMC-WDPA), and hence potentially used already in the global coverage accounting. However, the WPDA contains numerous areas which are not accounted in the global coverage (e.g., biosphere reserves) (I. Meliane, pers. Com.). In addition, some areas (like Ramsar wetlands may not be considered MPAs by some States and not reported in their national statistics on protected areas, generating discrepancies between national and WCMC statistics. Conversely, some States report on the WPDA some Ramsar sites that do not meet the MPA management criteria. In some countries, however, designations of some types of areas (e.g., cultural areas) requires explicitly that they should not overlap with MPAs, formally resolving the issue (for example in Algeria; Imen Meliane, pers. com.).

When dealing with existing ABFMs, established under the authority of a fishery authority, the risk that the ABFM be already designated as an MPA is rather remote. However, the risk may exist for totally closed

ABFMs dedicated to biodiversity conservation. Finally, in case of overlap of a potential OECM with an MPA care will need to be taken to avoid double counting.

5.5.2 The area may have been established for other purposes (Ab)

This statement clearly states the fact that in OECMs, the conservation of biodiversity attributes is an important band necessary objective which, however, may not be the primary objective. The majority of ABFMs have had, historically, the conventional sustainability of the fishery (target stock maintenance and economic viability) as their primary and often sole objective. However, to be considered as OECMs, ABFMs have to produce, in addition, significant positive biodiversity outcomes (benefits). During the las two and half decades, however, with the growing development of the Ecosystem approach to fisheries (EAF), ABFMs have increasingly taken on explicit biodiversity conservation objectives, sometimes even as primary objectives. Objectives, both primary and secondary, are addressed in more detail in **Section 2.4.1, Principle (a)** and **Section 5.6** (Criteria B).

5.6 Criterion B: The area is governed and managed

Criterion B is sub-divided in three sub-criteria: the area is a geographically defined space (B1); the area has legitimate governance authorities (B2); and the area is managed (B3). Each sub-criteria is accompanied by suggestions of some elements of evidence to considered.

The purpose of Criterion B is to avoid "paper OECMs" identified for the sake of fulfilling international coverage targets with little positive impact on global conservation outcomes. The requirement of a formal governance and management also implies logically (and is argued by **IUCN WCPA, 2018**) that an area that is not governed and managed, even in a natural or near-natural state, cannot be identified as an OECM until it is formally delimited, identified and regulated by appropriate authorities.

Governance and management are two interconnected and partially overlapping levels of organization and activity : (1) the strategic level institutions, processes, policies, strategies, laws, rules; and oversight; and (2) the operational level management, regulations, measures, means, monitoring control and surveillance (MCS) and their implementation during the fishing operations. In both levels a degree of active stakeholder participation is recommended

Governance and management are central aspects of OECMs, second only to biodiversity conservation outcomes (addresses in Criteria C, **Section 5.7.1**). The subject is addressed all across Decision 14/8[32]. The concerns expressed are numerous and include: (i) many aspects of governance (e.g., legitimacy, diversity, equity, and collaboration) and management (systems, participation, effectiveness, ecosystem approach, threats, integration, long-term intent, information, performance evaluation, and cultural and other values. An implicit concern is also to avoid "paper OECMs", ensuring stewardship and enforcement.

Activities needed to check the ABFM against Criterion B are: (i) to ensure that the area is well geographically defined in terms of location area and depth (B1); (ii) The governance of the area is legitimate (B2); and a functional and effective management system is in place (B3). The task may be complex, particularly in multispecies multigear fisheries, under multiple jurisdictions, and unlike the preceding criteria, it demands a significant amount of information and competence on the fishery and on biodiversity frameworks.

[32] In the core text of the Decision (§1,4,7); in the definition itself (§2) and in all annexes, particularly Annexes II, III, and IV. In Annex III, the terms are used in Principles (g, h, j, and k) and in Criteria B2, B3, C1. C2, C4, and D2.

5.6.1 These sub-criteria and the elements of information they require are addressed in more detail and in that order in the following sections. The area is a geographically-defined space (B1)

This is a central requirement in Criteria B1 which specifies that *size and area are described, including in three dimensions where necessary.* This area may be geographically "defined" by its a set of geographical coordinates, a polygon, or a single point location (**UNEP-WCMC, 2019**). In the ocean, the delineation may be: (i) three-dimensional, including depth (as indicated in Criteria C1); (ii) static, at shallow depths or in the deep-sea bottom; and (iii) dynamic or mobile, when the boundary is attached to a moving oceanographic structure (e.g., current, front, gyre). In this case, the boundary may be described in quasi real-time by an algorithm (using satellite information) or a **move-on rule**. The third dimensions and the potential mobility raise some issues:

The vertical dimension of marine OECMs is important as most of the biodiversity biomass resides the water column and the ocean ecosystem is strongly stratified. Jurisdictions are also vertically stratified, e.g., over sea-bed mining areas, and extended continental shelves. However, vertical ecological connectivity is also important and the control of economic activities occurring at different depth in the same place is certainly not easy with existing means. As a consequence, the **IUCN-WCPA (2019)** has expressed *strong presumptions against vertical zoning of OECMs*, indicating a preference for the integration of the whole water column in the OECM definition, irrespective of the depth. This is not a requirement of Decision 14/8, however, and States may decide on a case-by-case basis.

The potentially dynamic aspect of OECMs is another issue, particularly but not only for pelagic ones. Mobile ABFMs exist, that move with the oceanographic features to which they are attached. They may move seasonally but also in the longer term – e.g., because of climate-driven changes– and the management measures move with them. The same might be possible with the biodiversity attributes of a dynamic OECM but in the absence of practical applications, the possibility remains theoretical for the moment. IUCN-WCPA (2019) suggests that *In exceptional circumstances, boundaries may be defined by physical features that move over time, such as … sea ice.*

5.6.2 Legitimate governance authorities are in place (B2)

The sub-criterion seeks to clarify whether: (i) The area has a legitimate authority (B2a); (ii) traditional governance is recognized and empowered, where relevant (B2b); (iii) governance can be considered "equitable" in line with the CBD Convention and The Decision's guidance (B2c; Section 2.11); and (iv) governance involves only one or many authorities (B2d).

These concerns are examined below:

a. Governance has Legitimate Authority (B2a).

The concern is that the institution dealing with OECMs should have the formal power and means needed to achieve in situ conservation of biodiversity within the area; to decide on identification, conservation objectives, and management options; to exert oversight; and to report to CBD and WCMC, directly or through the State as most appropriate.

The *de facto* and *de jure* Legitimate authorities in both UNCLOS and the CBD is the State Parties to these conventions, which may decide to recognize or mandate other institutions to act on their behalf.

The term "legitimate" is used in Annex II (§ B,8) in reference to "legitimate implementation"; in Annex II (§B,11,a) in reference to "legitimate representation" and in Principle (h) and Criterion B2, in reference to "legitimate authorities". However, the term is defined neither in the Convention nor in the Decision 14/8. According to dictionaries, a "legitimate" authority in an authority which is lawful, legal, established

or recognized by law, or by another body of rules and standards. It may also be derived from a right or status supported by tradition, custom, or accepted standards.

In fisheries, the Legitimate Authority entitled to establish and manage area-based management measures (fishery closures) to optimize the fishery or to reduce its collateral impact on non-target species and habitats, has always been the fishery authority. If the OECMs identified in fisheries are former ABFMs that produce significant broader biodiversity co-benefits while pursuing their conventional primary objective of fishery management, their dual objective, and the need to integrate the OECM within the fisheries management plan, would imply that the Legitimate Authority be the authority in charge of fisheries. It is important to note that, as an integral part of the fishery management plan and tool-box, OECMs would benefit from the existing national and international fishery governance and management frameworks, including monitoring and evaluation (**cf. Chapter 7**), and control and surveillance capacity, but also suffer from its eventual deficiencies. However, because of the obvious implications of OECMs for biodiversity conservation and related networks, such authority should collaborate, under the leadership and stewardship of the State, with the authorities managing other sectors whose activities may impact the OECM, including the authority in charge of conservation. Collaborations would require cross-sectoral, spatially integrated policy frameworks, nested the local to the regional levels, e.g., between RFMOs and Regional Seas Organizations (RSOs).

The legitimate Authority might be locally-based (in case of traditional or devolved management authority), national (centralized) , bilateral (for transboundary OECMs), and regional (e.g., in RFMOs). In cases when governance of fisheries is highly devolved so the "legitimate authorities" of OECMs are at local scales, some, or all aspects of OECM planning and identification might be conducted at higher governance levels to facilitate large-scale integration, but with full participation by the local "legitimate authorities".

Participation and empowerment of stakeholders are usually accepted as ways to increase the sense of legitimacy by stakeholders and, presumably, their sense of stewardship (see below).

b. Governance by Indigenous people and local communities (IPLCs) (B2b)

This sub-criterion states that *the governance by IPLCs is self-identified in accordance with national legislation and applicable international obligations* (B2b). IPLCs are mentioned 36 times in The Decision[33], underlining the importance attached by CBD parties to this issue.

The concern is to ensure a full participation in identification and governance of the OECM by the communities depending on the area (the OECM and the fisheries around it) for their livelihood, and hence likely most impacted by decisions.

The following sections address the issues of IPLCs, Free and Prior Informed Consent, and participative governance

iii. About IPLCs

The reference to Indigenous Peoples and Local Communities (IPLCs) is not very frequent in international fisheries literature, even though reference to coastal vulnerable communities and traditional management, knowledge and use rights, are common in the small-scale fisheries literature. The expression is much more frequently used in conservation. Article 8(j) of the CBD states that *each Party will, subject to its national legislation, respect, preserve and maintain knowledge, innovations, and practices of IPLCs, embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity, and promote their wider application with the approval, and involvement, of the holders*

[33] In the core text (paragraphs 4, 5, 6, 7, 10 and 11) as well as repeatedly in Annexes II, III and IV,

of such knowledge, innovations and practices, and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.

Given the complexity of human history and social organization, there can be no single definition for being "indigenous". The Convention on Biological Diversity does not define IPLCs. The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) does not adopt a universal definition for "indigenous peoples", and a definition is not recommended. The characteristics of indigenous peoples most accepted in the international framework include: self-identification as indigenous; descent from the occupants of a territory prior to an act of conquest; possession of a common history, language, and culture regulated by customary laws that are distinct from national cultures; possession of a common land; exclusion or marginalization from political decision-making; and claims for collective and sovereign rights that are unrecognized by the dominating and governing group(s) of the State. Of these, self-identification is central (**Anaya 1996; Mauro and Hardison, 1990**).

Governance by IPLCs is self-identified in accordance with national legislation and applicable international obligations. In general, governance by "legitimate authorities" : (i) reflects the equity considerations adopted in the Convention; (ii) may be by a single authority or several collaborative authorities; and (iii) provides the ability to address threats collectively (CBD Decision 14/8)

In marine capture fisheries, the IPLC issue is more likely to be relevant in EEZs and particularly in coastal rural areas (e.g., in LMMAs) than in deep-sea fisheries (except in areas with very narrow continental shelves) and in the High Sea.

iv. About self-identification

The concept of self-identification is referred to Principle (i) and Criteria B2, in connection to indigenous and local communities, the governance system within which the decisions are made and the specific measures they adopt. The right to self-determination implies that all peoples have the right to freely pursue their economic, social, and cultural development. Backing FPIC are the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Measures established by these communities may have a better probability to be efficiently enforced and complied with.

Criteria B2 reminds that such self-determination should be in accordance with national and international legislation , framing the right of indigenous (or local) communities to decide who is member of the "community" or excluded from it. In fact, the American Declaration of the Rights of Indigenous Peoples (2016) declares that the States shall respect the right to such self-identification as indigenous, individually, or collectively, in keeping with the practices and institutions of each indigenous people.

v. About FPIC

Identification of OECMs in areas under IPLC governance will need to respect the principle of Free and Prior Informed Consent (FPIC). This important governance principle is raised in Annex II (§6, §11), Annex III (in Principle (i) and paragraph (C,1, (iii)) and in Annex IV (§3).

FPIC is a specific right that pertains to indigenous peoples and is recognised in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and in line with the International Labour Organization Convention[34]. It allows IPLCs to give or withhold consent to a project that may affect them or their territories. Once they have given their consent, they can withdraw it at any stage. Furthermore, FPIC enables IPLCs to negotiate the conditions under which the project will be designed, implemented,

[34] https://www.un.org/development/desa/indigenouspeoples/publications/2016/10/free-prior-and-informed-consent-an-indigenous-peoples-right-and-a-good-practice-for-local-communities-fao/

monitored, and evaluated. This is also embedded within the universal Human Rights to self-determination (cf. the 2007 UN Declaration on the Rights of Indigenous Peoples). It follows that the agreement of Indigenous Peoples (specifically to establish OCMs in their territories) is free (obtained without coercion), prior (to any decision or start of activities), informed (with appropriate information) and consensual (collective decision of right holders through traditional decision-making processes (**FAO**; http://www.fao.org/indigenous-peoples/our-pillars/fpic/en/).

The FPIC principle raises numerous questions regarding implementation, such as: Which person or institution is entitled to provide consent for the community? Would community consent override individual rights of non-community members? How to resolve conflicts? Who are the best information providers; What documentation should be provided to the community? How far in advance? In what language? How can full awareness of the community be ensured? How can existing imbalances in power structures be addressed? How can local knowledge be used for communities' benefits? What appeal mechanisms may exist in case of violation of FPIC? (**UN ECOSOC. 2005**).

Effective consultation and participation to data collection, assessments, elaboration of advice, decision-making, implementation, and enforcement, with due respect to traditional rights and social structures, all contribute to attaining free, prior, and *informed* consent, even though the outcomes may not always please every community member. Often the issue may be best addressed under co-management schemes or pure community-based management.

vi. About types of governance

Beyond the specific issue regarding governance by IPLCs, Decision 14/8 (Annex II) is clearly intended to apply across a diversity of governance systems e.g.: (i) centralized at the State level, e.g., in a Ministry or Department; (ii) deconcentrated in peripheral State offices; or (iii) decentralized or locally devolved, e.g., to coastal communities and municipalities under co-management arrangement, or to IPLCs. Private governance is also considered in The Decision. However, in the ocean, the conditional exclusive use rights are allocated by UNCLOS to the States and are usually recognized as inalienable (cannot be taken away) and imprescriptible (do not decay with time). Conventional forms of property cannot usually exist in the ocean except in some exceptional circumstances and in the territorial sea where the forms of terrestrial property might be extended. These various forms of governance are important in terms of the process through which candidate OECMs are considered, assessed, and implemented.

In most cases, the available capacity for data collection and assessment of non-target resources will need to be upgraded and available budgets will be a constraint, particularly for small, low-value fisheries. Economies of scale might be possible addressing the OECM issue at ecosystem or EEZ level instead of at the single fishery level.

c. Governance reflects the equity considerations adopted in the Convention (B2c)

The concern is that costs and benefits of establishing the OECM be distributed among stakeholders in a way considered as fair as possible by them.

The Convention refers to the desirability of equitable benefit sharing (Preamble; Articles 1; 8j, 15.7). The Decision itself is a lot more explicit in referring to "equitable governance" to which Annex II is dedicated entirely. This type of governance is expected to follow "good governance" principles regarding the rule of law, participation, equity, etc. (**Graham, Amos and Plumtre, 2003**) developed by the United Nations Agencies and other organizations, and which should be adopted and applied irrespective of governance types. These "good governance" principles are referred to several times in The Decision Annex II (§ B9, B10, B12).

Equity is an emergent property of social-ecological systems which is hard to define and measure as an outcome. It may be considered as achieved when none of the stakeholders, with the available information, can conceive a better alternative acceptable to the others[35]. However, equity may be dynamically and approximately achieved through an "equitable" governance process. The Decision facilitates the task by indicating that equitable governance requires (i) formal recognition (of rights, identities, and values) of the people concerned; and (ii) inclusive procedures for communication, participation, and decision-making; which, together are assumed to lead to (iii) an equitable distribution of costs and benefits among actors. In an equitable governance system, decisions are taken and implemented legitimately, competently, inclusively, fairly, with a sense of vision, accountably and respecting rights (from CBD Decision 14/8, **Annex II,B,8**). Equity will be "felt" when consensus among all relevant stakeholders is reached.

d. Governance may be by a single authority or collaborative (B2d)

This element of evidence indicates that *the governance may be by a single authority and/or organization or through collaboration among relevant authorities and provides the ability to address threats collectively*.

As already mentioned above (under legitimate authority) the dual objectives of OECMs mainstreamed in economic sectors imply some collaboration to deal effectively and efficiently. Collaboration will be particularly important (and complex) for cross-sectoral, transboundary or high seas OECMs. This collaboration may be materialized by Letters of Intent (LOIs), Memoranda of Understanding (MOUs) or stronger institutional agreements. It may lead to joint scientific surveys, monitoring, inter-operable databases, working groups (for identification or performance assessment), advisory committees and, ideally, decision-making processes. Experience in that important and often mentioned governance issue (and challenge) is very often mentioned, but rarely satisfactory.

RFMOs and RSOs offer already functional collaborative frameworks and relations between these two types of organisations is growing (e.g., in the North Atlantic and the Mediterranean). In the North Atlantic in particular, the RFMOs (NEAFC, NAFO) and the RSOs (OSPAR, HELCOM) all have access to the same international scientific organization (ICES) to obtain assessments and advice regarding both fisheries and the environment (**ICES, 2021**).

The element of evidence also suggests that such collaborations would help addressing threats both current and future] collectively.

The issue of "threats" which is also briefly mentioned in (B3d) is addressed more substantially by The Decision in Sub-criteria (C1b) and (C1c) (**Section 5.7.2**).

5.6.3 The OECMs are managed (B3)

The sub-criterion intends to clarify whether: (i) *the area is managed in ways that achieve positive and sustained outcomes for the conservation of biological diversity* (B3a); (ii) *relevant authorities and stakeholders are identified and involved in management* (B3b); (iii) *an effective management system is in*

[35] A state referred to in academic works as Pareto efficiency (e.g. Jacobsen et al, 2016) or Nash equilibrium. Based on the game theory the Nash equilibrium is a theoretical state in which no stakeholder, with the available knowledge of the situation, has any incentive to change it (see for example **Plank et al. 2016**) The Pareto efficiency or optimality is a situation where no individual can be better off without making at least one other individual worse off or without any loss thereof. In reality, the "equilibrium" implied is as dynamic as the complex ecological, social and economic environment within which it is (temporarily) established.

place (B3c); (iv) m*anagement is consistent with the ecosystem approach, including the ability to manage a new threat* (B3d).

These elements are addressed below. We will note, however, that a more logical order for the sub-criteria would have been to consider First, the overall management system or set-up (B3c); Second, specify the authorities concerned and the stakeholders identifies (B3b); Third, the detailed measures in place (B3a); and, finally, the coherence with the Ecosystem Approach (B3d). Nonetheless, we will follow the list of sub-criteria as given in the Decision.

It should b be noted that the sub-criterion B3, which is focused on management, does not mention the need to identify the current and future threats to be managed (controlled, reduced, eliminated). It does refer to "threats" in B2d and B3d but the need to undertake a threat assessment is strangely peripheral in the central management criterion. To some extent, threats are more thoroughly addressed in C1b and C1c.

a. The area is managed in ways that achieve positive and sustained outcomes for conservation of biodiversity (B3a)

We should note that this consideration is practically identical to (C1a) that will be considered in **Section (5.7.2)** adding that the area "*achieves or is intended to achieve*" the expected outcomes. Th the implications are that (i) the area should be managed (unmanaged natural areas are not eligible); (ii) the ways the area is managed (e.g., the management process and measures) lead or are likely to lead to the intended positive biodiversity outcomes. However, from that angle, it would seem to duplicate Criteria C1 which has clearly the same intent. As the entire sub-criteria (B3), and all considerations therein are regarding management operations, while (C1) is focussed on biodiversity outcomes of these operations, a logical interpretation and allocation of tasks, would be that, following that dichotomy, (B3a) is more about describing the ways the potential OECM would be managed to achieve the management objectives while (C1a) would focus more on the biodiversity outcomes of the measures. Similarly, the issues dealt with in Criteria D (EFSs, and other locally relevant values) are relevant in both (B) and (C) and cannot be left aside for the end of the process.

With the above understanding, under (B3a), the assessment team produces an inventory of the specific measures in place or planned in the OECM (e.g., access rules, gear controls, authorized practices, control, and surveillance); and (ii) to specify what are their expected biodiversity outcomes. This information should be shared with the assessors dealing with C1c.

This cannot really be done without having established, first, a list of threats to be addressed with these measures and second, having established what are the objectives assigned to the OECM

i. Inventory of measures to address current and future threats on biodiversity

This is particularly important for the possible enhancement of the OECM performance on biodiversity, and should focus on the most "significant" opportunities with potentially highest return on investment, lowest cost/benefits ratios without, however, neglecting "low hanging fruits". This requires collecting information on the potential effectiveness of such measures on the biodiversity attributes identified as priorities in **Section (5.7.2, a)** and to propose potentially effective measures, illustrating their purpose, likely impact, likely cost, and factors known to often impede or promote their effectiveness. These elements are important to consider when deciding whether additional measures could effectively and efficiently be added to the potential OECM.

ii. Designing contingency plans and decision rules, and applying precaution

This should be done to the fullest extent appropriate (**FAO, 1996**), balancing risks of misses and false alarms. Data scarcity and management difficulties call for raising the level of precaution in the risk management framework. Advice could also be developed on ways to integrate the action across fisheries and within the ecosystem (to prepare the integration addressed in **Chapter 6**).

iii. Advising on the improvements eventually needed in the existing MER

Improving the capacity of the OECM to "achieve" its objectives may require strengthening the capacity to monitor the biodiversity attributes' evolution in the OECM, and evaluate specifically the performance of the measures applied into and around it (cf. **Chapter 7** for details) and also to ensure the long-term intent of the OECM.

iv. Integrating the OECM in the management plan

Like any ABFM, an OECM is not likely to be managed alone, with its own management plan, system of surveillance, etc. The OECM objectives (primary and secondary) and special technical measures applied in it (e.g., regulating access, gears, and practices) should be integrated in the fishery management plan of the fisheries in which it applies. Its control and surveillance would be integrated in the one conducted for the whole area covered by the fishery. The expected positive conservation outcomes should be described in the management plan together with any special monitoring and evaluation system in place.

The issue of "effectiveness" is also addressed in **Section 5.7.2** (Criteria C1)

b. Relevant authorities and stakeholders are identified and involved (B3b)

The issue of "relevant authorities" is already addressed in **Section 5.6.2** (sub-criterion B2) and will not be addressed here.

"Stakeholders" and "right-holders" or "right owners" are referred to in several places across The Decision. In ***Annex II (B, 9, footnote 23****),* they are defined as follows: *In the context of protected areas, "rights holders" are actors with legal or customary rights to natural resources and land, in accordance with national legislation. "Stakeholders" are actors with interest and concerns over natural resources and land*
In addition, in **Annex (IV, C, 2)** which is dedicated to the subject, it is suggested that : (i) relevant rights-holders and stakeholders should be identified, considering livelihoods, cultural and spiritual specificities at various scales; (ii) communities of practice and rights-holder and stakeholder networks should be developed and fostered to facilitate mutual learning and exchange, and also to support governance, monitoring, enforcement, reporting and assessment; (iii) a common understanding should be developed across rights-holders and stakeholders regarding the objectives and expected outcomes of OECMs; and (iv) social and communication skills of managers and practitioners of OECMs could be fostered and strengthened.

It is obvious that right-holders are stakeholders but all stakeholders are not right-holders. The latter are those stakeholders who (1) are directly and concretely impacted by conservation measures implemented on their property or effecting their use-rights and livelihoods. The Decision also contains several references to "rights" such as *Human Rights, rights of IPLCs, legal or customary rights*, that should be respected[36]. The extent to which the other stakeholders are affected by decisions is extremely variable and depends inter alia on whether they live (i) in the same community (household, village, ethnic group, municipality) and may be affected by trade-offs and allocation of costs and benefits within the community,

[36] Cf. In Annex II, paragraphs (I, 2 and 6; II, B, 8, 9, and 11a)

or (ii) far away from the resources, in the country or far abroad, sharing little or nothing else than "concern" for conservation and existence values.

Fishing operators may be formal holders of modern access rights and use rights (e.g., individual, or communal; transferable or not) as well as traditional rights holders (including management rights) on which their livelihood is often totally dependent. In many areas, however, traditional rights have been progressively cancelled or neglected by States, threatening both the livelihood and cultural conservation. In many fisheries systems, however, re-establishing or recognizing these rights is seen as a necessary incentive to promote effective co-management or community-based management and conservation.

c. A management system is in place (B3c)

Management systems are mentioned only twice in The Decision, with no further detail. Based on our experience in fisheries management, a management system would be the complex web of institutions and instruments that are involved in management. These may include the following elements: (i) the legitimate management authority; (ii) the dedicated legislation (e.g., Fisheries Act) and measures; (iii) supporting services (e.g., in charge of statistics; resources, economic and other assessments; monitoring control and surveillance; auditing, and communication); (iv) the oversight and advisory bodies; (v) the stakeholders; (vi) the network of collaborations, e.g., with environmental agencies, for enhanced biodiversity assessments; (vii) the Navy and coast guards, for control, surveillance, interception and arrest; and the judicial institutions (for trials). The "system" might also include the processes that connect all these elements, including the performance assessment of the system itself.

The system may be quite complex in countries with large and diversified EEZs (as USA, France, Australia) but much simpler in Small Island Developing States (SIDS) and, at a lower level, in coastal communities and IPLCs. This may be the reason why The Decision does not establish any standard for the management system.

The minimum that could be considered for a functional management system to effectively "*contributes to sustaining in-situ biodiversity conservation* (as stated in B3d) would probably be that: (1) there is a Legitimate Authority; (2) there is at least a unit in charge of management; (3) biodiversity-related objectives and possibly targets exist; (4) there are specific measures in place; (4) the measures are enforced; and (5) there is some more or less regular and formal monitoring allowing performance evaluation.

Ideally, this general information about the management system should be considered first, before getting into the more operational details.

d. Management is consistent with the ecosystem approach with the ability to adapt to achieve expected biodiversity conservation outcomes, including long-term outcomes, and including the ability to manage a new threat (B3d).

This element refers to two interconnected approaches to management, the ecosystem approach and the adaptive approach. The Ecosystem Approach to Fisheries (EAF) (**FAO 2003**) explicitly includes the precautionary approach (**FAO 1996**) which requires an adaptive approach to respond to uncertainties, including emerging *new threats*. Therefore, in OECMs used in well-managed fisheries, the existing framework in which ABFMs are used already includes this requirement, even though implementation. In practice has been rather incomplete and slow.

i. About the ecosystem approach

From a biodiversity conservation angle, al lot of guidance is already available on the Ecosystem Approach to conservation. e **CBD (2004)** and from IUCN (**Shepherd, 2004, 2008**). For the CBD, the ecosystem approach is fundamental. It is *a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Thus, the application of the ecosystem approach will help to reach a balance of the three objectives of the Convention: conservation; sustainable use; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.* Furthermore, *the ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It also recognizes that humans, with their cultural diversity, are an integral component of many ecosystems … It was understood that in applying the ecosystem approach, all principles need to be considered, with appropriate weight given to each, in accordance with local conditions*. The CBD Ecosystem Approach is based on 12 principles and offers significant guidance (**CBD, 2004:6**). The IUCN guidance follows the 12 CBD Principles and offers illustrations of the EA Principles application through case studies, and promotes adaptive management. . It also stresses that *it is never enough to consider only protected areas (PAs) when planning conservation. Other adjacent areas need to be taken into account, and not just the buffer zone. The sustainable interaction of people and biodiversity can only be developed in a larger ecosystem area, and the ecosystem approach encourages both a larger vision on the ground and an exploration of interconnections.*

From a fisheries point of view, the Ecosystem Approach to Fisheries (**Garcia et al, 2003**) has been formalized in FAO Technical Guidelines (**FAO, 2003**), progressively implemented, and evaluated (**Garcia and Cochrane, 2005**; **Sanchirico et al, 2008**; **Garcia, 2009; Link, 2010**). While obvious progress has ben made in many areas (reducing bycatch of protected and other vulnerable species, and impact on vulnerable ecosystems and essential habitats) and adapting the criteria for eco-certification (MSC reference) progress is very slow in many developing countries and in some RFMOs.

ii. About adaptive management

Adaptive management of fisheries was advocated mor then half a century ago (**Walters and Hilborn, 1976; Ludwig and Hilborn, 1983**). In advanced management systems, adaptive management has been the rule for decades with management targets revised every year, based on fisheries outcomes. The approach gained new momentum with the adoption of the precautionary approach, following UNCED, in the early 1990s. Most well-developed fisheries management systems have already adopted and implement a precautionary approach as part of their adaptive approach and de facto both are an integral part of the ecosystem approach. In these systems, the approaches are applied to the fishery target species as well as to some non-target species for which special protection or recovery plans have been developed. In the last two decades, the closure of VMEs can be also seen as a precautionary measure. Precautionary adaptive management is still very rarely practiced in the developing world and possibly never in small-scale fisheries, because of limited governance capacity and objective operational difficulties.

Adaptive management should have the ability to anticipate and detect and respond to new emerging threats to biodiversity (see below).

iii. About threats

A central concern across both Criteria B and C is the risk assessment and management capacity needed to detect and address the forces presently impacting biodiversity, or likely to impact it in a foreseeable future. In its Principles, Criteria and additional voluntary guidance, The Decision frequently refers to

"*threats" to the components of biodiversity*, without defining "threats". These "threats" are qualified as *existing, current, new, potential, anticipated, pervasive*. They need to be *managed, prevented, reduced, eliminated, addressed collectively… using policy and regulations*. "Threats" could therefore be understood as the current (or future) "forces" that are (or might be) exerted on biodiversity components. However, the Decision refers also *to current threats to biodiversity and potential threats from new and emerging pressures* (Annex IV, C,1, a) which would instead indicate that "threats" are "impacts" resulting from "pressures". However, this last interpretation would not be in line with the CBD Glossary[37] which –under "Drivers of biodiversity loss"– lists the following "*threats to biodiversity"*: demography, urban development, overexploitation, pollution, climate change and invasive species, apparently equating "drivers" and "threats*".*[38]

In order to maintain coherence between this document and The Decision we will therefore refer essentially to "threats", current and future, and use "pressure" only when the use of this term is well established (e.g., when referring to "fishing pressure"). The difference between current and future threats is important for management as the ways to deal with them and the degree of urgency are necessarily different.

The clear intent of The Decision and of this step is to (i) identify the threats, either current or reasonably anticipated that affect or will affect biodiversity in the exploited ecosystem and (ii) to provide evidence that the potential OECMs (with the technical measures taken inside and around them) have a reasonably documented capacity to reduce or eliminate the related risks that both pressures and threats represent for biodiversity conservation. The magnitude of the impacts and the resulting risks depend on the nature and intensity of the anthropogenic or natural forces involved, and on how they are or will be managed[39].

The Decision refers specifically to "risk" only two times (in Annex I, I, 4 and Annex I, II, B, a), in both cases referring to "risk reduction". The risk attached to a given threat may be estimated in economic terms by multiplying the cost of its expected damage by the probability that it materialises. The limitations of this approach to quantifying "risk" are coming increasingly into focus as there can be threats to aspects of biodiversity providing social, cultural, spiritual, identity and relational benefits to people, the values of which may not always be captured with be usual economic metrics (**Pascual et al., 2017**).

iv. Inventory of current and potential threats

A first inventory of current and potential threats on biodiversity attributes of concern will aim to identify their nature, source, and scale. Current threats may come from the fishery in which the potential OECM is currently operating, or from other fisheries in or around it e.g., through overexploitation, bycatch or destructive fishing practices on vulnerable habitats. They may also originate in other economic sectors of activity, marine or land-based, or from climatic oscillations and change. Current threats (and potentially also future threats) add mortality, reduce biomass, and possibly modify species composition and ecosystem structure, productivity, reproduction potential, and resilience to environmental oscillations and change. If they emerge from the fishery sector, threats may be directly controlled with management plan and measures. If not, they will require collaborative management across sectors. Threats may emerge from the future evolution of the specific fishery, the fishery sector, other economic sectors, or other overarching drivers, and require a precautionary approach to management (e.g., taking measures that may reduce the probability or risk attached to a threat), and the elaboration of contingency plans (to

[37] Accessible at https://www.cbd.int/cepa/toolkit/2008/doc/CBD-Toolkit-Glossaries.pdf

[38] see also http://www.archives.biodiv.be/biodiversity/threats.

implement when the threat materializes). Climate change, like many drivers, already generates current threats on biodiversity, with noticeable impacts such as displacement of stocks and coral bleaching. It also generates potential additional "threats" as it increases with time, increasing future risks if not mitigated or reversed in time. The same applies to some extent to the demography driver.

It would be useful to rank the threats by order of assessed or assumed importance and to collect information about their trends. For benthic habitats and species, the most obvious threat is bottom trawling and measures may be needed to reduce bottom impact (Changing gears) or eliminating this technique from the OECM. This is often the measure adopted in VMEs. Complementary measures might be needed for control and surveillance, and for monitoring of biodiversity trends.

5.7 Criterion C: The area achieves a sustained and effective contribution to in-situ conservation of biodiversity

Criterion C states that the area *achieves sustained and effective contribution to in situ conservation of biodiversity.* It is sub-divided in 4 sub-criteria which, for a logical assessment process, could preferably logically re-ordered as follows: First, identify what the important biodiversity attributes are in the area (C3); Second, assess the state of these attributes and the measures in place to confirm that the expected outcomes are –or are likely to be– achieved (C1); Third, confirm that these benefits are –or are likely to be– maintained for the long-term (C2); and Fourth, confirm the existence of a monitoring and information management system for long-term assessment and adaptive management (C4).

These sub-criteria and the elements of information they require are addressed in more detail and in that order below.

5.7.1 In-situ conservation of biodiversity (C3)

This sub-criterion is entirely dedicated to one important consideration: the *identification of the range of biodiversity attributes for which the site is considered* important and suggests considering e.g.: biodiversity hot spots; *communities of rare, threatened or endangered species[40]; representative natural ecosystems; range-restricted species; key biodiversity areas [KBAs]; areas providing critical ecosystem functions and services[41]; and areas for ecological connectivity.*

In addition, the Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment (COP Decision VIII/28; **CBD, 2006**) call for priority to be given also to the protection of declining or endemic ecosystems; habitats that are unique or play a vital role in supporting seasonal or migrant species; endemic or declining species; species of known use or cultural value to society; and irreplaceable biodiversity which cannot be found anywhere else. OECMs may also : (i) serve as "stepping-stones or corridors between key habitats; (ii) provide support for different life history stages and functions of threatened species; or (iii) provide buffer zones to mitigate sectoral impacts. **CBD (2006)** also highlights that priority can also be given to opportunities to enhance biodiversity through restoring, re-creating, or rehabilitating natural habitat and to full compensation of unavoidable negative impacts on biodiversity (no Net Loss), in line with the Biodiversity Impact Mitigation (BIM) hierarchy[42] (**BBOP, 2012; ten Kate and Crowe, 2014).**

[40] As available in the IUCN Red List of Threatened Species.

[41] EFSs are addressed in Section 6.7, Criterion D.

[42] The use of the Mitigation hierarchy is mentioned in Annex IV (Section C5e). Within the BIM, the use of compensatory offsets has been controversial. It has been argued that UNCLOS implicitly prohibits the use of compensatoy offsets for target and non-target species which all need to be maintained or rebuilt at least to their MSY

Furthermore, maintenance of ecosystem functions and services (EFS) are important benefits for ecosystems and their and biodiversity (e.g., in terms of productivity and resilience) and for human populations (in terms of life support). The first are relevant for the OECM objectives while the second are relevant for the ABFM objectives. While win-win solutions may exist, trade-offs may also have to be considered that may question the validity of the identification or the area as OECM or as ABFM

The concept of ”in-situ conservation of biodiversity” is central for OECMs. It is referred to in the formal definition of OECMs and in Annexes II (§ 5 and 7) and, abundantly, in Annex III, in Principle (c) and Criteria B2, B3, C, C1, C3, and D2. Some considerations about the terms used in the Sub-criterion are proposed below.

a. About biodiversity attributes of concern

The Decision refers in general to biodiversity “attributes”, for what terms like “features” or “elements” or “components” might be used. In this document, we use the term “attributes” for coherence with The elements of biodiversity other than the target species, present in the OECM, that are: (1) impacted by fishing operations and for which conservation measures are required to eliminate, reduce, mitigate the impact, and eventually restore healthy conditions; or (2) identified by a mandated agency, or widely supported social process, as a conservation priority, e.g., listed as endangered, threatened or protected in national or international legislation. If biodiversity attributes of concern for the fishery were also impacted in the same area by other sectors, this should be documented as much as possible.

b. About ”In situ”.

"In-situ conservation' is defined in Article 2 of the CBD. For capture fisheries, the relevant part of the definition says that ”*in-situ*” conservation is the *conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings...* In capture fisheries, the conservation (maintenance and recovery) of wild target and non-target species, as well as the protection of essential fish habitats (e.g., mangroves, seagrass and algal beds) is always *in-situ*. In some cases e.g., for anadromous species like salmon or sturgeon, their conservation may involves a combination of *in-situ* and *ex-situ* management of the related culture-based marine fisheries (ocean ranching) in which land-based artificial nurseries are used to enhance stocks’ productivity in the wild. Stock enhancement is more widespread in coastal lagoons, lakes, and flood plains (**FAO, 1989; NACA-FAO, 2000**).

c. About ”conservation”

In general, the term ”conservation” covers a range of restrictions of human activities, from preservation (no-use) to sustainable use (as defined in the CBD). In addition, the definition of *in-situ* conservation makes it clear that, such conservation should follow an ecosystem approach and promote both natural features of the habitat and viable populations of species characteristic of those habitats. This definition does not necessarily require pristine habitats and populations at completely un-impacted states. It does require that the habitats have all “natural” features and are not undergoing degradation, and that the populations of the characteristic species either be viable or recovered if they are depleted.

IUCN-WCPA (2019) identifies three types of conservation based on the priority it has in the OECM: (i) *Primary conservation*, when biodiversity conservation are intended and are primary objective of the management measures. This is often the case in deep-sea fisheries Vulnerable Marine Ecosystems; (ii) *Secondary conservation* when such conservation benefits are also intended but only as a secondary objective and supported by specific measures; and (iii) *Ancillary conservation*, when the known

level (**Squires and Garcia; 2018**).

biodiversity benefits produced are not an objective, are were therefore unintended, and produced as a co-benefit of the primary management measures aiming at another objective. OECMs used in fisheries may produce the any of the three types of conservation, but more frequently to types (2) and (3).

5.7.2 Effective (C1)

The terms "*effective*" and "*effectiveness*" are used in the OECM definition, in Principles (d), (i) and (j), and in Criteria C1 and C4 illustrating the fact that "effectiveness" is important determining factor for OECMs identification and peformance assessment. There is also a stong overlap in this respect between C1, C4 and B3 even though the term "effective" is not explicitly used in the latter, – because they all refer to the potential OECM capacity or expectation to *achieve positive and sustained biodiversity outcomes,* which is a definition of their "effectiveness".

The biodiversity attributes of the potential OECM, particularly the attributes of concern for the fishery sector, have been already listed in the preceding **Section 5.7.1 (Sub-criterion C3**). Knowing that these attributes exist in the potential OECM is useful. Showing in what state they are and possibly how they are evolving would be much better would reflect better the OECM effectiveness.

As a matter of fact, the elements of evidence listed **Table 3**, suggest to check whether: (i) *the area achieves, or is expected to achieve, positive and sustained outcomes for the in-situ conservation of biodiversity; (ii) threats, existing or reasonably anticipated ones, are addressed effectively by preventing, significantly reducing or eliminating them, and by restoring degraded ecosystems; (iii) mechanisms, such as policy frameworks and regulations, are in place to recognize and respond to new threats; and (iv) to the extent relevant and possible, [whether] management inside and outside the OECM is integrated.*

The various elements of evidence suggested in support of Criteria C1 are examined below.

e. The area achieves, or is expected to achieve, positive and sustained outcomes for the in-situ conservation of biodiversity (C1a)

This element has significant implications in terms of evidence to be provided. It would be obviously impossible to demonstrate in this element of evidence, the positive outcomes achieved for biodiversity attributes, if such attributes had not been identified in the preceding step, inversing the order of C1 and C3. The specific achievements of the OECM are likely to be different for different biodiversity attributes. They may be positive for predators and simultaneously negative for their preys (trophic cascades). They will be obtained more rapidly for short-lived species than for long-lived ones. Both of these evolutions may be partially obscured by environmental oscillations and change that may also be positive or negative, important, or marginal, depending on the attributes concerned.

Showing that the potential OECM produces (or can be expected to produce) positive and sustained biodiversity outcomes implies to know what these outcomes currently are (or can be expected to be).

The assessment of biodiversity outcomes may be more or less complex depending on the number and nature of biodiversity attributes to be considered. Cooperation between experts in fisheries and marine ecology and conservation will be essential. The assessment of current and future benefits may require very similar data, methods, and competences, and could probably be undertaken in parallel or jointly. The methodology potentially available is briefly mentioned in **Section 5.2.8**.

What the current positive outcomes are may be shown by: (i) an inventory of the biodiversity attributes of concern (now available in C3, **Section 5.7.1**); (ii) an assessment of their state and trends in relation to the current threats; and (iii) a description of the measures in place (available in B3a, **Section 6.5.3a**) with their contribution to the present situation (observed or intended outcomes).

What these outcomes might be in the future requires description of : (i) the likely future changes in nature or intensity of threats; (ii) the likely consequences on biodiversity attributes and eventual new concerns[43]; (iii) desirable and possible improvements in the management regime of the OECM and, as appropriate, in the fishery), including the additional measures needed to obtain such improvement; and (iv) some foresight of the new expected outcomes from such measures, with some indications of costs and benefit to biodiversity attributes and to stakeholders.

Some of these activities are discussed further below.

i. State and trends in biodiversity outcomes

The state and trends of the biodiversity attributes of concern detected in an OECM (cf. **Section 5.7.2**) may be positive or negative at the time of the identification, depending on the evolution of the environmental or human factors driving them, including the management and conservation measures that have been applied in the OECM. Their assessment is therefore very relevant for the identification of the OECM, its present or future contribution to positive biodiversity outcomes, and the management regime to be applied inside and around it, to maintain or improve these outcomes.

If the potential OECM is an existing ABFM, it was established to maintain or rebuild stocks (if overfished) at their maximum level of productivity (MSY), e.g. protecting its juvenile or spawning stocks and their essential habitats. While so doing, the ABFMs and the technical measures applied in it may also produce broader positive biodiversity outcomes for associated and dependent species and habitats (and more generally for the biodiversity attributes of concern). These benefits may have been intended or unintended when they were established, and hence reflected or not in the initial ABFM objectives[44]. Increasingly, however, some ABFMs are being established with the primary objective to protect essential habitats (like seagrass beds or vulnerable marine ecosystems, VMEs) from Significant Adverse Impacts and, principally from bottom-impacting gear.

There are many approaches and methods to assess the states and trends of the biodiversity outcomes of concern are in a potential OECM (and any totally or partially protected area) both in data-rich and data-limited situations. The abundant literature on methods used to assess the impacts of MPAs on biodiversity, for example, is also relevant for OECMs, particularly the literature relating MPAs and fisheries (e.g., **Alban, Boncoeur and Roncin, 2011; Garcia, Boncoeur and Gascuel, 2013; Todd, Stevenson and Tissot, 2013; Affllerbach et al., 2014; Weigel et al., 2014; Sciberras et al., 2015; Sadio et al., 2015; Fulton et al., 2015; Russi et al., 2016; Ban et al., 2017; Ward, Heinmenan and Evans, 2019; Leite et al., 2019**).

ii. Benefits and co-benefits

The terms "benefits" and "co-benefits" are often used when referring to positive outcomes of management measures. IUCN defines conservation "benefit" as : *An ecosystem value that provides direct gains or advantages to stakeholders, in terms of money earned, subsistence resources collected, or less tangible gains such as spiritual peace or mental wellbeing*." (**Ivanic et al., 2020**). The Decision uses this term in line with this definition, referring to *socioeconomic costs and benefits*, *benefit sharing*, etc. However, it also refers to *clear benefits to biodiversity conservation* (**Annex III, A, c**) as well as to *social and ecological benefits* (Principle (k)). The Decision also states that OECMs' *contribution to in-situ*

[43] Some of the changes might be positive.

[44] The Decision states that it is desirable that all benefits, intended and previously unintended, be listed as objectives, so that all important positive biodiversity outcomes appear as intended and relevant when assessing efectiveness.

conservation of biodiversity is a co-benefit of their primary intended management objectives, and that they should become a recognized objective of OECM management (**Decision 14/8, Annex III, C, 1, d**).

In this document we may refer, therefore, to *intended positive biodiversity outcomes* as "biodiversity benefits" and to unintended ones "as biodiversity co-benefits". In line with the Biodiversity Impact Mitigation (BIM) hierarchy (**ten Kate and Crowe, 2014**), biodiversity benefits (or positive outcomes) may include maintenance or increase in biomass, abundance, and diversity of biodiversity[45], as well as protection or recovery of vulnerable habitats and ecosystems, contributing to No Net Loss, or Net Gain in biodiversity attributes. Benefits may also include reduction of threats and risk of biodiversity loss, e.g., reducing the potential damage and/or the likelihood that the threat materializes and, possibly, compensations for habitats losses[46],.

iii. Potential biodiversity benefits of conservation measures

Management measures applying inside and around an ABFM and OECM might include rules of access to, and removal of biodiversity; regulation of gears and practices; controls on landings and trade; and economic incentives and disincentives. They need to be described with their intended positive outcomes, and should have already been described in **Section 5.6.3** on management **(Sub-criterion B3).** However, in complex social-ecological systems, accurately measuring such outcomes and establishing unequivocal cause-effect relationship between an observed outcome and one specific measure is often a challenge

Knowing what the states of the biodiversity attributes of concern are, assessing the outcomes of single measures in complex social-ecological systems like fisheries in which a web of measures operate jointly in a constantly changing environment, affecting numerous linked biodiversity items, is a real challenge, even in data-rich environments with high scientific capacity. This difficulty is a reason to make data-limited "evaluations", subject to re-evaluations as soon as possible, as actively collected new data become available. Pending a more convincing demonstration of positive outcomes, deterrent enforcement and established decreases in current threats would be precautionary. Evidence of a reduction in the probability of future threats or of their foreseeable impact (risk) could also be considered as positive outcome

It may be useful to underline the fact that, when an ABFM is found to already meet the OECM criteria with its existing historical contribution to broad biodiversity attributes, such contribution will likely continue under the OECM new status (No Net Loss). The ABFM identification and reporting as an OECM recognizes its previously ignored biodiversity contribution to biodiversity conservation and increases the global coverage of conservation measures. However, it may further increase its global conservation efforts and benefits (Net Gain) only if identification is accompanied by the introduction of additional conservation measures, increasing or producing new positive biodiversity outcomes.

The state of the biodiversity attributes in a potential OECMs, depends on the intensity of the threats under which they have been, and currently are, as well as on the effectiveness of the measures being currently applied inside and outside the OECM boundary.

The potential impacts of fisheries on biodiversity attributes have been abundantly described (e.g., in **Goñi, 1998; Jennings and Kaiser, 1998; Kaiser et al, 2003; Chuenpagdee et al., 2003; FAO, 2008; Zhou and Griffith, 2008; Zhou et al., 2011; Gascuel et al., 2016; Piroddi et al., 2017; Zhou and Smith, 2017**). These studies generally address together the threats and their impacts, establishing connections that can be

[45] A dilema might emerge if, for example, biomass increases as diversity decreases.

[46] Recognizing that the issue of "offsets" is controversial.

used to infer the type of measures that might be needed to avoid, reduce, or mitigate the impact of a specific threat. It is important, however, to avoid generalization and examine these relations case-by-case, in the local context.

iv. Identification of indicators, reference values, and benchmarks

It would also be useful to qualify the severity of the impact of fishing on biodiversity (between zero impact and serious damage), to better appreciate the potential value of an OECM. However, no general scale of severity is available, comparable to those used for hurricanes or earthquakes. However, both the UN Resolution 61/105 (in 2006), the International Guidelines for the Management of Deep-sea Fisheries in the High Seas (**FAO, 2009)** and the CBD Aichi Target 6 (in 2010) refer to the need to avoid Significant Adverse Impacts (SAIs) (see details in **Section 5.7.2 (v)**

SAIs are defined as impacts that compromise ecosystem integrity i.e., ecosystem structure and function, in a manner that: (i) impairs the ability of affected populations to replace themselves; (ii) degrade the long-term natural productivity of habitats; or (iii) cause, on more than a temporary basis, significant loss of species richness, habitat or community types (**FAO, 2009**). Items needed to identify SAIs would include: (i) the intensity or severity of all impacts from fishing or – to the extent feasible – cumulative impacts from other activities on the area; (ii) the absolute and relative spatial extent of these impacts (compared to the area covered by the biodiversity attributes of concern); (iii) the sensitivity/vulnerability of the biodiversity attributes to the impact(s); (iv) the ability of the component to recover from identified harm (resilience) and the potential rate of such recovery; (v) the likely changes to ecosystem functions given the impacts in items (i) to (iv).

Ideally, and as far as possible within the capacity, budgets and collaborations available, it would be useful to consider also non-fishery impacts, considering the relative magnitude of cumulative non-fishery impacts relative to the fishery impacts.

The Decision states that for assessing and reporting progress in achieving the qualitative aspects of Aichi Biodiversity Target 11, clear, reliable, and measurable indicators need to be developed (**Annex IV, C, 4 ,c**). In theory, good indicators need to be relevant, consensual, up-to-date, timely, representative, responsive, accurate, tested, precise, robust, stable, affordable, practical, cost-effective, flexible, easy to aggregate, easily communicable, and institutionalized (**Garcia et al., 2009**). In practice, and particularly for biodiversity and ecosystem attributes, the "best quantitative information available" might often be limited, and qualitative indicators and trends might have to be used, particularly when using local knowledge.

Agreed reference values and benchmarks are also needed for a proper monitoring and evaluation of performance during implementation of measures within the OECM area. In this respect, the contribution of the monitoring and evaluation system (MER) is fundamental (cf. **Chapter 7**). Identifications and assessments based on limited data should be subjected to recurrent re-evaluations, with objectives of both evaluating performance of the OECM and strengthening the evaluation framework.

v. Significant adverse impacts (SAIs)

The concept of significant adverse impact (SAI) is also not mentioned in Decision 14/8 but might however be very relevant to the determination of OECMs in their role in impeding, limiting, or reducing negative impact on in-situ biodiversity. The requirement to avoid SAIs is embedded in UNGA Resolution 61/105 (related to Vulnerable marine Ecosystems, VMEs) and used in Aichi Target 6 in relation to both target and non-target species.

Referring to vulnerable ecosystems, the UNGA resolution, does not provide a definition or standards for what "adverse" means or when impacts can be considered "significant". A definition and standards are provided by the FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas (**FAO 2009b: § 17**) which states "Significant Adverse Impacts are those that compromise ecosystem integrity (i.e., ecosystem structure or function) in a manner that: (i) impairs the ability of affected populations to replace themselves; (ii) degrades the long-term natural productivity of habitats; or (iii) causes, on more than a temporary basis, significant loss of species richness, habitat or community types. Impacts should be evaluated individually, in combination and cumulatively" . This definition indicates a very close link between the concepts of SEL and SAI and the fact that avoiding SAIs contributes to maintaining ecosystems within safe ecological limits. However, assessing SAIs or quantifying the contribution of a VME (and more generally an ABFM) to biodiversity conservation, case by case, is far from simple.

The FAO Guidelines cited above also indicate that the following factors should be considered when assessing biodiversity outcomes in OECMs: (i) the intensity or severity of the impact at the specific site being affected; (ii) the spatial extent of the impact relative to the availability of the type of habitat being affected; (iii) the sensitivity/vulnerability of the ecosystem to the impact; (iv) the ability of an ecosystem to recover from harm, and the rate of such recovery; (v) the extent to which ecosystem functions may be altered by the impact; and (vi) the timing and duration of the impact relative to the period in which a species needs the habitat during one or more life-history stages "(paragraph 18). All these important considerations mitigate against the use of single indicators and fixed reference points for assessing if a SAI has occurred. No conflict has been noted between the intent of SAIs as used in the CBD and the FAO guidance on SAIs in VMEs which has been acknowledged in CBD COP Decision X/29 (paragraph 54).

For fisheries, avoiding SAI requires that threatened species, essential habitats or VMEs are accorded a high degree of protection to prevent further harm from fishing and allow recovery. However, this protection has no effect on factors other than fishing that may be contributing to the degraded status of the stock, species, or ecosystem, thereby potentially limiting protection and recovery. Maintaining the ecosystem within SEL might be interpreted as requiring the persistence of overall structure and functions (e.g., maintaining impacts below some thresholds and balancing all other requirements).

vi. Safe ecological level (SEL)

The concept of Safe Ecological Limit (SEL) is not referred to in Decision 14/8 but it is worth considering in the evaluation OECMs of how contribute to biodiversity conservation.

Aichi Target 6 calls for impacts of fishing on species, stocks, and ecosystems to be kept within SELs and Targets 4 and 5 also refer to the concept. However, the concept has never been precisely defined (and agreed) in operational terms, e.g., with clear measurable targets and units for its quantification (**Donohue et al., 2016**). The concept, its origin in the "Planetary Boundaries" framework, its intent, the related concept of "safe operating space for humanity", the support to the concept and resistance to it, etc. have been discussed in detail in **Rice and Garcia (2019**). The framework provides a direct link to well-established fishery stock assessment frameworks identifying limits for stock status, minimum spawning biomass, stock-recruitment relationships, maximum fishing mortality, etc., which are the foundation for contemporary single-species fisheries management, with strategies and decision rules to maintain stocks within safe limits. The possible difference is that it gives greater focus to tipping points, regime limits and shifts, factors that are also proving to be challenging within established and less disputed management frameworks such as fixed fisheries reference points in variable ocean ecosystems (also discussed in **Rice and Garcia, 2019**).

These concepts could be applied for broader biodiversity conservation, defining safe limits below which ecosystem properties (e.g., structure and function) may not be driven. The relation between a state and a function it supports, often has a critical inflexion point defining a limit for a state beyond which a function is threatened (**Rice, 2009**). Parametric and non-parametric methods used to define relations and critical inflexion points for safe limits, including in situations of uncertainty (I**CES, 2001; 2002; Cadrin and Dickey-Collas, 2015**) are well known and do not require an understanding of the full functional relationship between the ecosystem state property and the functions it serves. Approaches exist to deal with data-rich and data-poor situations (Canales et al., 2017, Fulton et al., 2016).

vii. Identification of measures that could be used to address impacts.

The inventory of the measures in place in and around the potential OECM should have already been done (see **Section 5.6.3, a, (i))** and what might be needed here, is to specify the relation between the local impact to be addressed and the expected outcome of the measure being considered. It would be useful to have evidence of the effectiveness of the measures being proposed, together with the likely magnitude of their outcomes (and degree of reduction of the impact). Although a direct local evidence of effectiveness would be preferable, it might not always be available (yet) and, while collecting local clues –including local knowledge– the performance of similar measures in other comparable ABFMs or OECMs could be considered as "preliminary evidence" for the purpose of the identification, if used under similar contexts (in terms of vessel sizes and gears, target species and key bycatches, seabed and water-column habitats and biotic communities; measures taken and governance quality).

In case an upgrading of the ABFM is envisaged to better meet the OECM criteria, additional protection measures may be considered, such as (i) adjustment of the area boundaries to improve ecological protection; (ii) joining of neighbouring areas to improve connectivity; (iii) adding technical measures regarding fishing gears and practices); (iv) increasing penalties' deterrence, or incentivising compliance; etc. The potentialities are significant and limited by practicality and cost-effectiveness.

f. Threats, existing or reasonably anticipated ones are addressed effectively by preventing, significantly reducing, or eliminating them, and by restoring degraded ecosystems (C1b).

Dealing with threats, anticipating, *preventing, reducing or eliminating them,* is a management responsibility and the subject has been addressed under Criteria B3 (**Section 6.5.3. d, iv**) which refers to "new threats" and provides a list of potential threats.

As drafted, this consideration is another example of strong overlap between the Criteria B and C as they both address different but complementary aspects of the "threats" issue. The fact is that it would be difficult to address the effectiveness of management measures e.g. (under Criteria B3) without a clear idea of what are the current and potential threats that need to be controlled, reduced or eliminated (reviewed under C1b).

This stresses again that the list of criteria given in **Table 3** is a check-list of overlapping requirements and properties of OECMs and not a totally logical roadmap for their effective identification. This may not matter much if the whole assessment is undertaken by one multi-disciplinary group and much of the information needed is available. It could be a problem, requiring some streamlining of the OECM identification process, if different teams with different competences (and possibly from different institutions) need to work separately, for examples on biodiversity assessments and on management measures and regulations, or on economics, to generate the new information needed.

Considering that Criteria B is mainly about governance and management of the negative forces (threats) and how to deal with them, while Criteria C is mainly about biodiversity attributes affected by these

threats and their eventual protection, it seems essential, when undertaking an OECM identification by criteria, to do so in parallel (or jointly) for Criteria B and C, with good interaction between the assessment streams. Obviously, the measures needed to address threats (in Criteria B) and those needed to improve biodiversity (in Criteria C) overlap largely, may be complementary (e.g., reducing fishing pressure and adding a no-take zone), and may even be similar (e.g., reducing fishing pressure will allow biomass to grow), but they may not be identical.

Under that understanding, the task under Criteria (C1b) is to (i) show that the state and trends in the various biodiversity attributes of concern are positive and implicitly that the current measures are effective; or (ii) if present outcomes are not sufficient, show (e.g., by modelling), that better outcomes might be obtained with new or enhanced measures.

Note that not all biodiversity attributes can be simultaneously improved (**Rice et al. 2018: § 3.3**). Enhancing predators, for example will decrease abundance of their preys, and reducing discards may reduce seabirds' food and reproductive capacity. Consequently the "values" of the multiple biodiversity consequences of any measure need to be considered, noting that these "value" can have social and economic implications which, in turn, affect compliance and the probability that such values be really obtained.

Some of the tasks to be undertaken are briefly reviewed below.

i. Assessing the OECM-specific pressures and threats

The assessment of pressures (and threats) on biodiversity is usually intended to include both their identification, the description of their nature (drivers, factors and mechanisms involved), and the evaluation of their current (or potential) impact, noting their sources and evaluate their potential significance in terms of the expected impact on biodiversity and related social and economic costs if they did occur. A range of methods are available for the assessment, such as such as biological and social surveys, time series analysis, community-level case studies (for that scale of OECM) and various other approaches (See **Section 5.2.8**). The pressure-state-response (PSR) framework **(Moldan et al., 1997; Chesson, 2013**) and the Multi-Criteria Decision Analysis (MCDA) (**Fletcher, 2008**) could be used to organize the data and guide a participative assessment. All threats identified in a broad consultation process can be examined and assessed jointly (e.g., as unlikely, negligible, likely, or significant). It will be most useful to register all threats with the arguments leading to such qualifications, in case that qualification may need to be changed in the future as better information becomes available. If climate change occurs progressively enough, its impacts on OECM effectiveness can be included in periodic reviews of performance (**Section 7.4.1**). When relevant and as much as possible, it would be useful to collect information about actions taken in other sectors or jurisdictions to reduce, mitigate and eliminate similar threats and pressures, possibly with their known outcomes (e.g., in the preparation of cross-sectoral or regional action.

g. Mechanisms, such as policy frameworks and regulations, are in place to recognize and respond to new threats (C1c).

This element addresses the action needed as a new "current" threat materialize. Threats may originate (i) in the fishing area, due to fisheries or other sectors; or (ii) from outside it e.g., from land-based pollution, illegal foreign fishing, long-range oceanic connections, or climate change (a consequence of atmospheric pollution). For effective management, the source of the new impacts must be ascertained and the needed collaborations with non-fishery institutions established.

The identification of confirmed new threats may involve introduction of new measures in the OECM boundaries. In case of large-scale threats like those linked to global climate change, the consequences might involve changes in the geographical location of the fishery resources and of the stock life stage to be protected, as for example the juvenile haddock in the Haddock Box in the North Atlantic Ocean (**ICES, 2021**). The displacement of an old ABFM to a new location may call for the closure (or relocation) of the OECM attached to it and possibly the re-opening of a new related OECM at some distance (considering that many biodiversity attributes will also likely move together with the target stocks). Alternatively, the old OECM might be maintained, eventually with new characteristics. Indeed, ecologically important fixed ecosystem features (e.g., channels, estuaries, lagoons, deltas, canyons, seamounts) may maintain important ecological roles even though the species composition they host may change. Mobile ecosystem structures (e.g., thermoclines, fronts, gyres, currents) will move and OECMs connected to them may have to move too, to maintain their role for the fishery and the biodiversity.

There could be some advantage in also developing some foresight, identifying an advance some of the most likely threats, as a precautionary approach, and developing contingency plans for the most likely ones, that will become active if and when the threat materializes, shortening the response time. Marine Spatial Planning may be useful to foresee such threats, particularly the likely cross-sectoral ones.

h. To the extent relevant and possible, management inside and outside the other effective area-based conservation measure is integrated (C1d).

This element of evidence of a potential OECM effectiveness, is very important in the case of OECMs used in fisheries and it is detailed in Chapter 7-Integration of OECMs which reviews the issue of integration of the OECM: (i) within the specific fishery management plan; (ii) in the whole fishery sector; (iii) across economic sectors in an EEZ; and at regional level, within seascape or similar frameworks.

5.7.3 Sustained over long term (C2)

This Sub-criterion provides only two considerations: (i) *The OECMs are in place for the long term or are likely to be (C2a); and (ii) "Sustained" pertains to the continuity of governance and management and "long term" pertains to the biodiversity outcome (C2b).*

The terms "*sustained*" and "*long-term*" are often associated, in the OECM definition, Principle (h) and Criteria B3, C1 and C2. The specification about the use of the terms (in C2a) is not systematically followed in The Decision itself but we follow it in this document. The two terms are obviously strongly connected as *a sustained* management effort is necessary to maintain the positive outcomes for the *long term*. The frequency of these terms in the Decision, stresses the concern, but no guidance is given in The Decision as to what would constitute an acceptable "long term" for an OECM, leaving this responsibility to States in their *flexible, case by case*, implementation.

The concern is that ABFMs may, in theory, be opened and closed easily, as needed by the situation in the fishery. When adopted withing a recovery plan, there is also a concern that they will be cancelled when the recovery is achieved. Obviously, a short-lived OECMs would not produce long-term biodiversity benefits. It is also understandable, in principle, that *short-term or temporary measures should not constitute an OECM* and that *a commercial fishing closure that stays in place only until an overfished area recovers, is not an OECM* (**IUCN-WCPA (2019:6**). However, it is also suggested in the same document that *seasonal arrangements may qualify as OECMs if the seasonal measures are part of a long-term overall management regime that results in the year-round in-situ conservation of biodiversity for which the site is important… In this case, short-term regulatory instruments, renewed continuously, may provide de facto long-term measures*. This remark stresses the fact that "long-term" does not mean automatically "permanent".

The concern is understandable, logical, and in line with the intent of The Decision. It could be examined from two fishery management angles: (1) the ordinary management regime; and (2) the extraordinary rebuilding regime.

a. The "long-term" in the ordinary management regime

In the "ordinary management regime" applied more or less effectively to maintain all fisheries at or around their MSY level, ABFMs are introduced in a fishery to ensure its sustainability (primary objective). The measure may also produce biodiversity benefits and co-benefits compatible with an OECM role (**Decision 14/8, Annex III, C, 1, d**). We are not aware of a systematic review of ABFMs' common lifespan. Experience indicates that such lifespan may range from a few days or weeks in real-time closures, to few months/year in a seasonal closure, and to decades or more, particularly in the case of protection of essential habitats and vulnerable ecosystems[47]. A priori short-term ABFMs (e.g., real-time and ad hoc closures) do not seem to have the OECM prerequisites. Seasonal ABFMs may also not be promising potential OECMs, but may play an important role as seasonal stepping-stones in the lifecycle of key species, possibly generating significant long-term biodiversity benefits (as suggested above in **IUCN-WCPA, 2019**). More conventional ABFMs usually protect a critical life stage of a target fishery species (such as recruits or spawners), reduce bycatch of threatened species, or to reduce overall fishing pressure (with dubious effectiveness in the latter case). They tend to remain in place for as long as needed for the fishery to be sustainable[48]. Based on the life cycle of the species concerned and its essential habitats (e.g., for feeding, reproduction, and refuge), their characteristics tend to be stable. Such ABFMs would, in principle, be terminated only if a major change happened in the fishery itself, or in the species the life-cycle, eliminating their usefulness. This might happen, for example, if the threatening gear or practice were banned permanently (eliminating the risk for the species, without loss for biodiversity), or if climate changes significantly modified the distribution area of the species and its critical life-stages, reducing or cancelling the ABFM protection, and potentially modifying its OECMs functions. In the latter case, because the primary fishery sustainability objectives are overriding, the ABFM would probably need to be moved too and its OECM status revisited. The old OECM might be maintained with the same or revised biodiversity profile. **Many other more or less satisfactory scenarios may be imagined, but in line with the Ecosystem Approach to Fisheries, in which OECMs should be mainstreamed, such an issue could be transparently and satisfactorily addressed.**

b. The "long term" in a rebuilding regime

In a "rebuilding regime", ABFMs may be usefully introduced to boost recovery of deeply depleted stocks (**cf. Garcia and Ye, 2018**; **Kenchington et al., 2018**). By design, effective rebuilding plans are temporary, and so could the ABFMs introduced as part of the rebuilding regime which formally closes when the rebuilding targets have been reached. If such ABFMs had been identified as OECMs, because of their positive conservation outcomes, the concern is that the OECM would also be terminated, and the related biodiversity outcomes would rapidly vanish. It should be stressed that this concern, referred to a "sliding back" is a concern also for the fisheries targets. In addition, it is unlikely that all species in the concerned

[47] Even though our practical experience is still too limited to presume of a VME lifespan.

[48] For example, in SE Australian fisheries, spatial closures have seen very small changes over the years. Most remained and it can be expected that they will be either permanent or change very slowly, despite the lack of legal certainty, because: (i) they are seen as contributing to sustainability; (ii) they are not removed even after rebuilding; and (iii) in multispecies fisheries, not all species recover at the same pace. Shifts of some closures in response to climatic oscillations and change have been considered but are not always accepted by all stakeholders (**Keith Sainsbury, pers, comm**).

assemblage will recover at the same pace and the most vulnerable ones may require longer rebuilding times. As a consequence, some "rebuilding closures" may remain in place following the formal termination of the rebuilding regime, in the new "ordinary management regime" usually enhanced to avoid sliding-back (see for example in **Bloor et al., 2021** and footnote[48]). Alternatively, the ABFM might be closed but the OECM might remain, with conservation as its primary objective. **Again, many scenarios might be imagined and the elimination of the OECM is only one of them and possibly not the most likely in an ecosystem-based fishery management.**

What is clear is that while the lifespan of an ABFM does not seem to have been an important issue for a measure assumed to remain in place as long as needed, its identification as an OECM calls for some clear statement and evidence of the long-term intent of the measure, compatible with the interest of the biodiversity features of concern and with the need for dynamic adaptation of the fishery and biodiversity management to medium and long-term ecological oscillations and trends. The evidence regarding the Legitimate Authorities' willingness to "*sustain*" the management effort for "*long-term*" outcomes could be included in the documentation used to identify and report an OECM.

The expectation of sustained and long-term biodiversity benefits also raises, implicitly, the problem of the existence or likely occurrence, in the future, of non-fishery threats that fishery-regulations would not be able to address. It also raises the issues of risk assessment, monitoring, enforcement, and adaptation to new situations (including climate change) as well as revision and revocation procedures, e.g., if and when an OECM is found to not satisfy anymore the conditions that led to its identification.

Formal stakeholder involvement and support may increase the likelihood of a measure to persist in the long-term. Conversely, the perception that the necessary fishery flexibility or adaptability might be unnecessarily threatened by OECMs would be a strong disincentive for their adoption.

The evidence needed to illustrate the long-term intend of the OECM could include: (i) evidence of long-term formal policy frames, institutional arrangements (central or local), legal or strong socio-cultural requirements; (ii) identification of enabling (or impeding) factors, likely to help maintain (or reduce or cancel) the expected biodiversity benefits or co-benefits of a potential OECM and the measures applied inside and around it; or from other likely changes to the environment; (iii) assessing the direct and indirect social and economic costs and benefits of the OECM, and their distribution among communities, social groupings and economic interests affected by the measure to evaluate the likelihood of stakeholders' support in the long term; (iv) assessing the dependence of the OECM benefits on the conditions outside the potential OECM area, e.g., on: the complementary management measures in place in the fishery(ies) operating in and/or around the OECM; connectivity with other OECM areas or within the MPA network; or land-based pollution and other impeding factors.

5.7.4 Information and monitoring (C4)

Sub-criteria C4 stresses the need to have in place a comprehensive information management and monitoring system to provide the data needed to assess the OECM effectiveness. The elements of evidence suggested are: (i) *documentation of the known biodiversity attribute,… relevant, cultural and/or spiritual values…, and the area and the governance and management in place; (ii) a monitoring system that informs management on the effectiveness of measures with respect to biodiversity, including the health of ecosystems; (iii) processes in place to evaluate the effectiveness of governance and management, including with respect to equity; and (iv) availability of the general data of the area such as boundaries, aim, and governance.* Some of this information is requested for registration of the OECM in the WCMC database (**See Section 7.4.2**) and some may be voluntarily downloaded in such database where it is

publicly accessible. More detailed information would need also to be stored in national or regional (RFMOs) information systems.

However, The Decision is not very explicit regarding the burden and level of proof needed to demonstrate OECMs' effectiveness (See **Section 5.7.2** on this issue). It requires evidence of achievement of *positive and long-term outcomes* (C1a) and of *restoration of degraded ecosystems* (C1b), but it does not refer to specific management and conservation targets[49], reference values, and indicators, which are standard in the Pressure-State-Response (PSR) framework adopted in the United Nations (**Moldan et al., 1997**) and widely used in environmental impact assessment. Moreover, despite the central importance of "effectiveness" in OECM criteria, the provision of evidence of such effectiveness, when registering the OECM in the world OECM database, is only optional (cf. **WCMC 2019** manual). It could, perhaps, be argued that the need for an assessment of the state of biodiversity attributes in the OECM is implicit when the Decision refers to "effectiveness", "monitoring", "baselines" etc., and that best practices on how to provide detailed evidence in the large range of conditions in which OECMs operate, will emerge in the future, from Parties' implementation, varying substantially according to local conditions. In contrast, however, Aichi Target 6 clearly requires that (i) fisheries have no Significant Adverse Impacts [SAIs] on threatened species and vulnerable ecosystems and (ii) the impacts of fisheries on stocks, species and ecosystems are within Safe Ecological Levels (SEL) It could therefore be assumed that these reference values on the state of biodiversity apply *mutatis mutandis* in Aichi Target 11 and hence in OECMs used in fisheries. SAIs have been defined in the FAO Guidelines on vulnerable ecosystems (**FAO, 2009**) but SELs remind to be consensually defined (**Rice et al, 2018**).

5.8 Criterion D: Associated ecosystem functions and services and cultural, spiritual, socio-economic and other locally relevant values

5.8.1 Ecosystem functions and services (EFSs) (D1)

Ecosystem functions and services are referred to in Guiding Principles (b), (c) and (f) as well as in Criteria C3 and D1.

The suggested elements of evidence suggested are: (i) Ecosystem functions and services (EFSs) *are supported, including those of importance to IPLCs, for OECMs concerning their territories, taking into account interactions and trade-offs among ecosystem functions and services, with a view to ensuring positive biodiversity outcomes and equity (D1a); and (ii) Management to enhance one particular ecosystem function or service does not impact negatively on the sites overall biological diversity (D1b).*

Ecosystem functions (EFs)have been defined in many. For example: *the habitat, biological or systems properties or processes of ecosystems* ***(*Costanza et al., 1997**) i.e., the internal functioning of ecosystems and interactions between their abiotic and biotic components that transfer energy and matter between the components of an ecosystem (like in the trophic chain) and between ecosystems (e.g., through highly migratory species). Functions regulate the composition and structure as well as its diversity, productivity, and resilience of ecosystems and their dynamic inter connections. When an economic (or social) value can be attached to some ecosystem functions, or to the result of such function, it is referred to an "ecosystem service".

Ecosystem services (ESs), have been defined in many different but convergent ways, introducing sometimes confusion between EFs and ESs. A well-recognize classical definition is: "*the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human*

[49] The Decision refers mainly to Aichi Target 11, with is not specified in this respect.

life" (**Daily 1997**). In other words, ecosystem services are "*the set of ecosystem functions that are useful to humans*" (**Kremen 2005**). The authoritative Millennium Ecosystem Assessment (**MEA, 2005**) defined ESs *as benefits people obtain from ecosystems*.

For this reason, ESs are also referred to as "*Nature 's contributions to people*" (NCPs) to acknowledge the diversity of value systems that can be used to measure ecosystem services (see **Section 5.8.1**) (**Diaz et al 2018, IPBES, 2019**). Ocean productivity and its distribution across the ocean trophic chains are essential functions that human use to produce seafood, nutritious elements, and the resulting cascade of revenues, jobs, leisure, household support, cultural values that, in turn define human communities. It is virtually impossible to list all the ecosystem services or the natural products (goods) that people directly consume **(cf. MEA, 2005; Sekercioglu, 2010; IPBES, 2016**). The ecosystem is usually considered as provisioning regulating, supporting and cultural services (**MEA, 2005**).

A concept that emerged also recently, that of *nature-based-solutions (NbS)*, refers to *actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits*[50]. NbS *seek to maximize the ability of nature to provide ecosystem services that help address a human challenge, such as climate change adaptation, disaster-risk reduction or…food production*[51] (see also **Cohen-Sacham, et al., 2016**). The concept is not without controversy and is strongly debated in the on-going discussions on the CBD Post-2020 Global Framework for Biodiversity and many CBD parties refuse its introduction in the framework.

Many functions might concur to produce one service, and one function may produce many services. The relation between EFs and ESs is so complex that the extent to which EFs may be essential to humans, however, may still be only partially understood (e.g., in relation to pandemics). In the case of cultural services, for example, support to communities' identity, it would be hard to define precisely all the functions that contribute to it. The same applies to all non-commercial values of OECMs.

General guidance on assessment and management of ecosystem services has been developing rapidly in the last two decades, (e.g., **MEA, 2005; UNEP, 2014; Hattam et al., 2015; Salcone et al., 2016; IPBES, 2016**) but fisheries management has existed for centuries in traditional and modern forms. Information on specific areas is often scarce or absent, particularly in the marine realm and there is considerable on services delivered in specific areas may be scarce. Uncertainty about the contribution of specific species, or habitats to the processes, functions, and services of the larger ecosystem. However, the regional and global assessments of IPBES and follow-on thematic assessments (references to be provided **IPBES 2018a,b,c**) are beginning to inventory and map such information in consistent manner.

Although mapping the extent of the EFSs would be useful to assess the relative impact of the fishery and the measure, it can be a complex, costly, and uncertain task, far harder than determining the boundaries of a species or habitat distribution. While direct services to humans are obviously important, they depend on adequate supporting services. It is important to identify possible synergies and trade-offs among EFSs, in the short- and long-term), and the way in which a potential OECM would affect them. In fisheries, ESs may be more diversified and vital in coastal densely populated areas than in deep-sea fisheries. The action needed, therefore is to establish an inventory of ecosystem services being used in the area in which the

[50] https://www.iucn.org/theme/nature-based-solutions

[51] https://www.nature.org/en-us/what-we-do/our-insights/perspectives/three-things-nature-based-solutions-agriculture/

potential OECM is located (EFSs), in the OECM or around it and depending on it. To the extent possible non-fishery EFs may also be identified if they are protected or restored in the OECM

OECMs may probably be considered as a "Nature-based solution" to biodiversity degradation even though the measure may often need to be complemented by technical non spatial measures to achieve the expected benefits. They may contribute to the protection and sustainable use of many ESs which might not be all optimized at the same time. Marine Spatial Planning may be needed to improve compatibility between services and resolve trade-offs.

Criterion D1b which suggests that *management to enhance one particular ecosystem function or service does not impact negatively on the sites overall biological diversity.* This suggestion relates also to trade-offs and probably suggests that the process of sustainable use should not negatively affect biodiversity. Very few uses of the ocean can be conducted without impact on biodiversity but such impact should be controlled (e.g., to remain below Significand Adverse Impact (SAIs) and at Safe Ecosystem Level (SEL).

5.8.2 Cultural, spiritual, socio-economic and other locally relevant values (D2)

Cultural, spiritual and locally-relevant values are not mentioned in Aichi Target 11, but are part of the definition of protected areas (**Dudley 2008**). They are mentioned in the definition of OECMs –underlining their importance in OECMs too– as well as in Principle (J) and Criteria C4 and D2.

The elements of evidence suggested are that : (i) *Governance and management measures identify, respect and uphold the cultural, spiritual, socioeconomic, and other locally relevant values of the area, where such values exist (D2a)*; and (ii) *Governance and management measures respect and uphold the knowledge, practices and institutions that are fundamental for the in-situ conservation of biodiversity (D2b)*. We look at then successively below.

a. Identify, respect, and uphold the cultural, spiritual, socioeconomic, and other locally relevant values.

These values are of importance in coastal areas and small-scale fisheries but not only. They are very likely to decrease in importance from the cost to the open ocean and deep sea. Their mention in The Decision draws attention to the wide diversity of human dimensions of biodiversity conservation and should be considered in addition to the more material values of food, revenues, recreation, livelihoods and biodiversity values usually accounted for in the conventional fisheries sustainability objectives of OECMs. These values include:

- Cultural values relate to peoples' history, identity, traditional institutions and rights. They reflect the accepted rules and behaviour of the community/society that depend on or will be affected by the OECM.
- Spiritual values relate to religious, moral or ethical beliefs, specifically related in this case to the relations between humans and nature and more specifically to biodiversity and its conservation.
- Other locally-relevant values can also play important roles. For example, a common such value is a 'sense of place' that may or may not be cultural or spiritual, but in any case, can often be crucial in producing stewardship actions locally. In coastal Indigenous or traditional communities, protection of key species, habitats and biodiversity may be a part of cultural and spiritual practices, and should be recognized.
- Other social values, not specifically mentioned, such as social cohesion, community stability, conflict resolution and power-structures are incredibly important in general, and specifically relevant to the success of spatial management measures. The importance of accounting for and

incorporating these values into OECM discussions is as important in OECMs as it is in MPAs. to ensure stakeholders' buy-in and compliance, and to improve effectiveness.

The focus in potential OECMs is the issues which would contribute to conservation of biodiversity attributes on the long term.

The issues related to "values" also relate to issues of "participation", "legitimacy, "equity". While they might be perceived as less determining of the OECM status than biodiversity outcomes and management effectiveness, they are a fundamental element of "equitable governance", buy-in and compliance, and should therefore not be underestimated.

b. Respect and uphold the knowledge, practices, and institutions

Aichi Target 18, stated that *by 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.*

The need to consider traditional knowledge, institutions and practices also in OECMs is repeatedly mentioned in various parts of The Decision[52] as an enabling factor of effectiveness. Just as the "other values" referred to above, they relate to issues of "participation", "legitimacy, "equity" and are a fundamental element of "equitable governance", buy-in and compliance.

The best way to ensure that the issue is properly addressed is to ensure an effective degree of participation in the OECM identification and implementation processes.

5.9 Assessment of additional properties

The Decision refers to interrelated properties expected from OECMs, such as ecological representativeness, connectivity, complementarity, and integration. Except for "connectivity" (mentioned in Criteria C3a), they are not considered in the Criteria for Identification (**Table 3**) and, therefore, do not have an important weight in the identification process. Nonetheless, these properties are highly desirable as they would enhance the OECM effectiveness at conserving biodiversity in the broader ecological network and would strengthen the rationale for their identification.

However, alone, the absence or weakness of these properties would not disqualify an area from being an OECM when the Criteria for Identification have been adequately met. They could, however, point to possible improvements of the OECM effectiveness in the future. To our knowledge, absence of any of these properties have not been used to disqualify an MPA from Target 11 reporting either. For these reasons, in this document, we refer to them as "additional properties.

The additional properties briefly described below are not simple to address. They are mainly of an ecological nature but may be disturbed by fishing and other economic activities. Their evaluation requires a solid ecological information that may not be always available, even with excellent collaboration between fisheries and environmental institutions. Therefore , simple qualitative expressions of these qualifying inter-connected properties of OECMs may be elaborated, e.g., overlaying the fisheries and OECMs with ecological maps and using local ecological knowledge. More quantitative statements may require longer-

[52] Principle (i); Annex II, Sections (A, 6); (B, 9), (B, 11,(i)); Annex III, Section (C,1, f); Annex IV, Section (C, 1, b), C, 3, e), (C,4, c), (D, f, (ii)).

term and expensive research and to our knowledge, there are no globally agreed standards od representativeness, connectivity, complementarity or integration.

The development of MPA networks has often included assembling a large catalogue of regional biodiversity information to inform adoption of a biogeographic classification system for network design, and this information should be examined before undertaking additional work on OECMs, underlining once more the importance of the collaboration of fisheries and conservation institutions, combining the science of area-based conservation and sustainable use. Strong involvement of the sector and the communities concerned cannot be overstated.

5.9.1 Ecological representativeness

Ecological representativeness is referred to in Annex II and Principles (d) and (f).

Ecological representation is a fundamental quality of marine protected areas' networks that indicates that the network protects representative samples of all species, ecosystems present in the area covered by the network, at a sufficient scale to ensure their long-term persistence. This principle is at the core of the commitments within the Convention on Biological Diversity. However, single areas (except largescale MPAs) cover only a small part of the whole ecosystem and therefore, overall representativeness is ensured by the network and the key to success is an effective gap analysis at network level, to identify shortfalls in protection and locate protected areas so that the network captures much of the biodiversity attributes in need of protection (**Dudley and Parish, 2006; Williams, Harwood and Ferrier, 2016**).

Ecological representativeness of OECMs used in fisheries, therefore, refers to the range of biodiversity attributes of concern[53] –such as populations, life stages, and habitats– protected in the OECM. It is also the contribution of the OECM to the overall representativeness of the conservation network in the area, and the extent to which it fill gaps in such networks (e.g., as biodiversity "banks", corridors, or stepping-stones. This role is particularly important in coastal areas where No-Take Areas are becoming always harder to accept.

Describing OECM's contributions to representativeness would, first require finding an accepted biogeographic classification for the larger area in which the fishery and the potential OECM operate (e.g. the bioregion). If an MPA network was already under development within that area, such a classification is likely to have already been used (e.g., in **Rice and Houston, 2011**), and can be used for OECMs as well, facilitating the analysis of "connectivity" addressed immediately below. Second, the position of the potential OECM in this spatial classification can be examined. The more fully its boundaries lie within a specific biogeographic category the more the OECM is representative of that category. In addition, the more its content is underrepresented in the existing conservation network, the greater the relative contribution of the OECM to fill the gap, increasing its "representativity" within the network, and the "representativity" of the network relative to the total area of the biogeographic region. A similar "gap analysis" of the existing network relative to the full biogeographic region can also contribute to identify new areas (not yet identified as ABFMs) that could be identified as new OECMs and integrated into the fishery management plan.

Accounting for ecological representativeness represents a difficult change in perspective for fisheries. In that sector, the conventional approach is that of protecting as much as possible biodiversity attributes from the collateral impact of fishing, something fishers can understand. ABFMs are therefore designed based on local bio-ecological data with which they are familiar. Assessing the ecological representativeness of the OCEM in a large biogeographic unit, implies a significant broadening of the

[53] because of threats from fisheries or other sources of impact

concepts of "impact" and "management" at a scale of little relevance for fisher's life and their scale of "ecological knowledge". If a protected areas network already existed in the region, most of the information needed to examine this property in an OECM should already be available, facilitating the nesting of the OECM in the network.

5.9.2 Connectivity

Connectivity is referred to in Annexes I, II and III (Criteria C3). It has been defined as *a measure of the extent to which plants and animals can move between habitat patches* (**Worboys, 2010).** Connectivity between OECMs and MPAs is a property of the network of species and habitats they host and that enhance the flow of energy and biomass in ecosystems, maintaining biodiversity. Addressing this concept in the ocean is a non-trivial task which would require tight collaboration between conservation and fishery science. There is significant literature on ecological connectivity (see key references in **Meiklejohn, Ament & Tabor, 2010**).

Connectivity may be structural and functional and depends on species and context. It can be defined as the extent to which movements of genes, propagules (e.g., eggs and larvae), individuals (e.g., juveniles, adults) and populations (mass migrations during the life cycles), are facilitated by the network structure and the dynamics of the surrounding and supporting environment. Connectivity may be reduced or even eliminated by degradation of habitats and population structures (adapted from **Rudnick et al., 2012**).

Structural connectivity depends on the shape, size, and adjacency of MPAs and OECMs as well as the physical and oceanographic connections between them. The relevance of these properties varies with the species, their behaviour (e.g., pelagic, or demersal) and life stages (e.g., larvae, juveniles, or adults). Consequently, areas with complex biodiversity assemblages will need different structural connectivity pathways on the bottom and in the water column, that will be used differently by diverse species at different life stages. The largely static and bi-dimensional concept of "corridors" between protected areas used in terrestrial conservation becomes strongly dynamic and three-dimensional in the ocean. Structural connectivity may be modified more easily by fishing on the bottom (e.g., by trawling on biogenic habitats) than in the pelagic domain. However even benthic invertebrates with high mobility rarely depend solely on traversing the seafloor to distribute across the seabed, but have egg and/or larval stages that are transported by currents, so patches of degraded seabed pose less of a barrier to dispersal of marine species than corridors of human infrastructure (highways, railways, pipelines, etc.) do to terrestrial species.

Functional connectivity relates partly to the extent to which the structural connectivity of OECMs and MPAs, facilitates the movements of biodiversity components (e.g., eggs, larvae, adults, genetic material) between them, in the three dimensions, in the completion of their life-cycle (i.e., spawning, feeding, growth, maturity, mating). In addition, functional connectivity can relate to providing linkages of mobile predators to patches of prey, provision of refugia, etc. The various elements of the 3-D structural connectivity in the marine environment play different roles for different species, facilitating or not functional connectivity, depending on the species and life stages concerned, and on the way they move. Consequently, it must be considered at different scales, from neighbouring reefs (e.g., for feeding mating) to very large oceanic gyres for completion of a whole life-cycle (e.g., in the case of tunas, turtles, or lobsters). Connectivity, in the context of which food webs, and trophic cascades can be expected to occur though connectivity, with different results for predators and preys. For example, protection of forage fish in an OECM might enhance the feeding of protected seabirds and their reproduction in a distant protected rookery.

The resulting total connectivity among OECMs in an ecosystem and between them and the MPA network is, therefore, a complex 3-D phenomenon that might be conceptualized based on ecological and oceanographic knowledge, which is hard to quantify and monitor (**Goulletquer et al., 2013**). It depends not only on the size, composition and vicinity of OECMs and other protected areas but also on what happens between areas (e.g., fishing pressure, noise pollution, contamination, predation), affecting movements and energy flows between them. As such total connectivity is an emergent property of the ecosystem, and the interaction between its natural and human components.

Maintaining or improving connectivity between areas under different jurisdictions has international implications and thus may require multilateral agreements for OECMs that transboundary, extending in more than one EEZ and/or straddling into the High Sea[54].

Specifically, for OECMs resulting from FMPs, the 3-D aspects of connectivity can require special considerations. Horizontal connectivity can be reduced through partial obstruction (e.g. gears like pelagic drift nets) or interception by fisheries in areas that are neither OECMS nor MPAs, or through harvesting, reducing the sizes of the populations moving between areas Vertical connectivity in the water mass through nocturnal migrations and feeding behaviour can make biodiversity components receiving protection from measures applied only at some depths vulnerable to the fisheries when they move to depths where the measures do not apply. Such vertical stratification of measures to protect biodiversity can be important because demersal biodiversity (both fish communities and habitats) are more structured, more diverse, and usually considered more vulnerable than pelagic ones. Generally, vertical connectivity decreases with depth and may be weak in deep oceans (**Kerr, 2019**), except over high seamounts where the structural connectivity created by the seamount may facilitate a functional one, which also has to be taken into account in conservation measures.

Vertical zoning is used in management of some sectoral activities in the ocean to allocate resources or reduce conflict and risks of accidents, and fishery regulations commonly distinguish the demersal and pelagic domains as they often apply to specific fisheries resources that are in turn either demersal or pelagic. However, vertical connectivity is sometimes used as an argument against vertical zoning of protected areas and OECMs. The argument may be valid in shallow coastal areas (down to 100 meters) where fishing on demersal fish can result in bycatch of pelagic species and vice-versa (see a review by **Kerr, 2019**). If differing vertical zones of fisheries management measures were to be considered OECMs, benthic OECM would often have fixed locations whereas pelagic ones may often be dynamic, bringing with them the challenges discussed in **Section 4 – Criterion B1**. Vertical connectivity also may be a serious issue over the extended continental shelf where demersal resources are under national jurisdiction and those in the water column are under international jurisdiction, implying a legally-binding vertical zoning. Similarly, in the High Sea, the International Seabed Authority has a mandate to regulate mining in the seafloor, but not of activities in the water column above it.

The description of the potential OECM's contribution to connectivity requires identifying the relations between the biodiversity attributes of concern in the potential OECM, and the surrounding fishing ground and ecosystem e.g., analysing the distribution and lifecycle of key species, their migratory behaviour, continuities in bottom types and habitats, currents (for eggs and larval transport) and trophic relationships. It would also be useful to describe how the benefits provided by the OECM enhance or augment the benefits provided by other OECMs and MPAs in the surrounding area, when relevant.

[54] Although the OECM concept has emerged in the CBD and therefore applies only in areas under national jurisdiction (e.g., EEZs), nothing impedes CBD members to use them in regional fishery management organizations (RFMOs).

5.9.3 Complementarity

Complementarity is referred to in Annex I, and II as well as Principle (b) and (d).

Complementarity relates to the mutual synergetic roles of OECMs and MPAs in strengthening conservation networks within a larger marine and coastal seascape. Complementarity is related to representativeness and connectivity. It occurs when the OECM fills a gap in the biodiversity attributes protected in the ecological network, strengthens the functional connections among the network's areas, or manages pressures or threats in ways that allow measures in other areas in the network to be more effective.

The concept indicates that not only the parameters used to measure biodiversity conservation outcomes of OECMs should be comparable to those used to measure those of MPAs, but OECMs and MPAs should be complementary in that respect, ensuring additionality and synergy. This implies that wherever MPAs exist in the vicinity of OECMs, connectivity channels are identified (e.g., life cycles, major connecting drivers, etc.). At the very least OECMs should not provide biodiversity outcomes that would conflict with the objectives of MPAs to which they are functionally connected. Where an MPA could only provide partial protection to a key biodiversity attributes (e.g., if the species migrates outside the MPA for part of its annual life history cycle), additional protection provides by the neighbouring OECMs would be useful. Moreover, the fact that an MPA could be made more effective by adding complementary measures in neighbouring areas, could provide additional incentives for establishing OECMs in these areas. OECMs' complementarity may be realized in providing additional protected "step-stone" areas in the life cycles of protected species, or in protecting critical habitats or food sources for these species. As appropriate, complementarity with other areas defined in the ocean for biodiversity-related purposes such as Ecologically and Biologically Significant Areas (EBSAs) or Key Biodiversity Areas (KBAs), might be considered.

Defining this complementarity may require additional "institutional bridges" and specific collaboration between fishery and conservation science. Complementarity in area-based networks might be shown by the similarity in the biodiversity elements protected in OECMs and nearby MPAs (positive adjacency). It can be enhanced by connectivity, e.g., through migration and diffusion of life stages, even if the areas were physically some distance apart. OECMs should complement other existing area-based conservation measures, e.g.: (i) adding verified biodiversity benefits either through its own direct biodiversity outcomes or enhancement of the effectiveness of other network areas ; (ii) increasing the area coverage of the network; and (iii) improving or filling gaps in representativeness and connectivity.

However, complementarity cannot be an important feature of OECMs until functional networks of MPAs have been established, within which the OECMs established for fisheries could show a complementary role. However, it could be argued that OECMs might also play a complementary role to MPAs by providing protection to some species/habitats not yet protected by MPAs, or where local opposition to MPAs is strong or the governance processes to establish MPAs does not exist while sectoral conservations measure may have community support.

5.9.4 Integration

The concept of "integration" does not appear in the OECM definition but it is extensively referred to in The Decision: in operational paragraphs 1 and 4; in Annex I which is totally dedicated to the subject; in Annex III on OECM, particularly in Principle d; Criteria C; and management approaches; and in Annex IV. It refers to integration of the OECM within and between sectors and within ecological networks, including MPA networks and seascapes. Much of the work done on representativeness, connectivity, and complementarity, will facilitate integration.

In Principle (d), the issue is related also to *connectivity* (**Section 5.9.2**) and to *complementarity* **(Section 5.9.3***)* with MPAs within those landscapes and seascapes. MSP, ICAM and other spatially integrative management frameworks would facilitate such integration. ICAM is specifically cross-sectoral and beyond fishery management mandate but FAO (1996a) has published guidelines for the integration of coastal fisheries into ICAM. MSP principles and tools might be applied at sector level to integrate OECMs among them and with MPAs at EEZ level. Compliance by the fishery sector with this aspect of OECMs requires the direct intervention of the State to put in place and coordinate the implementation of a cross-sectoral legal and policy framework.

In Criterion C1, the issue refers instead to the need to ensure compatibility of management measures inside and outside the OECM. This consideration is particularly important for MPAs as what happens inside an MPA and outside it is usually under two different jurisdictions of ministries respectively in charge of fisheries and of environment. As OECMs are also ABFMs, aiming at the sustainability of the fishery surrounding them as primary objective, they should be *integrated in* the fishery management plan ensuring synergy between the measures inside the OECM (e.g., where a gear might be prohibited to protect a bycatch species) with the related measures outside the OECM (e.g., bycatch excluder device, bycatch ban, economic incentives). However, in cases where a formal management plan is not yet in place (as is often the case in small-scale fisheries) a specific management plan for the OECM would need to be established. Moreover, even in developed management systems, objectives contributing to *in-situ* biodiversity conservation necessary to be considered an OECMs may need to be better specified in the plan together with the special measures applying within the plan and the additional elements needed in the monitoring and evaluation system.

5.10 Synthesis and reporting

5.10.1 Synthesis

The main outcome of the quasi-sequential OECM identification process described in this chapter (**Figure 4)** is an assessment of the present or likely performance of a potential OECM in biodiversity conservation, and more specifically, the extent to which it meets the CBD Identification Criteria, one by one and overall. The outcome of the Identification process to be presented to the Legitimate authority might be:

- Positive, for those potential OECMs which satisfactorily met the criteria, identifying them as candidate-OECMs. These candidates will be considered and endorsed (or otherwise) as OECMs by the Legitimate Authority, based on the best available evidence, augmented by any other political and/or socio-economic considerations.
- Conditional, If the criteria are not satisfactorily meet but the matching might be improved with some cost-effective effort. The potential OECM would be presented as an upgradable ABFM with advice on possible improvement (e.g., modification of the boundaries and new technical measures) with some cost-benefit considerations. If the Legitimate Authority agrees, the upgrading will be undertaken and the ABFM nay be considered as an OECM e.g., if the expected outcomes can be reasonably proven and obtainable in a short time. Alternatively, the ABFM remains a potential OECM to be re-considered at the next round of assessments of within a given laps of time. If the upgrading is not considered worthwhile, the upgradable ABFM will remain a simple ABFM.
- Negative when the criteria are irremediably too poorly met, the assessment will be negative and the potential OECM will not be retained.

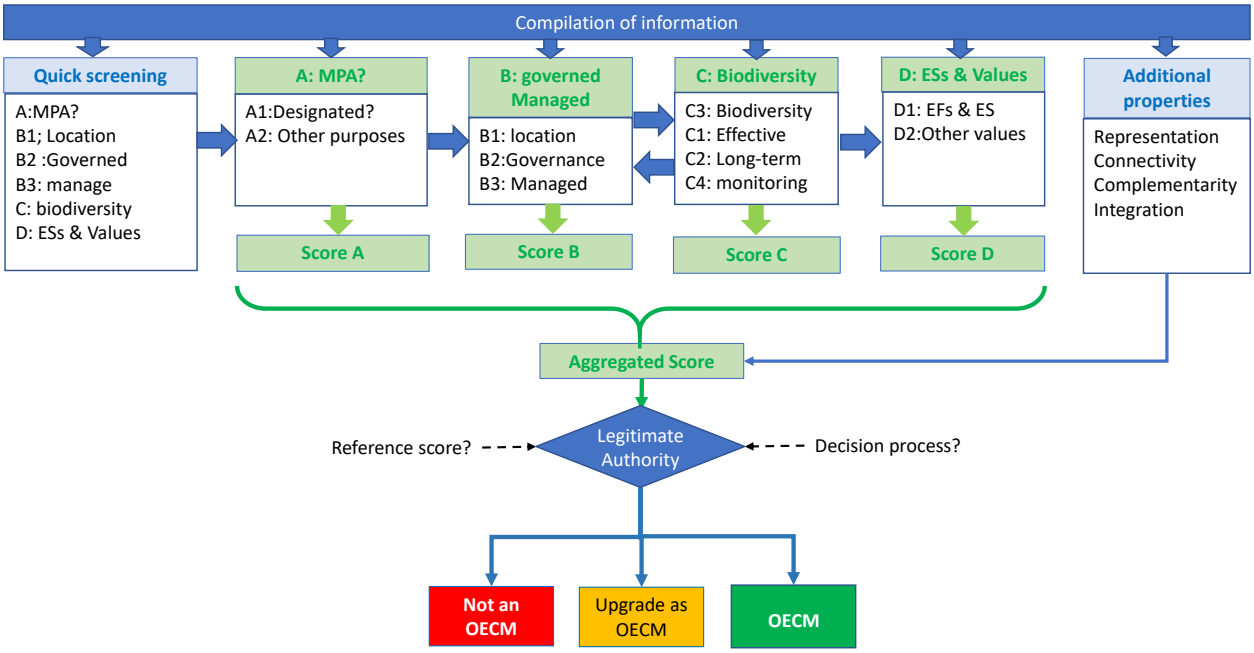


Figure 4: Graphical representation of the criteria-based identification process, linking the conclusions reached on every element of every Criterion (A to D) to the synthesis (aggregated scores and conclusion). For each sub-criterion (A1 to D2) the "elements on information", not visible on the Figure, may be qualitatively or quantitatively "scored", leading to an overall score for each criterion and an overall aggregated score for the potential OECM. The Legitimate authority decides based on pre-agreed reference scores or using other decision-making processes. The information regarding additional properties add qualifications to the assessment but do not determine it.

Criteria A (**Section 5.5**) is a binary assessment which decides if the area can be or not an OECM. It is unequivocally applicable at the initial quick-screening step. The assessment can only be "positive" or "negative" and the second (when the area is already an MPA) is eliminatory.

Criteria B to D and additional properties (**Sections 5.6 to 5.9)** determine if and how much the potential OECM fit to the required properties. The assessment undertaken on each "element of identification" suggested in The Decision (**Table 3**) is often unlikely to be wholly "positive or "negative", and highly likely to fall within a continuum between these two extremes. For some "elements" the assessment may result as "uncertain e.g., when data is insufficient.

In data-rich situations, in which quantitative and probabilistic methods may be used, numerical scores might be obtained for each element of evidence and aggregated successively at the level of each sub-criterion, each criterion, and the whole set of criteria. Therefore, the composite assessment against each criterion and the final assessment of the potential OECM performance, needs to combine numerous individual assessments into a composite total one, with some sort of Multiple Criteria Decision Analysis (MDCA) that might be more or less complex depending on the assessment context.

In data-limited situations, a qualitative scoring system following, for example, a "traffic light" approach[55] might be used to represent the degree to which a criterion is met in a potential OECM[56], and eventually track and represent their evolution over time. In such an approach, the assessors allocate a colour to indicate whether the match of each potential OECM property with the relevant criterion is deemed good (green), medium (orange) or poor (red) based on available guidance (e.g., in **Marnewick et al, 2019**). However, assessing the overall performance of the OECM, considering all Criteria together, requires guidance on the respective proportion of green, orange, or red, required to consider a potential OECM as meeting the set of criteria well (green), approximately (orange) or poorly (red). Alternatively, the qualitative traffic-light color-codes attributed to each Criteria need to be translated into forms that can be combined in various ways, e.g., through multi-dimensional scaling, or other integrated assessment methods.

In reality, it is likely that some assessments could only be qualitative while others could be quantitative and rules will therefore be needed for combining these assessments within and across steps.

An expert-based MCDA was used in the Aegean Sea by **Petza et al. (2019**) to assess over 500 broadly defined Fishery Restricted Areas (FRAS) against seven OECM criteria[57] identified by experts with fisheries and environmental experiences (cf**. Appendix 1**). A MCDA using a decision tree has been used within the FAO framework as well as at national level in support of the EAF implementation, including in regional and national multi-stakeholder assessments in data-limited environments (**Fletcher, 2008; Fletcher and Bianchi, 2014**). A similar decision tree may be used to identify OECMs following the stepwise process described above to elaborate an aggregated score for potential OECMs.

Other approaches might be used for the same purpose, using a similar logic. In data- and capacity-rich areas, complex quantitative modelling might be used to simulate the impacts of pressures and corrective measures and possibly optimize the combination of measures taken within and around the OECM (cf. **Section 5.6.3, a (iv)** and **Section 6.1**). Considering the range of actions points to consider, it is likely that both qualitative and quantitative assessments may need to be combined in an overall assessment of a potential OECM.

The assessment team being inclusive by design (cf. **Sections 5.2.5; 5.2.6; 5.3.6; 5.6.2, c**) involving a range of actors and using a range of knowledges, the process and method selected to reach the conclusion about a potential OECM should be understood by, and involve, all relevant participants. It can be noted that, contrary to what is usually the case in MCDA, the criteria to be considered in each identification step are not contradictory but convergent towards significant biodiversity benefits.

As illustrated in **Table 3** a number of elements, related to each criterion, condition the assessment, e.g.: (i) the list of "elements of evidence" to consider in each step; (ii) the scoring range for each of these "elements" (e.g., from 0 to 3); (iii) the number of scoring classes distinguished within that range and their boundaries (e.g., 0.0-1.0; 1.1-2.0; 2.1-3.0) (see another example in **Appendix 1**); (iv) the process used for aggregation of scores successively from the single "element of evidence" to the Total criteria set. In order to achieve coherence between assessments across a range of OECMs in a fishery, an EEZ or an ecosystem, and to maintain consistency of performance assessment overtime (cf. **Chapter 7**), these conditioning

[55] i.e., the experts allocate a colour (e.g., green, orange or red) when the assessment leads to a good, medium or poor conclusion.

[56] e.g., in Garcia, Rey-Valette & Bodiguel (2009) for indicators of sustainability or Marnewick et al., 2019, for OECMs.

[57] The CBD Decision 14/8 was not yet available at the time of the analysis and the criteria used where draft criteria emerging in the ongoing internationsl discussions at CBD and IUCN.

elements and their rationale must be agreed and registered for reference and eventual adjustments if required in the future. If different weights were used for the aggregation, their rationale should also be made clear, and registered for future reference. Similarly, when using a traffic light approach, the rationale leading to the colour selection must be explicit, agreed and recorded.

In a "learning-by-doing" incremental identification process, the experience gained in the assessment of the first ABFMs examined can be used for the following ones. The structure of the MCDA, the process needed for running it in a participatory way, the scoring approach, and the eventual weighting factors, may become progressively part of best practices and reference scores might even be pre-agreed, facilitating the process.

In the Aegean Sea case study by **Petza et al. (2019)**, for example, if it is considered that FRAs which scored between 70% and 100% in effectiveness generate sufficient biodiversity benefits, about 4% of the 516 areas examined would qualify as OECMs and, perhaps, those scoring between 60% and 69% might be considered as "upgradable" OECMs if their performance can be improved. Different results would be obtained if the "filters" used are different, e.g., reflecting more or less risk aversion.

Even when methods for consolidating information into simple scores are used to communicate results of OECM evaluations against the criteria, it is important to retain the full expert evaluation of the information used as the basis for scoring the area relative to the Criteria. The participants in the expert process bring a diversity of skills and perspectives to the evaluation, and they will review and evaluate information of various qualities about status of diverse constituent factors influencing the scorings.

Even if the most appropriate output for communicating results of the evaluation is a traffic light or similar "score", the assessment of experts of the information behind the scoring, including weight given to different types of evidence, differences among experts on the value of different strengths and weaknesses of the information based, etc. are likely to be valuable in subsequent steps to set or adapt objectives of the OECM, design the management strategies and plans, or to revisit the decision to accept or reject the area as an OECM.

There is no guidance in The Decision about the score or the amount of improvement or of assurance that may be required overall to decide whether an ABFM could be identified) as OECM or not. The reply generated by a complex assessment is unlikely to be just binary (i.e. " Yes", or "No") except for the key eligibility Criteria A. A good performance, justifying a positive identification could be when the OECM produces a strong positive outcome for a biodiversity value of concern considered as extremely important (e.g., endangered whales) even though other values might be less protected. Alternatively, the assessment might be considered positive if the OECM produces only moderate outcomes, but for a large range of biodiversity values of concern. The Legitimate Authority needs to have a good and faithful rationale for the decision. What is important is to clearly define the attributes of biodiversity claimed to benefit from the OECM and to provide evidence of such benefit. Such evidence can only be the "Best Evidence Available", whether generated by complex surveys, powerful simulation models, or local knowledge.

Following the Biodiversity Impact Mitigation (BIM) hierarchy, OECMs can be expected to: (i) "avoid" impacts on the biodiversity attributes of concern within OECM boundaries when possible; (ii) reduce/minimize such impact, otherwise; (iii) mitigate the residual impact or facilitate recovery to reference levels. The end result should be a stabilization or recovery of the biodiversity attributes of concern in the OECM boundary and, for mobile elements, possibly also in the surrounding fishery and ecosystem. This result would eliminate or reduce the probability of occurrence of Significant Adverse

Impacts (SAIs)[58], taking onto account the value and vulnerability of the biodiversity attribute of concern, their level of degradation, and the current and reasonably foreseeable future risks and threats. If such benefits were already provided in the ABFMs, granting an OECM status should better secure them for the long term.

Table 5: Theoretical and simplified example of scoring of OECMs properties in relation to Governance and management (Criteria B). Each "elements of evidence" (B1a to B3d) to be assessed for each sub-criterion has been scored between 0 and 3 (Col. 2). The overall score for each sub-criterion is given as percentage of the maximum possible value for that sub-criterion. The unweighted aggregated score for the whole criterion B is given in percentage at the bottom of the Table. (NR= not relevant in the area)

PROPERTIES (Options: 0= none; 1= poor; 2= medium; 3= Good)	SCORES	
	Nb	**%**
B1: The area is geographically defined		
B1a: Size and area are known?	2	
B1b: Boundaries are delineated	3	
B1 score	**5/6**	**83%**
B2: The area is governed		
B2a: To what extent is the Legitimate Governance identified?	3	
B2b: Is IPLC governance relevant. If yes, taken into account?	NR	NR
B2c: is governance "equitable" in CBD terms?	2	
B2d: Is governance collaborative enough to deal with threats?	2	
B2 score: OECM is eligible if B2 score > 75%	**7/9**	**77%**
B3: The area is managed		
B3a: Area is managed to achieve biodiversity outcomes	2	
B3b: Relevant authorities are identified	3	
B3c: A management system is in place	3	
B3d: Management is consistent with the ecosystem approach	2	
B3 score: OECM is eligible if score > 75%	**10/12**	**83%**
B: UNWEIGHTED AGGREGATED SCORE	22/27	84.1

5.10.2 Reporting to the Legitimate Authority

We refer here to a report about one potential OECM (whether an existing ABFM or a new area) that has been analysed, satisfactorily meets (or could meet) the criteria and could be considered as a "candidate-OECM" to be eventually endorsed by the Legitimate Authority, or as an "upgradable ABFM" that could be enhanced to meet the Criteria. Both are presented to the Legitimate Authority for final decision in a coherent report (thereafter referred to as Identification Report), highlighting for each potential OECM the rationale for its inclusion or exclusion with the information available. The report should be comprehensive, possibly containing more information than needed for the simple identification, and ideally present the possible options regarding the potential OECM (adopt, upgrade, or reject) and their consequences (e.g., integration in the FMP, upgrading costs). If so requested, the report may also contain a recommendation. Because of the sectoral and potential cross-sectoral nature of OECMs in fisheries, the Identification Report might also be forwarded to the appropriate government level for oversight. The report may conveniently be structured along the list of criteria followed in the identification process, including the different elements of information suggested in the Decision, and any additional information

[58] The CBD Strategic Plan for Biodiversity 2011-2020 adopted the concept of Significant Adverse Impact as reference level for recovery plans and measures for threatened species and vulnerable ecosystems (in Target 6).

identified, used and important enough to be formally registered. If requested, the report will contain recommendations to the decision-makers. Otherwise, the presentation of options should be in a neutral style. If the identification steps, the determining elements of information, the scoring system, and the reference scores (represented in **Figure 4**) have been pre-agreed, the final decision would be well informed.

The sections of the report might include (1) an executive summary; (2) a short report on the outcomes of the assessment of each criterion and of the "additional properties"; and (3) a synthesis of the total assessment outcome; and (4) if requested, a recommendation regarding the possible fates of the potential OECM. It is important to record the rationale leading to all conclusions to be considered for decision by the Legitimate Authority. If recommendations are not required the presentation of options for each candidate OECM should be in a neutral style, highlighting pros and cons and known costs and benefits.

If the scoring system and the reference scores had not been previously agreed with the Legitimate Authority at the beginning of the identification and have emerged from the identification process itself, they have to be clearly stated, with their rationale, in order to be understood and endorsed or rejected in the final decision. In case of disagreement with the scoring system, conclusions would need to be revised using an alternative system.

It might also be useful to have a section of the report with background additional general information about the area, not requested explicitly in the Criteria but nonetheless essential for the description of the area. For example: (1) Area "birthdate" ; (2) Dates of the assessment against OECM criteria[59]; (3) Possible biogeographical sub-divisions; (4) Multiple jurisdictions; (5) Main physical features like relief, depth range, bottom types; (6) Types of habitats like mud flats, mangroves, estuaries, lagoons, coral reefs, algal beds, seagrass beds, dynamic dunes, hot vents, sea mounts, canyons, deep-sea corals or sponge reefs); (7) Hydrography parameters of relevance to the biodiversity functions (e.g., tides, currents, gyres, stratification (thermocline), turbulence); (8) Known natural threats such as severe storms, hurricanes, earthquakes, tsunamis, and coral bleaching. Some description of the area (ecosystem) within which the fishery and the OECM sit, e.g., based on available literature, would be useful. Many of such elements would be useful in the identification process.

If a comprehensive approached had been selected, assessing together a large sample of ABFMs, the report might also include conclusions at that broader scale (e.g., total coverage, representativeness, connectivity between OECMs, Connectivity with conservation networks, etc.

5.11 Decision by the Legitimate authority

The Legitimate Authority receives the assessment report and has the prerogative to decide on the fate of the candidate-OECMs, based on the information received, and considering in addition any social, economic, and political dimensions of the decision. The identification process should appear effectively participative, in line with the principles of equitable governance. If the elements to be considered under each step, their scoring system, their aggregation, and the reference scores conditioning the decision options had been formally agreed with the Legitimate Authority at the beginning of the identification process, the decision will be facilitated. However, considering the little expertise available on OECMs identification, the rationale behind these elements might have to emerge from the assessment process itself, as proposals, and be formally endorsed together with the conclusions. Otherwise, parts of the assessment may have to be repeated.

[59] The process may have covered days or months

Following consideration of the report and possible recommendations, the Legitimate Authority must take decisions regarding (1) The formal identification of OECMs (a formal record of such decisions should be registered at national level); (2) The integration of the recognized OECMs into the management plans of the fishery and/or the sector; and (3) Whether to report to WCMC for inclusion in the world OECM database[60] and consideration for reporting on international targets. The WCMC manual foresees that OECMs and information on OECMs might be reported by the Legitimate Authority or a range of data providers, preferably with the consent of the legitimate authorities.

The decisions required from the Legitimate Authority relate to: (i) the OECM identification; (ii) the potential updating of the FMP with its potential financial implications[61]; (iii) the information considered as open to public access and use (defining eventual confidentialities if any); and (iv) decision about reporting to CBD and WCMC. Details follow.

The decision on OECM identification, based on the evidence provided, will typically be taken by the Ministry or any other Legitimate Authority in charge of marine capture fisheries (e.g., in centralized or decentralized State management institutions, or in Indigenous people and local communities institutions), following good and equitable governance principles (as defined in The Decision Annex II). The decision could involve all main stakeholders, including Ministries or other legitimate authorities with responsibility for conservation of biodiversity. The decision should also consider its expected costs, benefits, and other social and economic implications. Because of their dual objectives (fisheries sustainability and biodiversity conservation) as well as possible cross-sectoral implications, a broader consultation and coordination may be felt necessary at this final stage of decision and, at the present time, there is neither experience nor guidance on whether this would add value or increase complexity of the decision. Such decision confirms: (1) Which candidate-OECMs identified in the assessment process as satisfying the Criteria are formally recognized as OECMs; (2) Which candidate-OECMs are not yet recognized as OECMs but are worth undergoing modifications (that need to be stated) to meet the OECM criteria; (3) Which additional management and conservation measures need to be considered and integrated in the fishery management plan to ensure the expected biodiversity benefits; and (4) Which candidate-OECMs are considered unsuitable for further consideration in an OECM approach and why.

The introduction of an OECM in a fishery may lead to the needs to update the FMP, its objectives, measures, means etc. and this updating may be fundamental for the integration of the OECM into the fishery management plan (cf. **Chapter 6**) and a comprehensive appreciation of its performances (cf. **Section 7.3**). The updating needed may be relatively minor and within the mandate and budget of the management authority, in which case the updating is a formality. It may have more significant financial and operational implications (including in institutional and international collaborations) requiring a higher-level policy decision.

The Decision aims to transparency as a parameter of good governance, and hence to as broad as possible access of the information (**Criteria C4d**). However, in some cases reasons for maintaining confidentiality on some parts of the information might be felt preferable, calling for a policy decision. A high level of transparency remains nonetheless an important factor of stakeholders' mutual trust and compliance.

[60] Like the WDPA, the OECM database is a joint product of UNEP and IUCN, compiled and managed by UNEP-WCMC, in collaboration with governments, non-governmental organisations, and other data-providers. The database has been in development since 2019, in response to a request from parties to the CBD in November 2018 (CBD 2018).

[61] The absence or postponements of such decision may have serious consequences in terms of effective implementation.

Finally, a policy decision might also be needed, and was probably made already at the onset of the OECM identification process at national level, regarding the policy decision to reports all, or some or none of the OECMs to WCMC for future accounting against international targets. This issue is addressed more fully in **Section 7.4.2**.

6. INTEGRATION OF OECMS

The Decision (in paragraphs 1 and 4 and in Annexes I, III and IV) stresses the importance of integrating OECMs into seascapes and mainstreaming them across sectors. The Decision also refers to "management" of OECMs in its paragraph 7, extensively in Annex II (governance and management), as well as in Annex III (in the Guiding Principles and Criteria for identification) and in Annex IV (on achieving Target 11). Attention is given specifically to the management parameters (e.g., authority, diverse approaches, objectives, measures, respect of spiritual and cultural values) and management performance (e.g., effectiveness, consistency with EAF, equity, adaptability, and integration).

The effectiveness of the OECM operating within a fishery depends to a large extent on the quality of the management of the fishery operating in and around the OECM itself and the need for effective integration of management measures used in and around the OECMs cannot be overemphasized. The best way to mainstream OECMs across sectors while avoiding "paper OECMs" as much as possible, is therefore to formally integrate the appropriate OECMs within the management system of such sectors (with the necessary responsibility and accountability) , creating synergies and incentives for their identification and long-term maintenance.

It should be clear that fisheries without an effective management system (at centralized or decentralised level) and hence with no control on pressures and threats, are most likely to generate paper OECMs. It should also be clear that the case-by-case and flexible approaches called for in The Decision allow this mainstreaming and integration to be adapted to the local context and means available (e.g., using qualitative and quantitative assessment methods; centralised or local enforcement systems; formal or informal management plans).

OECMs need therefore to be explicitly integrated: (1) In the management plan of the fishery within which they operate; (2) With all OECMs used within fisheries and other economic sectors, at the EEZ level; and (3) Within the protected areas network, seascape, etc., at ecosystem/regional level. When relevant, the latter would include the integration with conservation measures of other agencies responsible for conservation of the biodiversity attributes of concern, such as in fisheries OECMs in which measures to control fishing impacts on seabirds are implemented.

These three levels of integration call for different governance arrangements and levels of capacity, with growing degrees of complexity. Item (1) is dealt with in detail below. Items 2 and 3 fall outside the scope of this document. They will only be superficially addressed below and the reader is advised to look at The Decision Annexes I and II, and to existing guidance on the subjects, e.g., on MSP, ICAM, and Strategic Environmental Assessment (SEA). However, it is likely that a lot of the information and activities needed to integrate OECMs within the fishery sector and across economic sectors and the ecosystem are already needed for their integration at fishery level, and that "only" the additional interactions and connectivity of interest at higher levels of governance need to be better documented.

6.1 Integration of OECMs within the fishery management plan

Abundant guidance is available for the management of responsible fisheries, in the Code of Conduct for Responsible Fisheries (**FAO, 1995**) and the related guidelines on management, on the precautionary approach and on the ecosystem approach to fisheries (EAF) (**FAO**, **1996; 1996a; 1996b; 2000; 2003; 2009a; 2009b; 2009c; 200; 2015; Cochrane and Garcia, 2009**). Consequently, the following sections focus on the management issues related to the OECM and its integration in the fishery management plan (FMP).

The enabling frameworks of relevance to OECMs' management effectiveness were reviewed in **Section 4.** The enabling factors include the standing of the Legitimate Authority; a formal fishery management plan or equivalent traditional set of rules; equitable governance, as specified in The Decision; enabling international instruments particularly when resources and biodiversity attributes are transboundary, straddling, or in the High Sea, and adequate management capacity including deterrent enforcement. Some factors are particularly important for OECMs such as, knowledge of current or likely threats from other economic sectors or natural drivers of system dynamics and their impacts; identification or foresight of climate change impacts on biodiversity and related responses; knowledge on the biodiversity attributes of concern, pressures (past, present and future), and likely threats on biodiversity, as well as the potential benefits realized or expected (**Section 5.7.2, a**). In addition, the introduction or reinforcement of a recurrent Monitoring, Evaluation and Reporting (MER) programme, an important component of OECM management implementation and performance assessment, is addressed in detail in **Chapter 7.** We will therefore not dwell further on these factors below.

The formal integration of the OECM(s) into the FMP aims to increase coherence between the fishing and conservation regimes implemented inside and outside the OECM and hence the overall efficiency of the OECM and the FMP. It is likely that the means available to monitor and assess an OECM will be commensurate with (and indeed will share) the resources available for monitoring the whole fishery. In some small-scale fisheries, the means available may be limited but the spirit of integration ought to be present. In the occasional cases when the biodiversity attributes expected to benefit from the OECM are themselves subject of conservation measures or management plans of other agencies (e.g., possibly seabirds, marine mammals or marine turtles), coherence with the species conservation plans, monitoring and assessments programs is also valuable, even if active integration (e.g., merging some sectoral and environmental institutions) is not feasible.

The integration in the FMP of the OECMs and the upgradable ABFMs identified by Legitimate Authority, with the new measures eventually needed to be applied within them, requires as appropriate:

- Noting formally the OECM(s) and upgradable ABFMs to be covered by the FMP in the scope of the management planning document. The descriptions of the OECM(s) and upgradable ABFMs may usefully be annexed to the FMP, with their specific characteristics (see below).
- Updating the FMP objectives and targets to better reflect the specific biodiversity conservation objectives and expected outcomes of the OECM(s) described in the identification process (**Chapter 5**). In line with the Biodiversity Mitigation Hierarchy, action may aim at No Net Loss (NNL) or Net Gain (NG) of biodiversity or restoration to some historical level considered adequate.
- Specifying the indicators and reference values or trends and other performance benchmarks or standards related to the above objectives, that are needed for the future recurrent assessment of the OECM performance. Adjusting the MER sampling and assessment accordingly (cf. **Chapter 7**).
- Specifying the measures taken in the OECMs to reach the objectives. These might be area-based or not and their objectives may be, e.g.: (1) Reduce impact on non-target species, protected species and vulnerable habitats below SAI (See **Section (572, a, (i))** for details); and (2) Maintain a functional ecosystem structure (e.g., trophic chain). Special measures might modify: (i) The existing rules of access to the area; (ii) fishing gear specifications; (iii) catch and bycatch regulations (particularly on threatened species); and (iv) habitat protections and restoration measures; (v) logbooks and on-board observer manuals; (vi) Electronic navigation and vessel monitoring systems (VMS). These modifications should also improve the coherence

(complementarity and synergy) between the measures applied in the OECM and around it. For traditional fisheries lacking a formal FMP, the prevailing local management rules may need to be upgraded (if needed) by the local Legitimate Authority. The recurrent reporting to WCMC would imply that although informal, these measures be somewhat registered at least at the level of the Legitimate Authority, with any evidence that they are effectively applied.

- Strengthening participation of environmental stakeholders, in addition to fisheries stakeholders, in the development of the FMP. Active stakeholders' participation in fishery management is already an established best practice and the management of the OECM will therefore likely follow the same process. If this was not yet the case, the implementation of an OECM might be a good opportunity to establish or strengthen it, considering that fishery stakeholders are a source of knowledge on the environment and biodiversity. However, if the location of the OECMs is likely to impact particularly a specific coastal community or other societal groups (e.g., environmental and sectoral NGOs), their participation needs to be ensured to improve effectiveness and equity (see below).

- Broadening the target audience of communication campaigns to inform interested parties about the presence of OECMs in the fishery and their implications for the fishery itself; for other fisheries operating in the same ecosystem; as far as possible, for other economic sectors that might , help promote the OECM (e.g., ecotourism) or might have to revise their policies or practices to allow the desired OECM biodiversity outcomes to be fully realized. The objective is to promote a good understanding of the new measures, call for increased collaboration, inform of the consequences of non-compliance and hence improve OECM performance.

- Checking new equity issues potentially created by the OECM in addition to these already addressed in the old ABFM, e.g., (1) Additional disruption of traditional livelihoods or sharing arrangements among geographically dispersed fishery participants; (2) New or increased violations of cultural of spiritual values; and (3) New or increased relocation from a traditional fishing area or exit from the sector, significantly altering distribution of benefits and costs. As far as possible also introducing measures to address such new issues by, e.g.: (1) adapting fishery measures in and out of the OECM to mitigate the distortion; and (2) introducing alternative measures that, if possible, would still maintain the OECM status, such as additional income-generating activities; compensations, etc. This would be particularly important when the resources are used both by small- and large-scale fisheries.

- Evaluating risk of non-compliance with OECM measures and strengthen MCS around and in the OECM. Also, identify impeding factors and corrective measures taken to mitigate their effect, as well as opportunities to incentivize improved compliance.

- Addressing impending internal and external threats to OECMs and clarify contingency measures and monitoring activities and benchmarks, with the view to ensure resilience, detect and respond quickly to emerging threats, and optimize the long-term total biodiversity benefits and co-benefits**.** This activity also requires fisheries managers to: (i) Identify the elements at risk in the natural and human components of the fishery system, and the sources of threats, in the environment, the fishery or in other economic activities; (ii) Improve foresight and predictive capacity: developing the needed threat-specific competences or bringing in the relevant experts (e.g., through collaborations), and collecting the relevant information through the MER system; (iii) Assess the related risks (e.g., cost of damage x likelihood) for the natural components, the ecosystem services and the related livelihoods; (iv) Identify responses to threats that are robust

to uncertainty[62]; (v) Develop contingency plans and associated triggers for action, and update them regularly; Display transparent information on uncertainties and their potential consequences for decision-making and implementation; and (vii) Identify/strengthen the regional collaborations needed to address transboundary threats.

- Ensuring that the fishery management plan is adaptive, i.e. that (i) it foresees potential changes that might occur in the OECM and/or in the fishery system, and that would affect OECM's performance; and (ii) it includes procedures for their early detection and, possibly, their mitigation. In that respect, when adjusting decision rules to improve performance assessment, it is important to avoid over-responding to small oscillations in performance due to natural variability in the social-ecological system. It would be ideal to define thresholds (e.g., in pre-agreed decision rules) of indicators' change beyond which management responses would be justified and cost -effective. The central role of the MER system in this regard is stressed in **Chapter 7**.
- Archiving and maintain information on FMP provisions and implementation**.** This function is best undertaken by a well-equipped MER system (cf. **Chapter 7**).

It should be reiterated that, as for the identification, the integration of OECMs in FMPs may be approached with different levels of means in different situations, but in each case the integration needs to be explicit and credible.

6.2 integrating OECMs within the fishery sector

As one of the intents of OECMs is to contribute to biodiversity conservation at the ecosystem level, their identification, management, and performance assessment should be coordinated and harmonized among fisheries that exploit the same ecosystem and food chain, contributing to integration of biodiversity concerns and measures into the sector.

The Decision (§12) *urges Parties to facilitate mainstreaming of … other effective area-based conservation measures into key sectors, such as, inter alia, …fisheries.* Mainstreaming and integration of biodiversity concerns into the fishery sector was addressed specifically in 2016 in Decision XIII/3, which: (i) in paragraph 62, encourages fisheries management organizations to further consider biodiversity-related matters in fisheries management in line with the ecosystem approach, including through inter-agency collaboration and with the full and meaningful participation of IPLCs; (ii) In paragraph 63, re-emphasizes the importance of collaborating with FAO, RFMO/As and regional seas conventions and action plans in addressing biodiversity in sustainable fisheries; (iii) in paragraph 68, urges parties to use existing guidance related to EAF and calls for further collaboration and information-sharing among the CBD Secretariat, the FAO and regional fishery bodies regarding information on EBSAs and VMEs, in support of achieving Aichi Targets (https://www.cbd.int/doc/decisions/cop-13/cop-13-dec-03-en.pdf).

The "integration" of the fishery-specific OECMs within the entire sector would be institutionally simpler and less expensive in interaction costs, than integration across sectors or MPA networks (cf. **Sections 6.3** and **6.4**), as it could be undertaken within one line-ministry and legal framework with additional collaborations with environmental agencies. It would also give to EAF a further boost away from the single-species, single-fishery approach.

[62] e.g., using Management strategy evaluation (MSE) –if the capacity and necessary information are available or accessible– or develop risk-based decision rules based on available information including expert opinion and local knowledge.

However, limited progress has been made in the effective integration of single fisheries' management at whole sector (or ecosystem) level despite the rising awareness of the systemic nature of fisheries in the last 50 years (e.g., **Walters and Hilborn, 1976; Walters, 1980; Allen and McGlade, 1987; Charles, 2001; Garcia and Charles, 2007; Link, 2018; Link et al, 2020)** and the adoption of the ecosystem approach to fisheries (EAF) at FAO, in 2001 (**Garcia et al, 2003; FAO, 2003a**). The integration has been substantially addressed from a theoretical scientific angle, focusing on the fisheries impact on the tropic web, e.g., on issues such as multispecies MSY, ecosystem-wide MSY, system-level optimum yield and the portfolio approach (**Link, 2017**), ecosystem-level Balanced Harvest (**Garcia et al., 2012; Zhou et al., 2019**). In operational management, this has led to considering multiple fisheries on several target-species or assemblages as "single" multispecies multigear fisheries (like most small-scale fisheries), albeit with little real management. This has led also to innovative management approaches such as: (i) implementing harvest caps on by-catch of protected, endangered or threatened (PET) species; (ii) implementing an overall cap on total ecosystem catch in the Eastern Bering Sea and Gulf of Alaska LMEs (Link, pers. Comm.); (ii) limiting removals from prey (forage) species stocks in the Antarctic (**Constable, 2011**).In practice, however, the management plans of single fisheries operating in the same region or ecosystem are still rarely integrated and there is little information on best practices for such integration, administratively and operationally. An exception might be in Western Australia where the various fisheries (métiers) using a common species assemblage (referred to as a "resource"), are considered together for management (**Fletcher et al., 2010, 2012**).

Part of the challenge may be that: (1) the "integration" of the bio-ecological and socio-economic dimensions of different fisheries in an ecosystem could go to a variety of depths (e.g., from information exchange and effective coordination, to full integration of the management plans), representing growing workloads and costs that may vary within the same fishery "system"; (2) The integration of all species, both target and non-target in a more or less structure total catch cap, may be easier to achieve, with reasonably stable or adaptive strategies, than that of the different fleets and their constant dynamic adaptation to external social and economic drivers. Fishery sectors including small-scale fisheries (SSFs), large-scale ones (LSFs), national and foreign face particular challenges[63].

Activities towards integration of OECMs at the fishery sector level would include: (1) Mapping all fisheries footprints (spatial distribution of fishing effort) and OECMs.; (2) Looking for potential synergies among the OECMs used in various fisheries in terms of geographical and functional connectivity; and (3) Harmonizing or, where feasible, merging management plans and measures of strongly overlapping or complementary OECMs, to facilitate their management (e.g., economies of scale in MCS) and possibly optimize their biodiversity outcomes. The merging of two candidate-OECMs may be an effective way to upgrade them to OECM standard.

6.3 Mainstreaming OECMs across economic sectors

Mainstreaming is the general *process of embedding biodiversity considerations into policies, strategies and practices of key public and private actors that impact or rely on biodiversity, so that it is conserved and sustainably and equitably used* **(Huntley and Redford, 2014**). A definition suggested specifically for fisheries is *the progressive, interactive process of recognizing the values of biodiverse natural systems in the development and management of fisheries, accepting full accountability for, and effectively*

[63] LSFs management tends to follow a "western" quantitaive, reductionist, and science-driven approach, while the management of small-scale multigear multispecies fisheries rests on a deeper understanding of multiple detailed sources of knowledge on resources and socio-cultural aspects. Integrating them is a challenge.

responding to, the broader impact of fishing and fishery related activities on biodiversity and related structure and function of ecosystems" **(Friedman et al., 2018).**

The Decision (Annex I, Section IIB) provides guidance about the integration of OECMs across sectors. Paragraph 2 of the Annex indicates that such integration could be achieved *by applying the ecosystem approach and taking into account ecological connectivity and the concept, where appropriate, of ecological networks*. It refers also to other Decisions of the CBD calling for integrating biodiversity in national poverty eradication and development plans. This higher level of integration is beyond the scope of the present document but the considerations made above (in **Sections 6.1 and 6.2**) for single-fisheries and integration across the fishery sector, would provide a good basis on which to build the participation of the fishery sector to cross-sectoral coordination frameworks, when established at the appropriate level of the government. This type of integration is more demanding and would usually require some overarching national framework such as ICAM (**United Nations, 1992**), Integrated Coastal and Ocean Management (ICOM; **Belfiore et al., 2004**)[64]; Integrated Ocean Management (IOM; **Freestone at al., 2010**)[65] and MSP (**Jentoft, 2017**; **Wright et al., 2018)** that have been advocated and meeting implementation problems in the last 3 decades.

Actions, based on suggestions in The Decision (Annex 1,B), include: (1) Identifying, mapping and prioritizing areas important for biodiversity attributes of concern and essential ecosystem functions and services. (2) Considering merging of strongly overlapping areas (pros and cons) and harmonizing sectoral legislation to enhance complementarity. (3) Reviewing and updating sectoral plans as necessary to ensure that they recognize and incorporate the many values provided by protected areas and OECMs in a synergetic manner. (4) Developing targeted communications campaigns aimed at the public and private sectors that lay out the biodiversity and ecosystem functions and services provided by protected areas and OECMs with the objective of increasing awareness of the value of nature for the private sectors and societal well-being. (5) Reviewing and revising existing policy and finance frameworks to identify opportunities to improve the enabling policy and financial environment for sectoral mainstreaming. Modern guidance in that matter encourage innovative finance –including investors, insurance companies and others– to identify and finance new and existing protected areas and OECMs and restoration of key degraded areas, to deliver on essential ecosystem functions and services, and to promote financial models for long-term sustainability. (6) Assessing and updating the capacities required to improve the synergetic mainstreaming of protected areas and OECMs, create enabling policy environments, undertake spatial mapping of essential ecosystem functions and services, and their multiple values.

In addition, if the sectors considered have their own MER systems, some coordination between them would be extremely useful, both in terms operational synergies, common databases, joint assessments, etc.

6.4 Integrating OECMs in seascapes

The Decision Annex (I) also refers to integration of OECMs into seascapes. Conservation International defines seascapes as "*Large, multiple-use marine areas, defined scientifically and strategically, in which government authorities, private organizations, and other stakeholders cooperate to conserve the diversity and abundance of marine life and to promote human well-being* (**Atkinsons et al., 2011:2).** IUCN Type V MPAs are referred to as "seascapes" i.e., "*areas where the interaction of people and nature over time has*

[64] See also: (1) https://globaloceanforum.com/areas-of-focus/integrated-ocean-and-coastal-management/; (2)

[65] See also: (1) http://www.beaufortseapartnership.ca/integrated-ocean-management/integrated-oceans-management-plan/; (2) https://www.oceanpanel.org/blue-papers/integrated-ocean-management

produced … distinct characters with significant ecological, biological, cultural and scenic value, and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values[66] (see also **Dudley, 2008; Day et al. 2019**). Seascapes may be created to contribute to broad-scale conservation and other values created by interactions with humans through traditional management practices, provide natural products and environmental services, and to act as models of sustainability[20]. The Seascape approach is aimed at building coalitions among government(s), corporations, and civil society to improve ocean governance, and highlights the importance of achieving effective governance across sectors and at all levels, from local to regional. It calls for bringing in the necessary science and knowledge, and empowering local governments and communities. Seascapes may be national such as the Bird's Head seascape in Indonesia or the Abrolhos seascape in Brazil. They can also be international such as the Eastern Tropical Pacific Seascape of Costa-Rica, Panama, Colombia and Ecuador, or the Sulu-Sulawesi Seascape of Philippines, Malaysia, Indonesia. Papua New Guinea, the Solomon Islands, and Timor-Leste.

This level of integration of OECMs is also beyond the management mandate of a fishery's Legitimate Authority and the scope of the present document. However, the elements of guidance provided in **Sections 6.2 and 6.3** and the preparation of the fishery sector for integration within the sector, would assist it in such broader engagement across sectors. Many actions required are similar to those required for cross-sectoral integration in the EEZ, with governance systems depending on the seascape scale and context.

Guidance on seascape establishment, governance and management is available, for example in **Ervin et al. (2010)** and **Atkinsons et al. (2011).** The integration of OECMs in seascapes is explicitly addressed in The Decision (Annex 1, A) as a strategy to combat ecosystem fragmentation and to optimize the functional performance of individual MPAs and OECMs through improved connectivity.

Suggested action includes: (1)Reviewing national visions, goals, and targets to ensure that they include elements of integration of protected areas and OECMs for increasing habitat connectivity and decreasing habitat fragmentation at the seascape scale. (2) Identifying key species, ecosystems, and ecological processes, including those vulnerable to climate change, for which fragmentation is a key issue and which can benefit from improved connectivity; (3) Identifying and prioritize important areas (including OECMs and MPAs) to improve connectivity and to mitigate the impacts of fragmentation of seascapes. (4) Conducting a national review of the status and trends of seascape habitat fragmentation and connectivity for key species, ecosystems and ecological processes, including a review of the role of protected areas and OECMs in maintaining connectivity. (5) Identifying and prioritizing the sectors responsible for habitat fragmentation and develop strategies to engage them in mitigating their impacts on protected areas networks including OECMs. (6) Reviewing and adapt seascape plans and frameworks**,** including marine spatial plans, and sectoral plans, integrated marine and coastal area management plans. (7) Prioritizing and implementing measures to decrease habitat fragmentation and increase connectivity, including the creation of new protected areas and the identification of OECMs, as well as indigenous and community conserved areas (ICCAs).

[66] See also: (1) https://www.biodiversitya-z.org/content/iucn-category-v-protected-landscape-seascape; (2) https://www.conservation.org/priorities/seascapes-large-scale-marine-management

7. MONITORING, EVALUATION & REPORTING

7.1 Premises

All fisheries ought to be monitored for management purposes, to continuously collect data and generate information regarding the fisheries, the natural resources they use, their impact on target species, as well as their compliance with management measures, providing the advice needed for adaptive management by the Legitimate Authority. Monitoring systems might be more or less sophisticated depending on the national or local governance capacity, the fisheries' size and economic value. As a consequence, the additional variables to be monitored in OECMs compared to ABFMs may require strengthening of budgets, and enhancing fisher's participation and external collaborations. In general, the principles of equitable governance are relevant for the MER organization and process. The MER informs the Legitimate Authority but also the stakeholders and the public on whether e.g.:

a. The fishery management plan (including the OECM) is being implemented effectively (as designed) and efficiently (at the lowest possible cost);
b. The expected outcomes of the management measures on the fishery and on the biodiversity attribute of concern are being achieved or can be reasonably expected to be achieved;
c. Emerging or unanticipated issues are arising that could affect performance; and
d. Possible options exist to cost-effectively improve performance in (a) and (b), and better prepare for (c).

Most if not all fisheries management strategies use ABFMs within which access and fishing practices are controlled[67]. Once introduced, ABFMs are very rarely assessed individually and recurrently[68] and the fishery-MER usually assesses only the overall performance of the management of the entire fishery looking at trends in these elements. The deep-sea fisheries VMEs may be an exception, related to the high level of attention given to these ABMTs following the United Nations General Assembly (UNGA) Resolution 61/1052, in 2006, and the adoption of the FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas, in 2008.

However, when ABFMs are identified as OECMs, each area, with the specific measures applying into it, needs to be assessed individually (case by case) and recurrently (in the long term) to ensure that it continuously produces the expected biodiversity benefits. The need for continuous monitoring of an OECM performance is stressed in The Decision (Annex III, § C,1,f). The frequency of these checks is a decision of the State and may depend on the biodiversity of concern, the means available in the MER, etc. However, for the OECMs that have been reported to UNEP-WCMC and uploaded in the global OECM database**)**, the WCMC Secretariat is committed to ask States for an update of their OECM information every five years (**UNEP-WCMC, 20190** (cf. **Section 7.4.2**). The long-term role of the MER system cannot therefore be overstated.

This Chapter is mainly about the process of monitoring, evaluation and reporting on actions and outcomes in the OECMs areas (referred to hereafter as the OECM-MER) after they have been formally identified and

[67] E.g. to conserve elements such as the target species, protecting essential habitats and/or vulnerable life stages and, increasingly, to reduce bycatch of unwanted or protected species.

[68] In practice, the interactions between the different measures, in and out of the ABFM, the predator-prey relationships, the environmental and socio-economic forcing, etc. are such that the effect of a single spatial measure on the fishery can often only be "demonstrated" by modelling, under a demanding set of assumptions

as they are used. Because of the dual function of OECMs –on fisheries sustainability and biodiversity conservation– the OECM-MER process is logically likely to be functionally connected to the broader Fishery-MER process with which it has to actively interact, for competence, means, interaction, etc.

7.1.1 MER at the fishery level

Usually financed by the authorities responsible for the management of fisheries or fishery research, the fishery-MER collects (from other sources) or generates (from scientific surveys) the information needed to track the broad performance of the fisheries and of their management. The process is often "anchored" in a fishery research institute or equivalent institution with a more or less sophisticated structure. In developing areas, particularly in island countries with limited population and capacity the supportive role of regional organizations cannot be overstated. The fishery-MER informs the fishery management unit of the Fisheries Department or of the Ministry, and involves cooperation with other fishery authorities (e.g., in charge of enforcement and fishery statistics) as well as environmental research institutes and the University.

The way fisheries are monitored and fishery management performance ranges from minimal to extremely sophisticated, depending on the capacity available to undertake the tasks. This capacity depends *inter alia* on the country, the size of its maritime domain, the number, size and importance of its fisheries (in terms of economic value, employment, social impact, etc.), the level of development and breadth of fishery research, the fishery management approach adopted, etc. In an RFMO/A, the MER characteristics reflect necessarily the capacities of the member countries. Except when specifically mentioned, **Section 7.1** refers to MER in well-managed fisheries with reasonably functional monitoring, evaluation, and reporting processes (hereafter, the fishery-MER). To some extent, the considerations made may be adapted to capacity-limited situations, keeping with the spirit and expectations of a proper MER and conscious of the implications of simplifications on implementation costs but also on robustness and credibility of the conclusions.

The purpose of a conventional fishery-MER process is to collect data and information in support of the management of the fisheries including the evaluation of the management system effectiveness. The Fishery-MER provide continuous information on (i) the fishing activity and its outputs; (ii) the status and trends of the target species; and (iii) the implementation of management measures and level of compliance. Increasingly since the adoption of EAF, the fishery-MER provides also information on: (iv) the collateral impact of the fishery on dependent and associated species –particularly protected species, and on essential habitats; and (v) selected aspects of the ocean and climatic environment of importance for the understanding of resources movements and productivity, fishing operations dynamics, and management performance.

The individual tasks of a fishery-MER can be described as:

- **Monitoring**: to regularly collect data and information on the living resources used and impacted by fisheries ; the natural and anthropogenic pressures that affect them; and the management measures (e.g., measures, costs, compliance). This requires measuring change in key indicators of: (i) fishing activity and pressure (e.g., areas fished, timing, gear used, fishing effort); (ii) fishery outputs (e.g., amounts and composition of catch, landings, bycatch and discards); (iii) Environmental conditions that might also affect the resources (e.g., temperature, rainfall, river outflows, climate change, environmental degradation); and (iv) management measures. In general, the cost-effectiveness of the management system, an important factor in the long term[69],

[69] Only very well developed and endowed Fishery-MER processes would regularly collect information on the wider

is not routinely monitored. Monitoring may be achieved using fishery-dependent data (e.g., on catch amounts and composition) as well as fishery-independent data (e.g., collected using research vessels). Effective monitoring of these elements requires an early identification of informative, affordable and robust 'indicators', easy to communicate to a wide range of stakeholders as well as an effective system of data archiving and management (see **Section 7.5**). Moreover, data are also collected about the MER activity, data collected, costs, outcomes, etc., to audit the MER performance (see **Section 7.6**).

- **Evaluation**: to systematically analyse monitoring records, to: (i) Develop an understanding of the status and trends of the living resources used and impacted by fisheries ; (ii) Provide a measure of progress towards fisheries management and conservation objectives and targets, with related indicators and performance measures; and (iii) Improve management foresight on emerging threats. A key challenge is on identifying and accounting for uncertainty and related risks in the assessments and management advice. In addition, the performance of the MER process itself, in terms of meeting the objectives assigned to it, may be evaluated (see **Section 7.3.2)**.
- **Reporting**: to inform: (i) The legitimate management authorities for development and management decision-making, raising of internal awareness of the management challenges, successes and uncertainties and proposing eventual corrective measures for adaptive management; (ii) The fishery sector and other stakeholders, including, the cooperating agencies and funding bodies; and (iii) The public at large, as part of the broader public accountability regarding the state of the resources and the management actions, costs and benefits.

The reports may also go to the internal or external audit offices, for use in future evaluations of performance (see **Section 7.6**).

The feedback from reporting consists of the response of the Legitimate Authority after considering the report, its conclusions, and its advice, in terms of new objective and targets and/or new measures. This last step of the process that completes the management cycle is considered to be not specific to OECMs and will not be discussed in any detail in this document

These three main tasks require a continuous or occasional capacity to collect statistics, deploy observations at sea, use remote sensing technology, and use assessment methods and models; to assess the economic and social conditions of the fishery and the state of the resources and related biodiversity in the fishery-MER competence area. Participation of key stakeholders and knowledge holders in the establishment and functioning of the MER is an asset, particularly in capacity-limited situations such as in small-scale fisheries and remote coastal communities. The description of the fishery-MER process and methods should be well documented, as part of the documentation on the fishery management system and specific fishery management plans.

An abundant literature is already available on MER processes for fisheries and conservation (e.g., for MPAs) e.g., in **Hockings (1998), Pomeroy et al. (2004; 2005), Fancy et al. (2008), Field at al. (2004, 2005, 2007), FAO (2003a, 2009a, b), Cochrane and Garcia (2009),** and **Lindenmayer and likens (2010)**[70] in which more operational guidance can be found.

environment and socio-economic aspects of fisheries. But the information may be obtained from other institutions (e.g., environmental agencies) or though occasional studies.

[70] See also; California, MPA monitoring action plan: available at https://www.wildlife.ca.gov/Conservation/Marine/MPAs/Management/Monitoring/Action-Plan: MPA Watch at http://www.mpawatch.org/

7.1.2 MER at OECM level

To maintain its status, the OECM must continue to meet the definition and identification criteria adopted in The Decision regarding the biodiversity benefits and additional properties (see **Section 4.2, Step 5**). This implies their translation into management objectives and targets, specific to the OECM but integrated in the fishery management plan (see **Section 5.7.1**). Indicators of pressure, status, and trends of relevance to the biodiversity attributes of concern are then collected by a specific MER (hereafter the OECM-MER) to provide the necessary evidence of OECM performance (cf. **Section 7.3.1**) and inform its adaptive management.

In a given fishery and fishing area, the OECM-MER and the fishery-MER need to be clearly distinct because of the particular requirement to monitor, evaluate and report on individual OECMs' performance to maintain their status. However, because of numerous operational and ecological interactions, the two MERS need to be integrated. For example:

- Many biodiversity attributes of concern in the OECM are likely to be also present or migrate outside it, and some biodiversity benefits may spillover from the OECM to the surrounding ecosystem, calling for integrated assessments;
- Collection of similar data with similar means inside and outside the OECM would facilitate assessment of the level of protection provided by the OECM as well as the level of impact of the fishery;
- Even though the biodiversity conservation objectives are fundamental for OECMs, their primary objective is to contribute to the fishery sustainability, a major concern for the fishery-MER;
- Conversely, in an EAF approach, fisheries management already applies conservation measures for non-target species and protected species (e.g., gear regulations, bycatch excluder devices, by-catch quotas, seasonal or permanent closures), calling for integrated assessment of conservation performance;
- Both MER systems need similar services: the MCS system, to ensure compliance; the statistical office, to collect, process and maintain fishery statistics; the research vessel, to collect fishery-independent data; and the fishery research laboratory, the university and environmental agencies, to undertake multidisciplinary assessments;
- The two MER processes report to the same Legitimate Authority, preferably though the same channels, to ensure an excellent integration;
- The fishery-MER and OECM-MER processes are confronted with many common external drivers and pressures (including climate change) and seeking similar outcomes for status, trends and performance; and
- Because of these numerous interactions, the fishery-MER may need to be strengthened to respond to the new or reinforced biodiversity conservation objectives of the OECMs.

As a consequence, the fishery-MER and OECM-MER need to be integrated, just as OECMs need to be integrated in the fishery management plan (FMP) (see **Section 6.1**). The higher the complementarity and overlapping the fishery-MER and the OECM-MER (e.g., in terms of objectives, targets, management

activity and resources), the more integrated they should be. Particularly, in an EAF approach, and for greater efficiency within limited budgets, the OECM-MER may be best conceived as a component of the fishery-MER with specific reporting requirements. For the same reasons, MER systems covering various fisheries operating in the same "ecosystem", EEZ or transboundary area, or developed in other economic sectors that have spatial or functional areas of overlap, would benefit from coordinating information exchange, and even from some level of integration.

In the OECM-MER, attention is given to those tasks and elements of biodiversity that are additional to those that would have been expected by the fishery-MER from the original ABFM in terms of sustainability of the target species use and eventual broader conservation concerns. The new needs depend on how well the existing fishery-MER programme, under an EAF approach, was already covering broader elements of biodiversity such as non-target species (including threatened and protected species), essential habitats and other biodiversity attributes of concern. The OECM performance in terms of equitable governance (see **Section 5.6.2,c**) might be facilitated in modern fisheries where principles of good governance are already applied unless local adjustments are needed, e.g., in fisheries across overlapping jurisdictions.

A good part of the background information needed to develop the OECM-MER programme[71] is likely to have been already compiled during the identification process (see **Sections 5.3 to 5.9**) and a good part of this information may indeed be provided to the identification process by the existing fishery-MER. However, additional information is likely to be needed to better address the specific biodiversity attributes of concern and other locally relevant values of the OECM. These may be: (i) either collected directly by the OECM-MER through its specific activities (e.g., on-board sampling programme; scientific surveys cruises, special working groups; collaborations; governance process; reports; or (ii) obtained through collaborations with partner-agencies. The new information generated by the OECM-MER may be stored and managed in the data and information system of the fishery-MER, for efficiency reasons. Conversely, the requirement for OECMs to address future threats to biodiversity (including climate change) and issues of representativeness and connectivity (networking) of OECMs, may lead to a need for additional monitoring data and tasks at higher geographical scale, in the fishery-MER itself and at EEZ or ecosystem level (See **Chapter 6** on integration).

The actions required for developing and running an OECM-MER within the fishery-MER are considered in some detail in the following section in relation to three domains: (1) Strategic planning and coordination; (2) Monitoring and evaluation; and (3) Data and information management.

7.2 Strategic planning of the OECM-MER

Strategic Planning is a systematic process of translating a vision (a desired future) into a strategy (a direction), with broad goals, specific objectives, a sequence of steps, explicit resources for implementation and, possibly, the control mechanisms guiding and controlling the implementation of the strategy (e.g., governance, oversight, management, reporting, and audit cycle). Many elements needed for strategic planning of an OECM-MER –such as governance, goals, objectives, targets, and means of implementation– would usually be "inherited" from the strategic planning of the fishery-MER itself, the FMP and higher-level planning processes. These elements need to be tailored for the OECM specific circumstances, in collaboration with the actors concerned, aiming at coherence in fishery management, inside and outside the OECM, across OECMs and, ideally, within the ecosystems where the fishery operates.

[71] e.g., historical information, surrounding ecosystems; geolocation; sources of data and information; stakeholders and potential collaborations; species; habitats; biodiversity features of concern; assessment methods, fishing activities; management measures in and around the area; and bibliography.

The OECM definition contained in The Decision provides the overarching goal of OECMs as: *to achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity, with associated ecosystem functions and services and, where applicable, cultural, spiritual, socio–economic, and other locally relevant values*. Other objectives more directly related to the strict sustainability of the fishery of the target species might well be the primary objectives of the OECM but they are not considered in this document as the guidance on conventional fisheries management and monitoring is already abundant. The more specific biodiversity conservation objectives may be set in terms of the desired (i) Status and trends of the biodiversity and other values of concern; and (ii) Performance of the OECM-MER process itself in delivering its expected output (effectiveness and efficiency). Both sets of objectives may be materialized by targets, indicators, and reference values (or benchmarks).

The specific upstream activities needed to plan the work of an OECM-MER include:

- **Describing the types of outputs expected from the OECM MER on biodiversity conservation**. This will help planning efficiently the MER biodiversity conservation-related activities, in addition to the activities regarding the fishery sustainability itself[72]. The main outputs relate to the assessment of the OECM performance in meeting the biodiversity conservation objectives that justify the OECM status[73]. A second important output is an assessment of the performance of the OECM-MER in delivering its monitoring, evaluation, and reporting tasks. Both require monitoring and evaluation of partly overlapping elements of the fishery and the ecosystem in which it operates. The MER report to the Legitimate Authority on OECM performance is expected to contain: (i) Data and information on the evolution of fishing operations and other drivers (including external drivers if available); (ii) The evolution of status and trends of the biodiversity attributes of concern, including the relevant ecosystem services; on the benefits (including harm-reduction) the costs, and their distribution among stakeholders; (iii) The evolution of external drivers (e.g., the global economy, markets, climate change, price of fuel) and on early warnings on impending threats, if any; and (iv) Based on the above, synthetic conclusions on the performance (effectiveness and efficiency) of the measures taken, in the OECM and its surroundings, with eventual considerations or recommendations on mitigation measures.
- **Describing the specific types of tasks assigned to the OECM-MER.** The expected outputs determine the types of tasks which might include: (i) To monitor the biodiversity attributes of concern and other values of relevance to conservation as well as fishing activities and other pressures and threats, in the OECM and surroundings (in coordination with the fishery-MER); (ii) To assess their status and trends in relation to the specific conservation objectives, indicators and reference values and trends; and (iii) To elaborate management options to maintain good trajectories or correct unsatisfactory ones, based on known or assumed cause-effect relations between status and drivers; and (iv) To assess its own performance as a monitoring process against international reporting and advisory standards (e.g., cost versus benefits; effectiveness; efficiency; timeliness; relevance; accuracy and treatment of uncertainty).
- **Identifying and documenting the additional biodiversity elements to monitor and evaluate**. These elements might include: (i) Biodiversity attributes of concern such as vulnerable species,

[72] The performance of the OECM in relation to the fishery and target resources sustainability (usually its primary objective) is of great relevance for the fishery sustainability and Aichi Target 6 and successor targets and for SDGs. An abundant guidance is available for the purpose and this subject is not addressed here.

[73] Secondary important out puts are produced in the process, such as: (i) a data and information management system to maintain records in the long term;

communities and habitats; areas important for life cycles, ecological representativeness and connectivity; ecosystem functions and services including food and livelihoods; and (ii) Other features of social, economic, cultural and spiritual importance, contributing to a sense of community and stewardship; (iii) Fishery pressure current and projected (catch, effort); (iv) Other pressures and threats, with their degree of significance and likelihood, possibly getting information from non-fishery sources; and (iv) Governance ensuring equity in the identification of stakeholders, their involvement in the governance process, and the distribution of costs and benefits. These elements (including their historical review) should have been already identified and documented during the OECM identification process (See **Chapter 5**) and endorsed in the identification decision. They may only need to be initially confirmed in the MER documentation and, as necessary, updated as the OECM and its drivers evolve. The elements to monitor are numerous and the budgets limited. Context-sensitive priorities may therefore need to be explicitly established, based on the relative ecological, social (cultural) and economic importance of the elements, resulting in a subset of elements being highlighted as "key performance elements" for the OECM[74].

- **Identifying the additional biodiversity conservation objectives and targets.** For each of the biodiversity attributes of concern identified above, the specific objectives and related targets need to be credible for both the fishery and conservation communities. They need to be decided at management level (e.g., when integrating OECMs into the management plan (see **Section 6.1**) and to be specified in the fishery-MER programme. If additional ones are identified in the OECM-MER process, they will need to be endorsed formally by the Legitimate Authority and retrofitted in the fishery-MER programme and the FMP. Following the Biodiversity Impact Mitigation (BIM) hierarchy[75] (**ten Kate and Crowe, 2014)** the management objective may be to avoid, minimize, mitigate, or compensate (where possible) a specific impact on biodiversity, to either maintain status quo (No Net Loss objective) or restore the element to some reference state (Net Gain objective). Following the Law of the Sea, the reference state for dependent and associated species might be the biomass *below which their reproduction would be threatened* (UNCLOS Art. 61.4). With very similar implications on biomass, the CBD, in Target 6 ,requires that these species *should not be affected by Significant Adverse Impact (SAI)*. As an example: if the element of biodiversity of concern is the trophic chain (as a proxy for ecosystem structure), the goal might be to maintain such structure (with the hope to maintain the ecosystem functions). One objective might be: to maintain the diversity of the apex predators' community.
- **Identifying the related indicators baselines, and reference values and their priority.** Values may be qualitative or quantitative and correspond to each objective and biodiversity attributes of concern. Most of these might have been determined during the identification process (**Chapter 5**). Arguments to consider include: (i) Priority given by the Legitimate Authority to the various objectives; (ii) Cost of data acquisition compared to budgetary resources available; (iii) Data versatility (usability across many objectives and OECMs); (iv) Complexity of the indicator elaboration pathway; (v) Ability to communicate status and change; (vi) Precision of the possible assessments compared to that needed for effective dynamic management (signal/noise ratio); and (vii) Support and trust of stakeholders. A large literature is available on the use of indicators

[74] The concept of "Key Performance Measure" is not foreseen in the Decision 14/8 but would reflect the degree of "flexibility" that the Decision provides for States in implementing the Decision.

[75] The use of the BIM hierarchy is recommended in CBD Decision 14/8, Annex IV,C, §5e),

for policy development and management both in fisheries and conservation (see for example **Garcia et al., 2009; Pomeroy et al., 2005; Addison et al., 2018**). For the trophic chain example used above, the variables would be the abundance of the apex predators' community species. The related indicator[76] would be a diversity index (species richness and/or abundance or evenness) of the community. The relative target (reference value) would be some adequate value of that diversity index observed at some time in the past or projected by simulation. The performance measure would be the ratio between the observe diversity index and the reference value for that index in well-functioning communities of the same type or in the same areas sometimes in the past. The indicators could conveniently be organized along the Pressure-State-Response framework (PSR) and its variants (**Moldan et al., 1997; Chesson, 2013**) and the MER would track the current pressures and impending threats (P) on the status and trends (S) of assets; and the management responses (R), clarifying cause-effect relationships between P, S and R. Priorities among baselines, indicators and reference values may be determined on the following arguments: (i) Priority given by the Legitimate Authority to the various objectives; (ii) Cost of data acquisition compared to budgetary resources available; (iii) Data versatility (usability across many objectives and OECMs); (iv) Complexity of the indicator elaboration pathway; (v) Ability to communicate status and change; (vi) Precision of the possible assessments compared to that needed for effective dynamic management (signal/noise ratio); and (vii) Support and trust of stakeholders. A large amount of literature is available on the use of indicators for policy development and management both in fisheries and conservation (see for example **Garcia et al., 2009; Pomeroy et al., 2005; Addison et al., 2018**).

- **Listing the additional management measures applying in the OECM.** Some of the measures to be applied in the OECM might have been in place already in the ABFM before becoming an OECM and should be already integrated into the overall fishery management plan and monitored. Additional measures, or modification of existing measures, may be needed, to reach the additional biodiversity conservation objectives. These measures might have been considered already during the identification process and proposed to the unit of the Legitimate Authority in charge of management. Following the trophic chain example above, the actions needed to achieve the objective of maintaining (or rebuild) the apex predators' community could be to eliminate the gillnet fishing mortality on the species concerned, e.g., by (i) banning the gear in the OECM or (ii) changing the gear specifications to modify its selectivity and avoid such species. The measure of performance (in terms of harm reduction) would be: (i) confirmation that all gillnets have been eliminated (and no alternative source of mortality was introduced) or (ii) the reduction of the apex predators' species bycatch. It should be noted that if these apex predators are also taken by the same or another fishery outside the OECM, as they migrate in and out of the OECM, coordinated bycatch reduction measures will be needed outside the OECM to avoid reducing or losing the net conservation benefits[77]. Such outside measures are not part of the OECM

[76] Indicators should ideally be institutional (part of the decision system), relevant, consensual, up-to-date, timely, representative, responsive, accurate, tested, precise, robust, stable overtime, affordable, practical and functional, cost-effective, optimized, flexible, easy to integrate or aggregate, commented(explained) and communicable (understandable) (**Garcia, Rey-Valette and Bodiguel, 2009**)

[77] If the same species were affected negatively inside the OECM, by pressures from other sectors, e.g., by collision with tankers, and the expected biodiversity benefits from fisheries measures could not be ensured, the OECM ought to be delisted or, better, a cross-sectoral agreement could be sought (with the lead or support of the State as necessary) to eliminate, reduce or mitigate the external impact. In case of climatic unfavourable events or trends

management responsibility but should be considered by the fishery-MER and the management authority to improve the overall biodiversity conservation performance in the fishery.

- **Listing the elements to monitor in order to assess the OECM-MER performance.** It is important, to check not only whether the OECM-MER is effective (obtaining the expected outcomes) but also efficient (in obtaining them at the lowest possible cost. Consequently, time series of records should also be collected concerning the OECM-related investments in management, e.g., : (i) Collection of the broad range of monitoring records, processing and managing them; (ii) Assessment of status and trends (research costs); (iii) Control and surveillance, to assess compliance with the regulations applying into the OECM; and (iv) Administrative and other costs of running the OECM-MER. These costs might be directly supported by the OECM-MER budget – likely a subset of the fishery-MER budget)– but may also be incurred by collaborating services and agencies contributing to the OECM-MER. It is important to note that in well-managed fisheries the cost of OECMs management represents a marginal and hopefully affordable cost increase of the fishery-MER system.
- **Selecting monitoring and assessment methods specific to the OECM-MER (if any)** e.g., to describe the change in the status of the biodiversity attributes of concern or the pressures exerted on them. Following the example above, how will the species diversity, abundance, or biomass of apex predators as well as the fishing pressure and its impact be measured over time? Again, some of the methods used in the process of identification of OECMs to assess pressures, threats, risks and biodiversity benefits are likely to be used also for the recurrent assessments conducted in the OECM (see **Section 7.3**). The methodology could improve with time as the MER system collects more data, masters new methodologies, or acquires new competences. The flexibility foreseen in The Decision, regarding the identification process, also applies *mutatis mutandis* in the MER functioning, for the same reasons, including objective limitations in the data and capacity available. The methods to be used in each national and ecological context need to be explicitly defined, e.g., as Standard Operating Procedures (SOPs), in order to ensure a level of standardisation, consistency and coherence across fisheries, time and space, in data collection, processing, analysis and interpretation of changes in the indicators. In areas where capacity is sufficient, the Management Strategy Evaluation (MSE) process used in advanced fisheries management programmes, modified to deal with broader biodiversity values (cf. **Smith at al., 2007**) could be used test the robustness of SOPs to uncertainties in data, assessment methods and decision processes. Methods for quick or in-depth assessments, using local knowledge, expert views, or sophisticated simulations may be combined to deal with different attributes, varying budgets (to optimize costs) or account for sensitivities or needs of the evaluators and decision-makers.
- **Identifying and strengthening the competences and collaborations available.** Possible activities in that direction include: (1) To identify the potential participants of a collaborative process; (2) To establish formal collaborations with institutions and organisations monitoring the ocean environment, biodiversity and social and economic parameters; (3) To identify additional sources of data and assessment competence (e.g., on seabirds, marine mammals, turtles, seahorses, snakes, depending on objectives and expected biodiversity outcomes) and as partners in MPA and OECM networks (increasing mutual trust). These collaborations should be taken into account in the fishery-MER.

(e.g., in the case of reduced productivity, coral bleaching), efforts should be made to proportionally reduce the fishing pressure in the OECM and possibly in the fishery itself.

- **Describing the types of outputs expected in the MER report** on the biodiversity attributes of concern[78]. Identifying the specific outputs expected from the OECM-MER, in its three major programme areas (monitoring, evaluation and reporting) on the situation and performance of the OECM and of the OECM-MER, will help planning efficiently the MER activities in these areas. The MER report to the Legitimate Authority is expected to contain: (i) Data and information on the evolution of fishing operations and other drivers (including external drivers if available); (ii) The evolution of status and trends of the biodiversity attributes of concern, including the relevant ecosystem services; on the benefits (including harm-reduction) the costs, and their distribution among stakeholders; (iii) The evolution of external drivers (e.g., the global economy, markets, climate change, price of fuel) and on early warnings on impending threats, if any; and (iv) Based on the above, synthetic conclusions on the performance (effectiveness and efficiency) of the measures taken, in the OECM and its surroundings, with eventual considerations or recommendations on mitigation measures. This last part of the report should be drafted so as to facilitate the elaboration of the report to be submitted to WCMC. A separate report might also provide an appraisal of the performance of the MER programme itself (self-evaluation) with suggestions for improvements.

Having undertaken the upstream activities indicated above, the MER tasks may be undertaken as suggested below (**Sections 7.3 to 7.5**)

7.3 Monitoring and evaluation of performance

As stressed earlier on, two aspects of performance need to be considered: (i) The performance of the OECM area (with the measures applied into it) in delivering the expected biodiversity outcomes; and (ii) The performance of the OECM-MER system or programme, in discharging its monitoring, evaluation and reporting tasks. These two inter-connected aspects are examined below.

Because this is an important point in The Decision, we should stress that the consent of the Legitimate Authorities that is needed for the identification process would necessarily imply a consent to monitor and evaluate the OECM performance in the longer term, with the means available and, as appropriate, support from the State and/or collaborating institutions.

7.3.1 Ongoing assessment of the OECM performance

The performance of the OECM is assessed in terms of its effectiveness i.e., its capacity to inform management on the extent to which it reaches its fishery and conservation objectives and targets. It may also be assessed in terms of efficiency i.e., its capacity to do so at the lowest possible cost.

In this document we consider only the performance in relation to biodiversity conservation objectives and targets, on which a decision to maintain, improve or delist an OECM may be taken. Following the Biodiversity Impact Mitigation (BIM) Hierarchy, the performance may be taken to relate to the degree to which the area-based measures succeeded to successively : (i) avoid collateral impact of fishing on the biodiversity attributes of concern; if not possible, (ii) reduce the residual impact of fishing to the extent possible and in any case below the level at which it would be considered a Significant Adverse Impact

[78] The performance of the OECM in relation to the fishery and target resources sustainability (usually its primary objective) is of great relevance for the fishery sustainability and Aichi Target 6 and successor targets and for SDGs. An abundant guidance is available for the purpose and this subject is not addressed here. See for example: **Hockings (1998), Pomeroy et al. (2004; 2005), Fancy et al. (2008), Field at al. (2004, 2005, 2007), FAO (2003, 2009a, b), Cochrane and Garcia (2009),** and **Lindenmayer and likens (2010)**

(SAI); (iii) rebuild the biodiversity attributes when the impact is too high; or else (iv) compensate for the impact, usually elsewhere (off site). The result is to maintain the biodiversity values of concern (No Net Loss) when they not under SAI, or otherwise to increase such values as needed (Net Gain). The rebuilding, performance may also relate to the speed at which the OECM benefits are improved compared to expectations. It must be stressed, that compensation is not foreseen in UNCLOS as all impacted resources must be maintained *in situ* or rebuilt at their safe level[79] (**Squires and Garcia, 2018**). The extent to which this would apply to essential or vulnerable habitats, however, is not clear.

Such performance reflects necessarily the quality of: (i) The OECM area, e.g., the fit between the area boundary (its location) and the biodiversity attributes of concern it intends to protect); (ii) The measures applied in the OECM area and, possibly, around it (e.g., access rules, gear regulations, and fishing practices); and (iii) The degree of participation of the actors directly impacted by the measure and the related enforcement effectiveness. The data and analyses required are similar to these undertaken during the initial identification process (see **Sections 5.6** to **5.8**) albeit more focused, and conclusions will be updated.

A comprehensive OECM performance also requires a check on the "additional properties" of the OECMs, i.e. their representativeness, connectivity, complementarity with the other protected areas around them, and their integration in broader networks (**Section 6.4**), even in circumstances where these properties may not be expected to change much with time. The eventual evolution of governance in terms of identification and participation of actors and equitable distribution of costs and benefits among them needs also to be checked. Performance with regard to these properties would not threaten the OECM status but could affect its performance on biodiversity conservation.

As stressed a few times in this document, the benefits expected from OECMs relate both to usual ABFM primary functions on the narrow "fishery sustainability"[80], and to the broader biodiversity conservation even though some of these biodiversity benefits are already expected under an Ecosystem Approach to Fisheries management (**FAO, 2003a**). Because of ecological interconnections, the benefits of the measures applied inside the OECM might be measurable inside the OECM (e.g., for resident species and habitat) but also outside it, in the fishery and beyond, in the surrounding ecosystem with which the OECM biodiversity interacts, e.g., through passive transport of propagules (e.g., of eggs, larvae, juveniles), active foraging movements in and out of the OECM by resident or external fish, or live cycle migrations.

A rich assessment methodology exists, developed in fishery and conservation science (cf. **Section 5.2.8**) and will not be described here. The assessments must be conducted in a timely manner, facilitating a rapid management response, or fulfilling the commitment to legislated reporting frameworks. A capacity to respond also to ad hoc questions from the authority (e.g., in case of unexpected events) would also be essential.

The necessary tasks rely on the information collected during monitoring and include:

[79] Be it the level at which their maximum sustainable yield (MSY) can be obtained, or above the level at which their reproduction would be threatened.

[80] The primary purpose of an OECM in fisheries is to contribute to the sustainability and economic viability of the fishery on target species. This aspect of its performance is central for the Fishery-MER but it is not addressed in this document, although the performance of the OECM in fulfilling its broader biodiversity conservation objectives reflects on the performance of the Fishery-MER within which it is integrated and, to some extent, on the performance of the integrated fishery management plan, in which the biodiversity conservation objectives are listed.

a. **Selecting indicators.** For each OECM objective and target, a range of indicators might be considered. A selection could be made based on their: (i) Measurability; (ii) Affordability, i.e. data acquisition costs, relative to budgets available; (iii) Versatility, i.e. usability across many objectives or OECMs; (iv) Elaboration complexity, relative to research capacity available; (v) Precision, relative that needed for effective dynamic management (signal/noise ratio); (vi) Clarity, of the relation between the changes in the indicators and in the attribute of concern; and (7) Easiness of communication and trust/support of stakeholders. A large literature exist on the use of indicators of fisheries sustainability (e.g., **Chesson and Clayton, 1998; FAO, 1999**; **Garcia, Rey-Valette and Bodiguel, 2009; Anderson et al., 2015;)** and for biodiversity conservation **(BIONET and IUCN, 1997; Ablan et al., 2004; Pomeroy et al, 2004; 2005; CBD, 2005; Biodiversity Indicators Partnership, 2010; 2011**). We will not address the subject in any detail in this document and only advise to use the best practices corresponding to the data and competences available focusing on the properties the OECM has asserted to have and what consequences it was expected to produce.

b. **Analysing trends in:** (i) fishing operations as the main source of pressure, inside and around the OECM, which impact the various elements of concern; (ii) **external drivers** such as the global economy parameters of relevance; markets demands; climate change; fuel price; and their observed or potential impact on the elements being assessed; (iii) **impending threats and related risks** (potential impacts) from the fishery sector and as much as possible from other sectors[81]; and (iv) **status of biodiversity and other values of concern, including ecosystem services**, updating the archived historical records and improving the understanding on causal relationships between changes in pressures and biodiversity values. Understanding trends and their changes is important to assess the effect of a measure and to correct it if necessary. To be able to understand trends and their changes, it is essential to understand the "natural" variability of indicators, so as to distinguish a reliable signal of change (e.g., due to the introduction or change of a measure) from the ambient "noise". This is not easy to achieve in complex ecosystems with numerous interacting variables, but the thorny problem may be mitigated by integrating the related risk of error in the definition of the performance measure (the higher the variance of the indicator, the more precautionary the benchmarks).

c. **Assessing the OECM performance with regard to biodiversity conservation** is a central product of the OECM-MER, needed to verify that the OECM status of the area has been maintained. Performance is assessed by comparing the status and trends of the biodiversity attributes of concern to the related objectives and targets. If the fit is good, the measures in the OECM might be operating as expected. If not, the measure may need to be changed. If the trend is right but slow, the measure may need to be adjusted, or the reaction time might have been underestimated. As stressed above, however, success and failure may always be due entirely or in part to a contrasting environment. In addition, the OECM performance is related to numerous indicators corresponding to the different biodiversity values of concern and their trends are unlikely to be perfectly synchronized (e.g., trends in predators and preys may be opposite and with different response times). Consequently, definitive conclusions on performance will require sufficient time for the cause-effect relations to be stabilized and understood. Comparisons with similar types of OECMs elsewhere would be useful. The conclusions reached in the OECM,

[81] I cannt be expected that the fishery sector will be able to face the cost and have the competence to assess trends in threats emanating from other sectors, but the MER might be able to at least inform itself on such threats, as far as they may be foreseable, and report on what is known about them, based on external sources..

eventually complemented by conclusions obtained in the fishery-MER, should show how effective management is in maintaining or improving the biodiversity attributes and other values of concern and in controlling fishing pressure in the OECM area.

d. **Assessing the "additional" properties of the OECM.** These properties were described in **Section 5.9** and refer to: (i) representativeness, (ii) connectivity, (iii) complementarity, and (iv) integration, as well as governance. They may enhance the OECM effectiveness and strengthen but do not condition the rationale for their identification. Hence, they can affect the improvement of the performance of the OECM but do not threaten their status unless serious mistakes were made in the identification. Properties (i) to (iii) relate to the relations between the biodiversity inside and outside the OECM, and may change with time as biodiversity evolves and knowledge improves. Property (iv) may change if the integration of the OECM in the management plan and the OECM-MER changes. The effectiveness of this integration would also be an argument for the assessment of the OECM-MER performance (see **Section 7.3.2**).

e. **Elaborating options for new or improved measures** in the OECM or around it, is essential in case on unsatisfactory performance, to improve it, e.g., for additional harm reduction and faster recovery, better cost optimization or improved distribution of costs and benefits among sub-sectors and coastal community groups. Depending on the governance system, the OECM-MER may be asked to recommend a particular option, with the rationale for the preference.

The activities above are presented in sequence but they are likely to be undertaken in parallel, interacting with each other. The results might be highly technical but need to be expressed in a way comprehensible for all stakeholders. For a more intuitive understanding, the results can be used to elaborate a dashboard for the OECM, ideally integrated in the fishery-MER dashboard (see **Figure 3** and its legend for explanations; see also **Garcia, Rey-Valette and Bodiguel, 2009** for more details and illustrations).

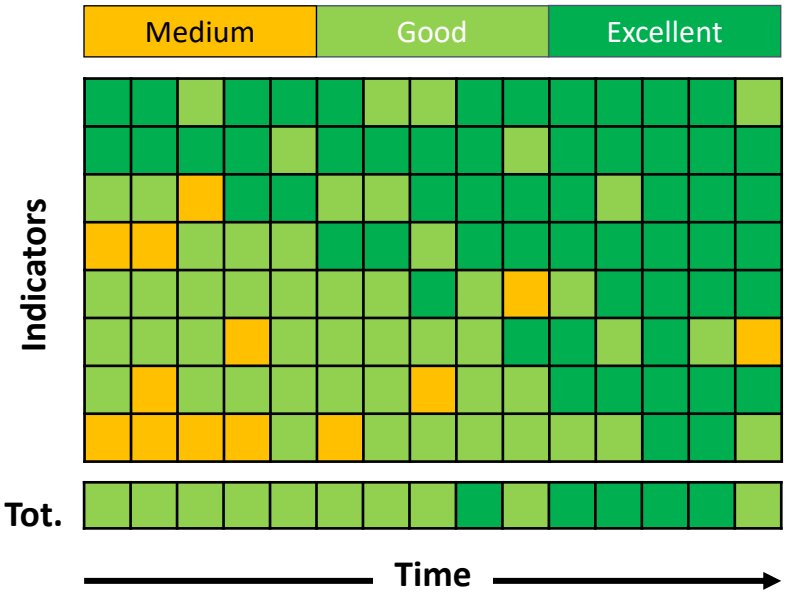


Figure 5 Theoretical intended evolution of a set of indicators (of biodiversity values and or pressures) with time, in an OECM, and overall score (Tot, bottom row) using a standard color-coding. The medium, good, and excellent performance (and related scores) may be defined for each indicator as the time

series develop) by comparing the observed state at each time interval to the reference values adopted for the OECM. In this example the overall trend is positive as the proportion of indicators being scored as "excellent" increases with time. An opposite trend would call for corrective measures.

7.3.2 Ongoing assessment of OECM-MER performance

The performance of the OECM-MER system or programme can be judged by the extent to which it functions according to operational objectives and plans when : (i) Collecting the data needed for the assessment of the OECM and OECM-MER performance; (ii) Undertaking the assessments required for both, including responsiveness to unexpected situations; and (iii) Timely and accurately reporting on both to the Legitimate Authority (see **Section 5.10.2**) with adequate recommendations for its improvements through adaptive management. The performance of the OECM-MER reflects necessarily on that of the fishery-MER into which it is integrated and, by extension, on that of the whole fishery management plan. It would be part and parcel of the activity report of the OECM-MER, likely integrated in the activity report of the fishery-MER. Such a report would contain a detailed compilation of e.g., the scientific surveys, sampling plan, and other data collection activities; data processing and storage; assessment activities including working groups; methodological developments in data collection and assessments; collaborations and participation; funding and expenses. The comparison between planned and effectively undertaken activities will provide an assessment of performance.

Many elements condition the performance of the OECM-MER, as any MER, e.g.: (i) Quality of its sampling programme, its continuous optimisation and adaptation over time ; (ii) Access to modern technology (e.g., research vessels, remote sensing, digital mapping, underwater video, data management, and assessment software); (iii) Its success in establishing institutional collaborations and active participation of stakeholders e.g., in collection of information and assessments and communication; (iv) The quality of its reports, their accuracy, timeliness, accessibility to all stakeholders; (v) The quality (safety, durability) of its data and information management system; and (vi) Its responsiveness to unexpected negative events and auditing recommendations. These issues are not vastly different from what they are for fishery MER itself, and often must be resolved at that level. They are not addressed further here.

The performance of the OECM-MER and that of the fishery-MER are inter-dependent as the two programmes share financial, technical, and human resources, produce overlapping or complementary outputs, and their respective contribution to ecosystem-level outcomes is hard to separate[82]. Moreover, OECM-MER programmes may be organized differently in different countries but, usually, would have to rely on external services for part of their work (e.g., for some categories of data or assessments regarding landings, compliance or climate) on which the OECM-MER does not have control, but may influence through collaboration and feedback. It is therefore important to clearly define the specific responsibilities of the OECM-MER in order to correctly measure its performance and conceive corrective measures when needed.

The performance of the OECM-MER ought to be assessed internally (self-evaluation, internal audit) and could be supplemented by an independent third-party auditing process, if so desired, probably at a lower frequency. The OECM-MER may be assessed alone, but for practical reasons should rather be assessed together with that of the fishery-MER with which it is integrated.

[82] Because of the numerous interactions between the OECM "ecosystem" and the broader ecosystem aound it and in which the fishery operates.

7.4 Reporting through the legitimate Authority

The Decision (Annex IV, Section 4) refers to "reporting" on OECMs, asking Parties to:

a. Improve the frequency and accuracy of reports, maximizing use of existing mechanisms;
b. Enhance the reports' visibility and encourage their broad multidisciplinary analysis;
c. Ensure that management is well informed to facilitate adaptive management;
d. Build the capacity to report and analyse management effectiveness analyses;
e. Build the political support to timely and effective reporting;
f. Engage indigenous peoples and local communities in assessment and reporting;
g. Develop and foster communities of practice

Regular reporting on the performance of fishery management measures –whether area-based or not– is one the most important purpose of the fishery-MER. These reports are needed by the Legitimate Authority primarily, for adaptive management of the fishery but are also often a requirement to inform the Government and justify the budget. For broader accountability and in appropriate formats, these reports may also be made available to the public at large. Such reporting requires procedures, standard, schedules, and formats established at the sector level (see **Section 5.10.2**).

At international level, The Decision (§6) *encourages the relevant authorities to …submit data on OECMs to UNEP-WCMC for inclusion in the World Database on Protected Areas on OECMs (WDPA-OECM-)* so that they can be taken into consideration when reporting on Aichi Target 11 and, presumably, in the Post 2020 Global Biodiversity framework as well as the 2030 Sustainable Development Goals. The implications are discussed in **Section 7.4.2**.

7.4.1 Recurrent reporting

The suggested structure of a Recurrent Report is similar to that of the Identification Report detailed in **Section5.10.2.** The descriptions of the fishery and the OECM may be relatively stable across years, requiring little or no updating. The evolution of the biodiversity attributes of concern and their drivers is the central part of the recurrent performance report and will show whether attributes have been maintained (No Net Loss) or improved (Net Gain), as expected, or degraded (net loss). The negative outcomes will obviously require more comprehensive information, including the possible causes, e.g., changes in pressures and threats in and around the OECM (including climate change), poor management, or weak compliance. Specific advice and –if requested– recommendations for corrective action will be essential for an effective adaptive management, possibly indicating the related costs and benefits and their distribution among stakeholders.

Considering the complexity of cause-effect relationships and feed-back loops in complex social-ecological systems, the causal linkage between the changes observed in the OECM (or the fishery) and the various potential drivers of such change may not always be straightforward. In any case, the measures that may be considered to counter negative trends may range from minor tweaking of the management regime (which can be done without affecting the status of the OECM) to its complete revision (cf. **Chapter 8**).

The frequency of the Recurrent Reports will be a local/national decision, based on the degree of urgency of the attributes' restoration, the attributes expected rate of change, the evolution of the drivers of change, and the means available. This frequency will in most cases be at least as frequent as the frequency of revision of the Fishery Management Plan[83], so that the implications of any changes in the FMP are considered in the OECM report and vice-versa. A less frequent reporting scheme may be needed when

[83] FMPs tend to be increasingly multi-annual

multi-annual management plans are implemented. Some lag time can be expected between the implementation of measures in an OECM and the detection of their impact in the ecosystem monitoring. Notwithstanding, the urgency of some of the OECM objectives (e.g., in relation of threatened species), may justify more frequent reviews than determined by the timing of FMP revisions. The necessary scope of reviews undertaken to address urgent objectives can be decided on a case by case basis, depending on the nature of the objective and the threats and pressures addressed by the OECM, but should be agreed when the MER is established. A short report may also be needed in case of significant change in management around the OECM, e.g., in the size of TACs and quotas, or when the results of new research programs may significantly affect the understanding on the basis which the OECM was identified and managed.

Reports should be made publicly available, with due considerations of confidentiality rights.

As a separate document, or as a clearly separate section (not necessarily transmitted to WCMC), the OECM-MER system should report on its own implementation process, e.g., (1) Financial, human and technological resources mobilized; (2) Participatory processes; (3) Sampling schedule; (4) New data collected; (5) assessment competences mobilized; (6) Extent to which the OECM-MER implementation plan was respected; (7) Lessons learned and improvements suggested, including an analysis of their costs and benefits (cf. next section). Similarly, the interaction, synergies, or conflicts between the OECM-MER and the fishery-MER should be reviewed.

7.4.2 Reporting to UNEP-WCMC

Merge with. Reduce duplication with 7.4.2 The Decision (§5b) encourages State Parties to submit data on OECMs to the United Nations Environment Programme's World Conservation Monitoring Centre [UNEP-WCMC] for inclusion in the World Database on Protected Areas [WDPA]. It would be logical for a State to do so to have its OECMs area accounted as part of its contribution to international biodiversity Targets (e.g., in the Post 2020 Global Biodiversity Framework) or in the Sustainable Development Goals (SDGs), but it is not an obligation, under current CBD Decisions. Good governance practices would suggest that the Legitimate Authority would make policy that recognized OECMs would either be consistently registered in the WCMC OECM database, or not, depending on national legislation and practices, rather than on a case-by-case basis.

Incentives for reporting to WCMC include: (1) Assistance provided by WCMC for coherent recurrent reporting; (2) Availability of a unique inventory of protected areas of different types and origin with regrouped and checked metadata, accessible on maps, providing also de facto a national observatory; (3) Capacity-building opportunities offered by UNEP-WCMC; (4) Contribution to research and spatial management; (5) Re-use of geolocated data at regional level, e.g., in RFMO/As or LMEs (regional observatories) (modified from UNEP-WCMC, 2019).

The elements needed for such initial reporting are indicated in the WCMC manual (UNEP-WCMC, 2019; https://www.protectedplanet.net/c/wdpa-manual/wdpa-manual-v16) and assistance for the reporting task may be obtained from the programme (at protectedareas@unep-wcmc.org). The first obvious overriding requirement is that the OECM must meet the CBD Definition of OECM which implies having check that the CBD Criteria are met. The "minimum attributes" that are absolutely required for registration of an OECM (hereafter underlined) and the "complete attributes" which the data providers are only encouraged to submit are explained in detail in the manual, e.g., : (1) Area category (MPA or OECM); (2) Name of the OECM in local or native language and English; (3) Designation name (e.g., refugia, closed area, fishery reserve); (4) Designation type, e.g., national, regional, international, transboundary); (5) Marine area covered; (6) Total area covered (marine and terrestrial); (7) Status (e.g., proposed,

established, candidate); (8) No-take areas included?; (9) Status year (when the OECM was proposed, established, etc..); (10) Type of governance and evidence of consent by all legitimate authorities; (11) Type of ownership; (12) Management authority; (13) Management plan; (14) Supplementary info, e.g., full identification report showing how criteria are met. This could be a summary of the national identification report; (14) Conservation objectives; (15) location codes: ISO alpha-3 codes. Additional (optional) information can also be submitted. The sources of the uploaded data must be provided. The intellectual property rights must be specified in the Data Contributor Agreement which must be signed and states inter alia how the data provided will be used and that redistribution or use of the data by third parties will be subject to the WDPA Terms of Use.

The UNEP-WCMC manual provides also information on: (1) Who can report to WCMC; (2) The intellectual property rights on the data; (3) the rules of access and use of the data; (4) The process of uploading into the OECM database and related data standards ; (5) the data verification processes (in case the data is not provided by a government); (6) Revisions of the data (at the data provider initiative or on call from WCMC (e.g., every 5 years).

The eventual reporting by Regional Fishery Management Organizations (RFMO/As) has not been specifically considered in The Decision. The issue is sensitive as the CBD does not have a management mandate on biodiversity beyond national jurisdiction. However, nothing impedes States Parties to the CBD to seek to implement their commitments under this Convention (e.g., on OECMs) in another convention to which they are also Parties, such as a RFMO/A. Indeed, many RFMO/As already have adopted measures, including spatial measures, to manage the impact of fisheries on biodiversity in their areas of jurisdiction. RFMO/As usually make their assessments and management performance reports available on their websites. They could perhaps report on OECMs to the WCMC database, as most competent data providers, on behalf of their member governments. Indeed, the WCMC manual indicates that data providers include (i) Secretariats of international conventions and (ii) Regional entities. Precedents exist in relation to other Decisions. For example, FAO and regional fishery bodies have been invited to share information with the CBD Secretariat, in support of achieving Aichi targets (CBD Decision XIII/3, Paragraph 68) and as input for the fifth edition of the Global Biodiversity Outlook (Decision 14/10, paragraph 10).

It is strongly advisable, for reasons of long-term data safety, effectiveness of the assessment process, and institutional memory to register all the information and advice leading to decisions regarding OECMs in a national repository (or, if not available, in a sectoral repository) to facilitate data retrieval, assessment updating, and adaptive management (cf. Section 6.4).

7.5 Archiving and communication

The data collected and information generated by the assessments represent a significant cost as well as an asset of significant economic value for the adaptive management system. As such, they need to be preserved (archived and maintained) and communicated broadly to all interested stakeholders, including auditors.

7.5.1 Archiving

The reports and all related numerical or narrative data and information, including local knowledge, should be safely stored in an information management system established in an accessible archive of an appropriate governmental agency, carefully considering the information standards (e.g., formats, software, languages) and rules, to ensure proper data input and consistency checks, workflows, data access and exchange protocols (confidentiality) and integrity of the databases. This is important for

historical and institutional memory, retrospective reviews and long-term performance appraisal, consistency in monitoring and evaluation, adaptive management, etc. Because of the degree of flexibility granted by the CBD Decision for the assessment and management approaches used, systematic archiving allows maintaining the "pedigree" of each OECM (e.g., date of creation; Legitimate Authority responsible for the creation; data available; time period covered; methods used; measures applied in the OECM; results obtained, etc.) which allows an objective opinion on the relative robustness of the OECM and an informative track of its evolution.

As the OECMs identified in fisheries will usually have a sustainable use as a primary objective, and will be integrated in the FMP, they will need to be archived in the same information repository as other related and interconnected measures taken in the sector. However, as they also contribute to conservation and may have strong cross-sectoral dimensions, they may need to be archived also with other Ministries and/or at State level, reflecting national policy and practice.

The task of keeping all national repositories synchronized is not to be underestimated but, as stated above, the WCMC database represents de facto a unique inventory of protected areas of different types and origin with regrouped and checked metadata, accessible on maps as a proxy national observatory. The national (and WCMC) registry serves as institutional memory and can be used for recurrent monitoring and evaluation of long-term performance assessment.

7.5.2 Communication to a diverse audience

The practice to broadly communicate on governance decisions and performance is part of equitable governance good practices. The results of the OECMs identification process, their performance and corrective decisions, should obviously and officially be communicated by the Legitimate authority to the auditors as well as all fisheries managers and fishers and other stakeholders such as the scientific community and conservation and fisheries advocacy groups. In particular feed-back information will be appreciated by all those who have contributed time, information, and competence to the process, using adequate communication means (e.g., governmental channels, social media, beach radios and TV news). This might be done also in local languages where appropriate, catering for a diverse audience in both fisheries, conservation and other sectors. This process will be facilitated if, consistent with principles of equitable governance, a high level of active participation has been provided throughout the entire process. It may require specific efforts to tailor the information communicated to different types of recipients, with different levels of formal education, and in local languages.

7.6 Auditing

Auditing is part of the general task of evaluating performance of any programme, particularly when using public funding. Auditing is not explicitly addressed in Decision 14/8 and is therefore not formally required for OECM identification and management. However, auditing would be important to reassure the fisheries and conservation stakeholders of the quality of the OECM management and of its alleged outcomes and it could be undertaken at national level if so decided by the Legitimate Authority or the State, for oversight and accountability. Auditing may also be undertaken by an accredited third party. In such a case, MER reports should systematically be submitted also to the auditors.

Ideally, for practical reasons, OECM auditing should be undertaken as part of the auditing of the broader fishery management of the fishery/sector within which the OECM(s) operate, unless decided otherwise, e.g., because of the urgency required by some threatened biodiversity attributes. In the context of OECM performance, an audit would seek to ensure that: (1) The indicators of performance of the OECM in relation to the biodiversity attributes of concern fairly reflect the performance of the OECM as required

in the CBD Decision 14/8 Principles and Criteria; and (2) The MER Programme is conducted in an economical, efficient and effective manner (adapted from **INTOSAI WGEA, 2007**).

The action needed would include:

- **Defining the auditing protocol.** This may be done by the auditors with the Legitimate Authority and in collaboration with the MER authority, so that the MER is well informed and can collect and archive all the necessary information.
- **Audit the performance of the OECM(s)** against OECM Principles and Criteria, possibly in connection with the audit of the FMP itself.
- **Audit the functioning of the OECM MER itself** to certify the wise use of funds and resources.
- **Communicate the non-confidential conclusions of the audit**, through all available communication means, to all fishery and conservation managers and to the public.

There is no detailed guidance yet on how to conduct such an audit of an OECM but there is broad guidance on auditing and particularly on auditing biodiversity (e.g., INTOSAI WGEA, 2007), environmental auditing (INTOSAI WGEA, 2007a) and auditing in the perspective of Sustainable Development Goals (SDGs) (INTOSAI WGEA, 2019).

8. REVISION OF OECM STATUS

If a periodic OECM-MER Report indicated significant and sustained reductions in the effectiveness or outcomes of an OECM, requiring more than a simple tweaking of the management regime, the Legitimate Authority could logically consider (i) a major revisions of the OECM (its characteristics and the measures applied into it as appropriate) to improve the performance and outcomes, or (ii) dropping the area from being reported under global biodiversity targets/ and from the WCMC or other archiving sites. The exact processes for making such decisions have not been spelled out yet anywhere but it can be assumed that the same bodies and processes described in **Section 5.6** on governance would be activated to review the new information and its implications with the thoroughness applied in the Identification stage.

Minor oscillations of the components of OECM performance from year to year are to be expected, due to natural oscillations in the ecosystem as well as estimation errors or minor unexpected changes in fishing operations. Appropriate corrective action falls within the remit of "ordinary" management of the OECM (see **Section 5.7.3**) and will not be discussed here. If a periodic OECM-MER Report indicated major and(or sustained reductions in the effectiveness (and outcomes) of an OECM, "extraordinary" measures would logically be recommended. As the first choice, a substantial revision of the OECM parameters might be considered to improve the situation (e.g., in its size and boundaries; the management measures inside and around it; its governance). If no improvement was considered possible, or worthwhile, the OECM ought to be delisted from the national archive and the WCMC OECM global database.

UNEP-WCMC operates a 'take-down' policy, allowing a withdrawal of all or a portion of the data from the database under various circumstances (breach of copyright, confidentiality, defamation, or libel). A similar and simpler procedure may be used for States to revise their OECMs records, if required following a MER performance assessment.

Actions needed prior to and for revisions are described below.

8.1 Prior to revisions

- **Determine the periodicity for considering revisions.** Based on scientific and other evidence, the Legitimate Authority may decide whether revisions: (i) Should occur with their own periodicity, e.g., required every 5-10 years, by default, unless special conditions (to be listed) call for it; (ii) Are synchronized with the process established to revise the FMP, e.g., annual or multi-annual; (iii) are synchronized with the reporting schedule established for the reporting to WCMC (see **Section 7.4.2**); or (iv) Triggered by negative OECM-MER conclusions regarding. For example, such triggers might include an inadequate performance on conservation objectives, questioning the OECM initial qualification; an inadequate performance on the narrow fishery sustainability objectives, questioning the ABFM status itself, regardless of the biodiversity outcomes; environmental change in the OECM or background that significantly affects performance; and significant change in the interactions with other economic sectors with potential consequences on the OECM status.
- **Determine the type of triggers and threshold values** that would lead to recommending a major revision or deletion from reporting, and could be integrated in decision rules. In many cases, determining critical levels may not be straightforward and comparisons with experience elsewhere and a precautionary approach would be necessary. However, specifying triggers and threshold values can greatly facilitate timely action on revisions, when they are appropriate to undertake.

8.2 To undertake a revision

- **Follow the assessment process of identification (Section 4)**, retrieve the information used for identification and that produced by the MER. Identify the steps that might have to be revised. The factors for an effective revision are similar to those of the identification (e.g., research capacity, collaborations, available data).
- **Avoid "over-reaction"** and take into account expected "natural" variations in system components as well as uncertainties in assessment and management before modifying the management regime. With time, the "normal variance" of performance may be appraised and explicit tolerances for deviations from the expected trajectories could be set. However, at the beginning, there is likely to be a weak basis to decide whether an observed change is "signal" of concern signalling inadequate performance of the OECM, or a "noise" characteristic of the system, to be noted but not calling for a regime change. High variability in the "properties" of an area would justify caution in its identification as an OECM.
- **If needed, suspend temporarily** the OECM from the WCMC database[84], while withholding a more permanent decision on its total removal until there is greater confidence that the unfavourable status and outcomes of the area are likely to persist. If the MER Reports are timely and of quality and if management responses to it are swift and effective, the corresponding revisions of specific measures or expectations could be fast enough to not necessitate a suspension.
- **Report as appropriate about the revision to CBD and in the OECM database handled by WCMC**.

[84] The WCMC manual does not refer to this option. Therefore, its feasibility should be checked with the WCMC Secretariat which is dedicated to support CBD parties in their effort..

REFERENCES

Ablan, M.C.A; McManus, J.W. & Viswanathan, K. 2004. Indicators for management of coral reefs and their applications to marine protected areas. NAGA, 27(1): 31-39

Addison, P. F. E.; Carbone, G. & McCormick, N. 2018. The development and use of biodiversity indicators in business: an overview. Gland, Switzerland: IUCN. vi + 16pp.

Afflerbach, J.C.; Lester, S.E.; Dougherty D.T. and Poonc, S.E. 2014. A global survey of ''TURF-reserves'', Territorial Use Rights for Fisheries coupled with marine reserves. Global Ecology and Conservation 2: 97–106

Aften, T. & Fuller, S. 2019. A Technical Review of Canada's Other Effective Area- Based Conservation measures: Alignment with DFO Guidance, IUCN WCPA Guidance and CBD SBSTTA Guidance. Accessed 19/02/2010 at https://davidsuzuki.org/project/protecting-coastal-waters/

Alban, F., Boncoeur, J. and Roncin, N. 2011. Socioeconomy-Assessing the impact of marine protected areas on society's well-being: an economic perspective: 226-246 in Marine protected areas. A multidisciplinary approach. J. Claudet (Ed.). Cambridge. Cambridge University Press.: 375 p.

Allen, P.M., & McGlade, J.M. 1987. Modelling complex human systems: a fisheries example. Eur. J. Op. Res. 30: 147–167. doi:10.1016/0377-2217(87)90092-0.

Anaya, J. 1996. Indigenous peoples in international law. Oxford University Press, New York, New York, USA

Anderson, J.L.; Anderson, C.M.; Chu, J.; Meredith, J.; Asche, F.; , Sylvia, G.; et al. 2015. The Fishery Performance Indicators: A Management Tool for Triple Bottom Line Outcomes. PLoS ONE, 10(5): e0122809. doi:10.1371/journal.pone.0122809

Atkinson S., Esters N., Farmer G., Lawrence K. & McGilvray F. 2011 The Seascapes Guidebook: How to Select, Develop and Implement Seascapes. Conservation International, Arlington, Virginia, USA: 60 p.

Ban, N.C.; Davies, T.A.; Aguilera, S.E.; Brooks, C.; Cox, M.; Epstein, G.; Evans, L.S. et al. 2017. Social and ecological effectiveness of large marine protected areas. Global Environmental Change, 43: 82-91

Bayley, D.T.I. & Mogg, A.O.M. 2019. Chapter 6 - New Advances in Benthic Monitoring Technology and Methodology: 121-132 *in* Sheppard, C. (Ed.) *World Seas: an environmental evaluation* (Second edition). Academic Press. Ecological issues and environmental impact, Volume 3: 650 p. https://doi.org/10.1016/B978-0-12-805052-1.00006-1

Bagri, A. & Vorhies, F. 1997. Biodiversity impact assessment. Prepared as a draft discussion paper for SBSTTA3, Montreal, Canada – 1-5 September 1997: 36 p.

Barange, M.; Bahri, T.; Beveridge, M.C.M.; Cochrane, K.L:; Funge-Smith S. & Poulain, F. 2018. Impacts of climate change on fisheries and aquaculture. Synthesis of current knowledge, adaptation and mitigation options. Rome, FAO. FAO Fisheries and aquaculture technical paper, 627: 628 p.

Belfiore, S., Cicin-Sain, B., & Ehler, C. (Eds.). 2004. Incorporating Marine Protected Areas into Integrated Coastal and Ocean Management: Principles and Guidelines. IUCN, Gland, Switzerland and Cambridge, UK. viii + 38 pp.

Biodiversity Indicators Partnership. 2010. Biodiversity indicators and the 2010 Target: Experiences and lessons learnt from the 2010 Biodiversity Indicators Partnership. Secretariat of the Convention on Biological Diversity, Montreal, Canada. Technical Series No. 53, 196 pages.

Biodiversity Indicators Partnership. 2011. Guidance for national biodiversity indicator development and use. UNEP World Conservation Monitoring Centre, Cambridge, UK. 40p

BIONET & IUCN.1997. Exploring biodiversity indicators and targets under the Convention on Biological Diversity. Report of the Sixth Global Biodiversity Forum, 1997. Biodiversity Action Network (BIONET) and International Union for Conservation of Nature and Natural Resources (IUCN). Washington, D.C., and Gland, Switzerland and Cambridge, U.K.: 150 p.

Bloor I., Dignan S., Emmerson J., Beard D., Gell F.E., Duncan P., Kennington K., McHarg K., Cunningham S. & Kaiser M.J. in revision. Boom not bust: Cooperative management as a mechanism for improving the commercial efficiency and environmental outcomes of regional scallop fisheries . Marine Policy (in press)

Butsic, V.; Lewis, D.; Radeloff, V.; Baumann, M.; & Kuemmerle, T. 2017. Quasi-experimental methods enable stronger inferences from observational data in ecology. Basic and Applied Ecology 19: 1-10

CCFAM. 2017. Report on Canada's Network of marine protected areas, June 2017. Canadian Council of Fisheries and Aquaculture Ministers (CCFAM). Ottawa. Canada Fisheries and Oceans: 24 p. Available at http://www.dfo-mpo.gc.ca/oceans/publications/oeabcm-amcepz/index-eng.html.

CBD. 2004. The Ecosystem Approach, (CBD Guidelines). Montreal: Secretariat of the Convention on Biological Diversity 50 p. https://www.cbd.int/doc/publications/ea-text-en.pdfCBD. 2005. Indicators for assessing progress towards, and communicating, the 2010 target at the global level. Nairobi, Kenya.United Nations Environment Programme: 34 p.

CBD. 2006. Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment (COP Decision VIII/28). Available at: https://www.cbd.int/doc/decisions/cop-08/cop-08-dec-28-en.pdf

CBD. 2012. Marine and coastal biodiversity: revised voluntary guidelines for the consideration of biodiversity in environmental impact assessments and strategic environmental assessments yiin marine and coastal areas. Document UNEP/CBD/COP/11/23 submitted to the COP, Eleventh meeting, Hyderabad, India: 43 pages. Available at: https://www.cbd.int/doc/meetings/cop/cop-11/official/cop-11-23-en.pdf

CBD. 2018. Decision 14/8. Protected areas and other effective area-based conservation measures. Adopted by the 14th Conference of the Parties of the Convention on Biological Diversity. Sharm El-Sheikh, Egypt, 17-29 November 2018. Document CBD/COP/DEC/14/8: 19 p. https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-08-en.pdf

Charles, A.T. 2001. Sustainable fishery systems. Oxford. Blackwell science. Fish and Aquatic Resources Series: 300 p:

Chesson, J. & Clayton, H. 1998. A framework for assessing fisheries with respect to ecologically sustainable development. Bureau of Rural Sciences, Canberra, Australia: 60 p.

Chesson, J. 2013. Sustainable development. Connecting practice with theory. Journal of Environmental Assessment Policy and Management , 15(1):27 p. DOI: 10.1142/S1464333213500026

Chuenpagdee, R.; Morgan, L.E.; Maxwell, S.M.; Norse, E.A. & Pauly, D. 2003. Shifting gears: assessing collateral impacts of fishing methods in US waters. Front. Ecol. Environ., 1(10): 517-524

Cochrane, K.L. & Garcia, S.M. 2009. A fishery managers' guidebook. Chichester UK and Rome (Italy). Wiley-Blackwell and FAO. 2nd edition: 518 p.

Cohen-Shacham, E., G. Walters, C. Janzen, S. Maginnis (eds). 2016. Nature-based solutions to address global societal challenges. Gland, Switzerland: IUCN. Xiii + 97 pp. https://portals.iucn.org/library/node/46191

Coll, M.; Carreras, M.; Ciércoles, C.; Cornax, M-J.; Gorelli, G.; Morote, E. & Sȷez, R. 2014. Assessing Fishing and Marine Biodiversity Changes Using Fishers' Perceptions: The Spanish Mediterranean and Gulf of Cadiz Case Study. PLoS One, 9(1): e85670. DOI: 10.1371/journal.pone.0085670

Collie, J.S., Botsford, L.W., Hastings, A., Kaplan, I.C., Largier, J.L. et al. 2014. Ecosystem models for fisheries management : finding the sweet spot. Fish and Fisheries, DOI: 10.1111/faf.12093: 25 p.

Constable, A.J. 2011. Lessons from CCAMLR on the implementation of the ecosystem approach to managing fisheries. Fish and Fisheries, 12: 138-151

Costanza, R.; d'Arge, R.; de Groot, R.; Farber, S.; Grasso, M.; Hannon, B.; Limburg, K. et al. 1997. The value of the world's ecosystem services and natural capital. Nature, 387: 253-260.

Day, J., Dudley, N., Hockings, M., Holmes, G., Laffoley, D., Stolton, S., Wells, & Wenzel, L. (eds.). 2019. Guidelines for applying the IUCN protected area management categories to marine protected areas. Second edition. Gland. Switzerland: IUCN.

Daily, G. C. (Ed.). 1997. Nature's services: societal dependence on natural ecosystems. Island Press, Washington, DC

Die, D. 2009. Chapter 16 - Fisheries management plans: pp 425-444 In Cochrane, K.L. & Garcia, S.M. (Eds). A fishery managers' guidebook. Chichester, UK. Wiley-Blackwell and FAO. 2nd Edition.518 p.

Dudley, N. (Ed.) 2008. Guidelines for Applying Protected Area Management Categories. Gland, Switzerland: UCN. x + 86 p.

Dudley, N. & Parish, J. 2006. Closing the gap. Creating ecologically representative protected area systems: A guide to conducting the gap assessments of protected area systems for the Convention on Biological Diversity. Secretariat of the Convention on Biological Diversity, Montreal, Technical Series no. 24, vi + 108 pages

Ervin, J., K. J. Mulongoy, K. Lawrence, E. Game, D. Sheppard, P. Bridgewater, G. Bennett, S.B. Gidda & Bos, I. 2010. Making Protected Areas Relevant: A guide to integrating protected areas into wider landscapes, seascapes and sectoral plans and strategies. CBD Technical Series No. 44. Montreal, Canada: Convention on Biological Diversity: 94 pp.

Fancy, S.G., Gross, J.E. & Carter, S.L., 2008. Monitoring the condition of natural resources in US national parks. Environ. Monit. Assess., 151: 161–174. doi:10.1007/s10661-008-0257-y

FAO. 1995. Code of Conduct for Responsible Fisheries. Rome. FAO: 41 p.

FAO. 1996. Precautionary approach to fisheries. 1. Guidelines on the precautionary approach to capture fisheries and species introductions. FAO Fisheries Technical Paper, 350/1. 52 p.

FAO. 1996a. Integration of fisheries into coastal areas management. FAO, Rome. Technical Guidelines for Responsible Fisheries, 3:17 p.

FAO. 1996b. Precautionary approach to capture fisheries and species introductions. Rome. FAO Technical Guidelines for Responsible Fisheries, 2: 60 p.

FAO. 1989. Aquaculture systems and practices: a selected review. Rome, FAO. ADCP/REP/89/43. http://www.fao.org/3/t8598e/t8598e06.htmFAO. 1997. Fisheries management. FAO Technical Guidelines for responsible fisheries, 4: 82 p.

FAO. 2000. Fisheries management. 1. Conservation and management of sharks. FAO Technical Guidelines for responsible fisheries, 4, Suppl. 1: 37 p.

FAO. 2003a. Fisheries management. 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries, 4 (suppl. 2): 112 p.

FAO. 2008. Report of the FAO workshop on vulnerable ecosystems and destructive fishing in deep-sea fisheries, Rome: 26-29 June 2007. FAO Fisheries Report, 629: 18 p.

FAO. 2009a. Fisheries management. 2. The ecosystem approach to fisheries. 2.1. Best practices in ecosystem modelling for informing an ecosystem approach to fisheries. FAO. Rome. FAO Technical Guidelines for Responsible Fisheries, 4, Suppl 2, Add. 1: 78 p.

FAO. 2009b. International guidelines for the management of deep-sea fisheries in the high seas. Rome, FAO: 73 p.

FAO. 2009c. Fisheries management. 2. The ecosystem approach to fisheries. 2.2 The human dimensions of the ecosystem approach to fisheries. FAO. Rome. FAO Technical Guidelines for Responsible Fisheries, 4, Suppl 2, Add. 2: 88 p.

FAO. 2009d. Technical Guidelines on Information and Knowledge Sharing. FAO Technical Guidelines for Responsible Fisheries. Rome. FAO: 97 p.

FAO. 2011. Fisheries management. 4. Marine protected areas and fisheries. FAO Technical Guidelines for Responsible Fisheries, 4, Suppl. 4: 199 p.

FAO. 2015. Voluntary guidelines for securing sustainable small-scale fisheries in the context of food security and poverty eradication. Rome. FAO: 27p. Available at: www.FAO.org/3/a-i4356e.pdf.

FAO. 2019. Report of the Expert Meeting on Other Effective Area-Based Conservation Measures in the Marine Capture Fishery Sector, Rome, Italy, 7-10 May 2019. FAO Fisheries and Aquaculture Report, 1301: 76 p.

Field, S.A., O'Connor, P.J., Tyre, A.J. & Possingham, H.P. 2007. Making monitoring meaningful. Austral Ecology 32, 485–491. doi:10.1111/j.1442-9993.2007.01715.x

Field, S.A., Tyre, A.J., Jonzen, N., Rhodes, J.R. & Possingham, H.P., 2004. Minimizing the cost of environmental management decisions by optimizing statistical thresholds. Ecology Letters 7, 669–675. doi:10.1111/j.1461-0248.2004.00625.x

Field, S.A., Tyre, A.J. & Possingham, H.P. 2005. Optimizing allocation of monitoring effort under economic and observational constraints. Journal of Wildlife Management, 69: 473–482. doi:10.2193/0022-541X(2005)069[0473:OAOMEU]2.0.CO;2

Fletcher, R. 2008. Implementing an ecosystem approach to fisheries management: lessons learned from applying a practical EAFM framework in Australia and the Pacific. In: Bianchi, G. & Skjoldal, H.R. (Eds). *The ecosystem approach to fisheries*. CABI (Wallingford, UK) and FAO (Rome, Italy): 112-124

Fletcher, W.J. & Bianchi, G. 2014. The FAO-EAF Toolbox: making the Ecosystem Approach accessible to all fisheries. Ocean and Coastal Management, 90:20-26.

Fletcher WJ, Gaughan DJ, Metcalf SJ, and Shaw J. 2012. Using a regional level, risk-based framework to cost effectively implement Ecosystem Based Fisheries Management (EBFM). In: Kruse et al. (eds). Global Progress on Ecosystem-Based Fisheries Management. pp. 129-146. Alaska Sea Grant College Program. doi: 10.4027/gpebfm.2012.07.

Fletcher WJ, Shaw J, Metcalf SJ, and Gaughan DJ. 2010. An Ecosystem Based Fisheries Management framework: the efficient, regional-level planning tool for management agencies. Marine Policy, 34: 1226–1238

Fox, H.E.; Holtzman, J.L.; Haisfield, K.M.; McNally, C.G.; Cid, G.A.; Mascia, M. B.; Parks, J.E. & Pomeroy, R.S. 2014. How Are Our MPAs Doing? Challenges in Assessing Global Patterns in Marine Protected Area Performance. Coastal Management, 42:3, 207-226, DOI: 10.1080/08920753.2014.904178

Freestone, D.; Cicin Sain, B.; Hewawasam, E. & Hamon, G. 2010. Draft policy brief on: Achieving integrated ecosystem-based ocean and coastal management. Global forum on oceans, coasts and islands. Global Oceans Conference 2010 3-7/05/2010 UNESCO Paris: 20 p.

Friedman, K.; Garcia, S.M. & Rice, J. 2018. Mainstreaming biodiversity in fisheries. Marine Policy, 95: 209-220. https://doi.org/10.1016/j.marpol.2018.03.001

Fulton, E.A.; Smith, A.D.M. & Punt, A.E. 2005. Which ecological indicators can robustly detect effects on fishing? ICES Journal of Marine Science, 62: 540-551

Fulton, E.A.; Bax, N. J.; Bustamante, R. H.; Dambacher, J. M.; Dichmont, C.; Dunstan, P. K.; Heyes, K. R. et al. 2015. Modelling marine protected areas: insights and hurdles. Phil. Trans. R. Soc. B 370: 20140278. http://dx.doi.org/10.1098/rstb.2014.0278.

Garcia, S.M. 2009. Governance, science and society. *In*: Grafton, Q. R.; Hilborn, R.; Squires, D.; Tait, M. and Williams, M. (Eds). *Handbook of Marine Fisheries Conservation and Management*. Oxford: Oxford University Press: 87-98

Garcia, S.M., Boncoeur, J. and Gascuel, D. 2013. Les aires marines protégées et la péche: bioécologie, socioéconomie et gouvernance. Presses Universitaires de Perpignan (France): 432 p.

Garcia, S.M. & Charles, A.T. 2007. Fishery systems and linkages: from clockwork to soft watches. In: ICES. Fishery management strategies. Oxford University Press. ICES Journal of Marine Science, 64(4): 580-587

Garcia, S.M. & Cochrane, K. 2005. Ecosystem approach to fisheries: a review of implementation guidelines. ICES Journal of Marine Science, 62(3):311-318

Garcia, S.M.; Kolding, J.; Rice, J.; Rochet, M-J.; Zhou, S.; Arimoto, T.; Beyer, J. E. et al. A. 2012. Reconsidering the consequences of selective fisheries. Science. Policy Forum. 335: 1045-1047

Garcia, S.M.; Rey-Vallette, H. and Bodiguel, C. 2009. Chapter 12. Which indicators for what management? The challenge of connecting offer and demand of indicators. In Cochrane, K. and S.M: Garcia. (Eds). A fishery managers' handbook. FAO and Wiley-Blackwell. :303-332

Garcia, S.M.; Rice, J.; Friedman, K. & Himes-Cornell, A. 2019. Identification, assessment and governance of other effective area-based conservation measures in the marine fishery sector. A background document prepared for the Expert Meeting on OECMs in the Marine Fishery Sector organized by

FAO, SCBD and IUCN-CEM-FEG , 7-10 May 2019 in Rome. 117 p. Available at: https://www.openchannels.org/literature/24881 http://ebcd.org/wp-content/uploads/2018/09/OECM-BD-V1-20190407-master-10-1.pdf

Garcia, S.M. ; Rice, J.; Charles, A. & Diz, D. 2020. OECMs in Marine Capture Fisheries: Systematic approach to identification, use and performance assessment in marine capture fisheries. Fisheries Expert Group of the IUCN Commission on Ecosystem Management, Gland, Switzerland. European Bureau of Conservation and Development, Brussels, Belgium: 87 p. Available at www.ebcd.org/feg.

Garcia, S.M.; Zerbi, A.; Alliaume, C.; DoChi, T.; Lasserre, G. 2003. The ecosystem approach to fisheries. Issues, terminology, principles, institutional foundations, implementation and outlook. FAO. Rome (Italie).FAO Fisheries Technical Paper, 443: 71 p.

Garcia, S. M. & Ye, Y. 2018. Rebuilding of marine fisheries. Part 2: case studies. FAO Fisheries and Aquaculture Technical Papers, 630/2: 220 p

Garcia, S.M.; Ye, Y.; Rice, J. & Charles, T. 2018. Rebuilding of marine fisheries. Part 1. Global review. FAO Fisheries and Aquaculture Technical Papers, 630/1: 274 p

Gascuel, D.; Coll, M.; Fox, C.; Guenette, S; Guitton, J.; Kenny, A.; Knittweis, L.; et al. 2016. Fishing impact and environmental status in European seas: a diagnosis from stock assessments and ecosystem indicators. Fish and fisheries, 17: 31-55

Goñi, R. 1998. Ecosystem effects of marine fisheries: an overview Original Research Article . Ocean & Coastal Management, 40(1): 37-64

Govan, H., Aalbersberg, W., Tawake, A. and Parks, J. 2008. Locally-Managed Marine Areas: A guide for practitioners. The Locally-Managed Marine Area Network: 70 p. Available at www.LMMAnetwork.org

Graham, J.; Amos, B. & Plumptre, T. 2003. Principles for Good Governance in the 21st Century. Ottawa. Institute of Governance. Policy Brief, 15: 9p. Available at: Unpan1.un.org/intradoc/groups/public/documents/UNPAN/UNPAN011842.pdf

Halpern, B.; Regan, H.; Possingham, H. & McCarthy, M. 2005. Rejoinder: uncertainty and decision-making. Ecology letters, 9: 13-14. DOI. 10.1111/j.1461-0248.2005.00862x

Mauro, F. & Hardison, P.D. 1999. Traditional knowledge of indigenous and local communities: international debate and policy initiatives. Ecological Applications, 10 (5): 1263–1269.

Hall, S.J. 2009. Chapter 8 - Area and time restrictions: 196-219 in: Cochrane, K.L. and S. M. Garcia (Eds) A fishery's manager guidebook. Chichester (UK) and Rome (Italy). Wiley-Blackwell and FAO. 2nd Edition: 518 p

Hattam, C.; Atkins, J.P.; Beaumont, N.; Borgen, T.; Bohnke-Henrich, A.; Burdon, D.; de Groot, R.; et al. 2015. Marine ecosystem services: Linking indicators to their classification. Ecological Indicators, 49: 61-75. https://doi.org/10.1016/j.ecolind.2014.09.026

Hilborn, R. & Walters, C.J. 1992. Quantitative fisheries stock assessment: choice, dynamics and uncertainty. Chapman and Hall: 570 p.

Hindson, J.; Hoggarth, D.; Krishna, M.; Mees, C.C. & O'Neill, C. 2005. How to manage a fishery. A simple guide to writing a Fishery Management Plan. London, England, Marine Resources Assessment Group (MRAG): 81 p.

Hockings, M. 1998. Evaluating management of protected areas: integrating planning and evaluation. Environmental management, 22(3): 337–345

Huntley, B.J. & Redford, K.H. 2014. Mainstreaming Biodiversity in Practice: a STAP Advisory Document, Global Environment Facility, Washington, DC: 88 p.

ICES. 2021. ICES/IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS). Edited by Kenchington, E.; Rice, J.C.; Diz, D.; Kenny, A.; Wright, P. & Petza, D. ICES Scientific Reports. 3:42. 195 pp. https://doi.org/10.17895/ices.pub.8135

INTOSAI WGEA. 2007. Auditing biodiversity: Guidance for Supreme Audit Institutions: 129 p. http://icisa.cag.gov.in/resource_files/87ca71601d696fd5b6baf378182c0603.pdf http://www.environmental-auditing.org

INTOSAI WGEA. 2007a. Evolution and Trends in Environmental Auditing. Available at http://www.environmental-auditing.org: 103 p.

INTOSAI WGEA. 2019. Environmental audit and the Sustainable Development Goals: a discussion paper: 34 p. Available at: https://www.environmental-auditing.org/publication/

IPBES. 2016. The methodological assessment report on scenarios and models of biodiversity and ecosystem services. Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES): 352 p. Accessible at: https://ipbes.net/assessment-reports/scenarios

IPBES. 2018a: The IPBES regional assessment report on biodiversity and ecosystem services for the Americas. Rice, J., Seixas, C. S., Zaccagnini, M. E., Bedoya-Gaitán, M. & Valderrama, N. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany: 744 p.

IPBES. 2018b: The IPBES regional assessment report on biodiversity and ecosystem services for Asia and the Pacific. Karki, M.; Senarata Sellamuttu, S.; Okayasu, S.; & Suzuki, W. (eds). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany: 612 p.

IPBES. 2018c: The IPBES regional assessment report on biodiversity and ecosystem services for Africa. Archer, E.; Dziba, L.; Mulongoy, K. J.; Maoela, M. A.; & Walters, M. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany: 492 p.

IUCN-WCPA. 2019. Recognising and reporting other effective area-based conservation measures. IUCN-WCPA Task Force on OECMs. Gland, Switzerland: IUCN.: 36 p. At https://doi.org/10.2305/IUCN.CH.2019.PATRS.3.en

Ivanic, K-Z., Stolton, S., Figueroa Arango, C. and Dudley, N. 2020. Protected Areas Benefits Assessment Tool + (PA-BAT+): A tool to assess local stakeholder perceptions of the flow of benefits from protected areas. Gland, Switzerland: IUCN. xii + 84 pJentoft, S. 2017. Small-scale fisheries within maritime spatial planning: knowledge integration and power, Journal of Environmental Policy & Planning, 19:3, 266-278, DOI: 10.1080/1523908X.2017.1304210

Jacobsen, N.S.; Burgess, M.G. & Andersen, K.H. 2016. Efficiency of fisheries is increasing at the ecosystem level. Fish and Fisheries.DOI: 10.111/faf.12171: 13 p.

Jennings & M.J. Kaiser 1998. The effects of fishing on Marine Ecosystems. Advances in Marine Biology, 34: 52 p.

Keith, D.A.; Martin, T.G.; McDonald-Madden, E. & Walters, C. 2011. Uncertainty and adaptive management for biodiversity conservation. Biological Conservation, 144 (4): 1175-1178 In: Keith, D.A.; Martin, T.G. & McDonald-Madden, E. (Eds.): *Adaptive management for biodiversity conservation in an uncertain world.* Biological Conservation, Special issue: 1175-1254

Kaiser, M.J., Collie, J.S., Hall, S.J., Jennings, S. and Poiner, I.R. 2003. Impacts of fishing gear on marine benthic habitats: 197-217 in Sinclair, M.//Valdimarsson, G. (Eds). Responsible fisheries in the marine ecosystem, Rome, Italy and Wallingford, UK. FAO and CABI publ: 411 p.

Kooiman, J. 2005. Part IV. Principles for fisheries governance. Pp 241-302. *In Koiman, J., Bavink, M., Jentoft, S. and Pullin, R. (Eds) . Fish for life. Interactive governance for fisheries.* Mare publications series, 3. Amsterdam University Press: 427 p.

Kremen, C. 2005. Managing ecosystem services: what do we need to know about their ecology? Ecology Letters, 8: 468–479.

Langlois, J.; Fréon, P.; Delgenes, J-P.; Steyer, J-P. & Hélias, A. 2014. New methods for impact assessment of biotic-resource depletion in life cycle assessment of fisheries: theory and application. Journal of Cleaner Production, 73: 63-71. https://doi.org/10.1016/j.jclepro.2014.01.087

Larsen, A.; Meng, K. & Kendall, B. 2019. Causal analysis in control-impact ecological studies with observational data. Methods in Ecology and Evolution 10: 924-934

Leite, L.; Thiao, D.; Westlund, L.; Zahri, Y. 2019. Participatory monitoring and evaluation in marine protected areas: experiences from North and West Africa. Rome, FAO. FAO Fisheries and Aquaculture Circular, 1173: 99 p.

Lindenmayer, D. & Gibbons, P. 2012. Biodiversity Monitoring in Australia. CSIRO Publishing, Melbourne

Lindenmayer, D.B. & Likens, G.E. , 2010. The science and application of ecological monitoring. Biological Conservation 143, 1317–1328. doi:10.1016/j.biocon.2010.02.013

Link, J.S. 2010. Ecosystem-based fisheries management. Confronting trade-offs. Cambridge. Cambridge University Press: 207 p.

Link, J. 2018. System-level optimal yield: increased value, less risk, improved stability, and better fisheries Can. J. Fish. Aquat. Sci, 75: 1–16. Dx.doi.org/10.1139/cjfas-2017-0250

Link, J.; Watson, R.A.; Pranovic, F; Libralato, S. 2020. Comparative production of fisheries yields and ecosystem overfishing in African Large Marine Ecosystems. Environmental Development, 36:100529. https://doi.org/10.1016/j.envdev.2020.100529

Ludwig, D. & Hilborn, R. 1983. Adaptive probing strategies for age structured fish stocks. Can. J. Fish. Aquat. Sci., 40(5) : 559-569

Marnewick, D.; Stevens, C. & Jonas H. (Eds). 2019. A step-by-step methodology for identifying, reporting, recognising and supporting other effective area-based conservation measures. IUCN: Gland, Switzerland.

Mascia, M.; Fox, H.; Glew, L.; Ahmadia, G.; Agrawal, A.; Barnes, M.; Basurto, X. et al. 2017. A novel framework for analyzing conservation impacts: evaluation, theory, and marine protected areas. Annals of the New York Academy of Sciences 1399:93–115

MEA. 2005. Ecosystems and human wellbeing. Our human planet: Summary for decision-makers. Millennium Ecosystem Assessment. Washington, D.C., Island Press: 128 p.

Moldan, B., Billharz, S. & Matravers, R. (Eds.) (1997) Sustainability Indicators: A Report on the Project on Indicators of Sustainable Development. Chichester, UK. John Wiley & Sons. SCOPE Report, 58, , 415 p.

NACA/FAO. 2000. Report of the Conference on Aquaculture in the Third Millennium. Conference on Aquaculture in the Third Millennium, 20-25 February 2000, Bangkok, Thailand. Edited by Subasinghe R. P.; Bueno, P.B.; Phillips, M.J.; Hough, C.; McGladdery, S. & Arthur, J.R. NACA, Bangkok and FAO, Rome: 120 p.

NOAA. 2017. Preparing management plans for trawl fisheries in South East Asia. Report on Workshop 3 (NA15NMF4630204) and supplementary workshop (NA16NMF0080374) on multispecies maximum sustainable yield. 24-27 April 2017, Bangkok, Thailand: 36 p.

Ounanian, K.; Carballo-Cárdenas, E.; van Tatenhove J. P.M.; Delaney, A.; Papadopoulou, K.N. & Smith, C.J. 2018. Governing marine ecosystem restoration: the role of discourses and uncertainties. Marine Policy, 96: 136-144. https://doi.org/10.1016/j.marpol.2018.08.014

Pascual, U.; Balvanera, P.; Diaz, S.; Pataki, G.; Roth, E.; Stenseke, M.; Watson, R.T.; et al. 2017. Valuing nature's contributions to people: the IPBES approach. Current Opinion in Environmental Sustainability, 26–27: 7-16.

Petza, D.; Chalkias, C.; Koukourouvli, N.; Coll, M.; Vassilopoulou, V.; Karachlef P.K.; Markantonatoua, A.C.; et al. 2019. An operational framework to assess the value of fisheries restricted areas for marine conservation. Marine Policy, xxx(xxx): 12 p. https://doi.org/10.1016/j.marpol.2019.01.005.

Piroddi, C.; Coll, M.; Liquete, C.; Macias, D.; Greer, K.; Buszowski, J.: Steenbeek, J.; Danovaro, R. and Christensen, V. 2017. Historical changes of the Mediterranean Sea ecosystem: modelling the role and impact of primary productivity and fisheries changes over time. Nature Scientific Reports, Scientific Reports | 7:44491 | DOI: 10.1038/srep44491: 18 p.

Plagąnyi, E. E. 2007. Models for an ecosystem approach to fisheries. FAO. Rome. FAO Fisheries Technical Paper, 477:108 p.

Plank, M.J.; Kolding, J.; Law, R.; Gerritsen, H.D. & Reid, D. 2016. Balanced harvesting can emerge from fishing decisions by individual fishers in a small-scale fishery. Fish and Fisheries, xxx: 14 p.

Pomeroy, R.S.; Parks, J.E. & Watson, L.M. 2004. How is your MPA doing? A Guidebook of natural and social indicators for evaluating marine protected area management effectiveness. Gland, Switzerland and Cambridge, UK. IUCN, WWF, NOAA: 215 p.

Pomeroy, R.S.; Watson, L.M.; Parks, J.E. & Cid. G.A. 2005. How is your MPA doing? A methodology for evaluating the management effectiveness of marine protected areas. *Ocean and Coastal Management*, 48: 485-502

Rice, J.; Garcia, S.M: & Kaiser, M. 2018. Other effective area-based conservation measures (OEABCMs) used in marine fisheries: a working paper. Background information document for the CBD Expert Workshop on marine protected areas and other effective area-based conservation measures in coastal and marine areas (6-9/02/2018; Montreal, Canada). CBD/MCB/EM/2018/1/INF/4: 70 p.

Rice, J.C. & K.A. Houston. 2011. Representativity and networks of Marine Protected Areas. Aquatic Conservation: Marine and Freshwater Ecosystems 21: 649-657.

Russi D., Pantzar M., Kettunen M., Gitti G., Mutafoglu K., Kotulak M. & ten Brink P. 2016. Socio-Economic Benefits of the EU Marine Protected Areas. Report prepared by the Institute for European

Environmental Policy (IEEP) for DG Environment. London, IEEP: 96 p.

Sadio, O.; Simier, M.; Ecoutin, J-M.; Raffray, J.; Laé, R. & Tito de Morais, L. 2015. Effect of a marine protected area on tropical estuarine fish assemblages: Comparison between protected and unprotected sites in Senegal. Ocean & Coastal Management, 116: 257-269

Salcone, J.; Brader, L. & Seidl, A. 2016. Guidance manual on economic valuation of marine and coastal ecosystem services in the Pacific. Report of the MACBIO project (GTZ, IUCN, SPREP); Suva, Fidji: 52 p.

Sanchirico, J.N.; Smith, M.D. & Lipton, D.W.2008. An empirical approach to ecosystem-based fishery management. Ecological economics, 64(3): 586-596

SCBD & NCEA. 2006. Biodiversity in Impact Assessment. Background Document to CBD Decision VIII/28 on Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment. Published by the Secretariat of the Convention on Biological Diversity and the Netherlands Commission for Environmental Assessment. Montreal, Canada. CBD Technical Series, 26: 73 p. Available at: https://www.cbd.int/doc/publications/cbd-ts-26-en.pdf

Sciberras, M.; Jenkins, S.R.; Mant, R.; Kaiser, M.J.; Hawkins, S.J.; & Pullin, A.S. 2015. Evaluating the relative conservation value of fully and partially protected marine areas. Fish and Fisheries, 16(1): 58-77. DOI: 10.1111/faf.12044

Sekercioglu, C.H. 2010. Chapter 3. Ecosystem functions and services. DOI:10.1093/acprof:oso/9780199554232.003.0004. In: Navjot S. Sodhi & Ehrlich, P.R. Conservation biology for all. Oxford University Press. DOI: 10.1093/acprof:oso/9780199554232.001.000

Shepherd, Gill. 2004. The Ecosystem Approach: Five Steps to Implementation. IUCN, Gland, Switzerland and Cambridge, UK. vi + 30 pp

Shepherd, G. (ed.). 2008. The Ecosystem Approach: Learning from Experience. Gland, Switzerland: IUCN. x + 190pp

Shin, Y-J.; Bundy, A.; Shannon, L. J.; Simier, M.; Coll, M.; Fulton, E. A.; Link, J. S. et al. 2010. Can simple be useful and reliable? Using ecological indicators to represent and compare the states of marine ecosystems. – ICES Journal of Marine Science, 67: 713-731

Squires, D. & Garcia, S.M. 2018. The least-cost biodiversity impact mitigation hierarchy with a focus on marine fisheries and bycatch issues. Conservation biology, 35(2): 989-997. https://doi.org/10.1111/cobi.13155

Squires, D.; Restrepo, V.; Garcia, S. & Dutton, P. 2018. Fisheries bycatch reduction within the least-cost biodiversity mitigation hierarchy: Conservatory offsets with an application to sea turtles. Marine Policy, 93: 55-61

Smith, A.D.M., Fulton, E.J., Hobday, D.C., Smith, D.C., & Shoulder, P. 2007. Scientific tools to support the practical implementation of ecosystem-based fisheries management. ICES Journal of marine sciences. Special issue on fisheries management strategies. 64(4): 633-639

Spalding, M.; Meliane, I.; Bennet, N. J.; Dearden, P.; Pati, P. and Brumbaugh, R. D. 2016. Building towards the marine conservation end-game: consolidating the role of MPAs in a future ocean. Aquatic Conserv: Mar. Freshw. Ecosyst.. 26 (Suppl. 2): 185–199. DOI: 10.1002/aqc.26

ten Kate, K. & Crowe, M.L.A. 2014. Biodiversity Offsets: Policy options for governments. An input paper for the IUCN Technical Study Group on Biodiversity Offsets. Gland, Switzerland: IUCN. 91pp. Available at: https://portals.iucn.org/library/sites/library/files/documents/2014-028.pdf

Todd C.; Stevenson, B.N. Tissot, W.J. 2013. WalshSocioeconomic consequences of ?shing displacement from marineprotected areas in Hawaii. Biological Conservation, 160: 50-58

Trenkel, V.M.; Rochet, M-J. & Mesnil, B. 2007. From model-based prescriptive advice to indicator-based interactive advice. ICES Journal of Marine Science, 64: 768–774.

United Nations. 1992. Earth Summit Agenda 21. The United nations programme of action from Rio. New York, United Nations: 294 p.

UNEP. 2014. Guidance manual on valuation and accounting of ecosystem services for Small Island Developing States. Regional Seas Reports and Studies, 193: 128 p. https://www.cbd.int/financial/monterreytradetech/unep-valuation-sids.pdf[85]

UNEP-WCMC. 2019. User Manual for the World Database on Protected Areas and world database on other effective area-based conservation measures: 1.6. UNEP-WCMC. Cambridge, UK.: 79 p. Available at: http://wcmc.io/WDPA_Manual

United Nations. 2007. *United Nations Declaration on the Rights of Indigenous Peoples*. Available at: https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf

Walters, C.J. 1980. Systems principles in fisheries management. In Fisheries management. Edited by R.T. Lackey and L.A. Nielsen. Wiley, New York. pp. 167–183.

Walters, C.J., and Hilborn, R. 1976. Adaptive control of fishing systems. J. Fish. Res. Bd. Can. 33(1): 145–159. doi:10.1139/f76-017.

Ward T. J., D. Heinemann and N. Evans (2001) The Role of Marine Reserves as Fisheries Management Tools: a review of concepts, evidence and international experience. Bureau of Rural Sciences, Canberra, Australia: 192 pp. Https://www.academia.edu/27944026/The_Role_of_Marine_Reserves_as_Fisheries_Management_Tools_a_review_of_concepts_evidence_and_international_experience?auto=download&email_work_card=view-paper

Watkins, G. (Ed.); Atkinson, R.; Canfield, E.; Corales, D.; Dixon, J.; Factor, S.; Hardner, J.; et al. 2015. Guidance for assessing and managing biodiversity impacts and risks in Inter-American Development Bank supported operations. IDB Technical Note, 932: 105 p.

Williams, K.J.; Harwood, T.D. & Ferrier, S. 2016. Assessing the ecological representativeness of Australia's terrestrial National Reserve System: a Community-level modelling. A report prepared for the Australian Government, Department of the Environment and Energy. CSIRO Publication Number: EP163634. Available at: https://publications.csiro.au/rpr/pub?pid=csiro:EP163634: 100 p.

Weigel, J.Y.// Mannle, K.O.//Bennet, N.J.// Carter, E.// Westlund, L.// Burgener, V.// et al. 2014. Marine protected areas and fisheries: bridging the divide. Aquatic conservation: Marine and freshwater ecosystems, 24(Suppl. 2): 192-215

[85] See also https://www.gov.uk/guidance/ecosystems-services; https://oceanwealth.org/ecosystem-services/; https://roa.midatlanticocean.org/ocean-ecosystem-and-resources/characterizing-the-mid-atlantic-ocean-ecosystem/ecosystem-services/; and https://www.cbd.int/financial/monterreytradetech/unep-valuation-sids.pdf.

Worboys, GL. 2010. The Connectivity Conservation Imperative. In Worboys, GL; Francis, WL; Lockwood, M (eds.). Connectivity Conservation Management. A Global Guide. London, England, Earthscan. p. 3–21

Wright, G.; Gjerde, K.M.; Johnson, D.E.; Finkelstein, A.; Ferreira, A.M.; Dunn , D.C.; Rodriguez Chaves , M. & Grehan, A. 2018. Marine spatial planning in areas beyond national jurisdiction. Paris, IDDRI. Issue Brief, 08/18: 4 p.

Zhou, S. & Griffiths, S.P. 2008 Sustainability Assessment for Fishing Effects (SAFE): A new quantitative ecological risk assessment method and its application to elasmobranch bycatch in an Australian trawl fishery. Fisheries Research, 91: 56–68

Zhou, S.; Kolding, J.; Garcia, S.M.; Plank, M.J.; Bundy, A.; Charles, A.; Hansen , C.; Heino , M.; Howell, D.; Jacobsen, N.S.; Reid, D.G.; Rice, J.C.; van Zwieten, P.A.M.; 2019. Balanced harvest: concept, policies, evidence, and management implications. Rev. Fish. Biol. Fisheries, xxx: 23 p. https://doi.org/10.1007/s11160-019-09568-w

Zhou, S. & Smith, A.D.M. 2017. Effect of fishing intensity and selectivity on trophic structure and fishery production. Marine Ecology Progress Series, 585: 185–198. https://doi.org/10.3354/meps12402

Zhou, S.; Smith, A.D.M. & Fuller, M. 2011. Quantitative ecological risk assessment for fishing effects on diverse data-poor non-target species in a multi-sector and multi-gear fishery. Fisheries Research, 112(3): 168-178. https://doi.org/10.1016/j.fishres.2010.09.028

APPENDIX 1 – EXAMPLE OF SCORING OECM CRITERIA USING AN EXPERT-BASED APPROACH[86]

An expert-based MCDA was undertaken in the Aegean Sea (**Petza et al., 2019**) to assess 516 Fishery Restricted Areas (FRAS) as potential OECMs. FRAs are fishery closures defined by the General Fisheries Council of the Mediterranean (GFCM) as *a geographically defined area in which all or certain fishing activities are temporarily or permanently banned or restricted in order to improve the exploitation and conservation of harvested living aquatic resources or the protection of marine ecosystems*". For their study, **Petza et al.** broadened this definition to cover also areas closed to fishing by *environmental, archaeological, or maritime legislation [at] national, European… or international…levels.*

Based on the literature available at the time of the analysis, a small group of fisheries and conservation experts identified seven criteria against which potential OECMs could be assessed (**Table 1, col. 1**). These criteria do not match those identified in Decision 14/8 because they were identified by the experts, before the CBD COP Decision was adopted. In addition, because of the broadened definition used, many FRAs overlapped significantly with already designated protected areas (**Petza et al., 2019: 6**), inadvertently violating the most important criteria of the OECM identification process[87]. I should also be noted that the criteria elicited by the experts were all related to the actions taken in the FRAs (objectives, regulations, governance) and not to their observed or intended biodiversity outcomes. The results are of interest however, both from historical and methodological points of view.

A Multi-Criteria Decision Analysis framework was proposed to assess, based on expert views, the extent to which individual potential OECMs would sufficiently contribute to marine biodiversity conservation and hence cold be formally identified as OECMs.

In order to set the MCDA framework a number of rating classes (or properties) was determined by experts (**Table 1, col. 2**) for each criterion, from the information available in the literature and in the FRAs database **(Petza et al., 2017**). Each rating property was allocated a score from 0 to 100 by each expert, based on its importance for the biodiversity objective and the median score of the expert group was taken as the consolidated score for the rating property (**Table 1, col. 3**). Independently, the seven criteria were also weighted and ranked by the experts, using the Analytic Hierarchy Process (AHP) based on pairwise comparison of the criteria.

For the case-by-case implementation of the MCDA to each potential OECM, each criterion was initially scored as indicated above, and then, the consolidated scores of the seven criteria were aggregated using a weighted additive model to produce the overall composite score of the OECM ranging from 0 to 100% (this is not shown in Table 1). Finally, the potential OECMs were classified among six classes of effectiveness according to their composite scores, as follows: (A) extremely effective (composite score from 100 to 90%); (B) very effective (89-80%); (C) effective (79-70%); (D) moderately effective (69-60%); (E) slightly effective (59-50%); and (F) ineffective (<49%). The % limits of the classes of effectiveness were

[86] **Disclaimer**: This annex, developed by the authors of the document, based on the original paper by **Petza et al (2019),** is purely illustrative of an example of a useful multiple criteria scoring process applied to OECMs. This does not imply that the authors endorse the criteria, rating classes, scores, and conclusions of the cited analysis. Any error or misinterpretation is our responsibility.

[87] i.e. that areas potential OECMs should not not have been already designated as MPAs.

expert-based. The minimum standard (class of effectiveness) that a *bona fide* OECM must meet might be suggested by the Expert Group but should be formally decided by the decision-makers. The workflow may be followed on **Table 1**.

To check the validity of their expert-based process, **Petza et al. (2019)** undertook an analysis of the consistency of the experts' judgements and a sensitivity analysis.

Table 1: Theoretical example of Criteria, rating classes and composite scores elaborated for an expert-based Multiple Criteria Decision Analysis of OECMs (Based on From Petza et al.,2019: supplementary Table 3). For illustration only, the score reached by the criteria (column 3, in bold) and the resulting weighted scores and resulting composite score (column 5) have been added and are only illustarive.

Criteria	Rating classes (properties)	Scoring	Weight (Tot=1)	Weighted score
1. The area is geographically well defined:	**By coordinates**	**100**	0.03	3,0
	By description	70		
	Not defined	0		
2. The biodiversity conservation objective is to…	Protect biodiversity as a whole	100	0.14	
	Protect specific habitats	**80**		11,2
	Protect specific stocks	60		
	None: but contributes significantly	30		
	None: but contributes slightly	10		
3. Activities allowed within the area meet biodiversity conservation objectives are…	No fishing activity	100	0.23	
	Static gears only	**60**		13.8
	Mobile gears	50		
	Static and mobile gears	40		
	Towed gears	20		
	Towed and static gears	15		
	Towed and mobile gears	10		
	All gears	5		
4. Management and control mechanisms exist within the area?	Yes, all needed	100	0.37	
	Partially	**50**		18.5
	No	0		
5. Area is in place for the long term	> 60 years	100	0.06	
	59 to 40 years	90		
	39 to 20 years	**60**		3.6
	19-10years	40		
	< 10 years	20		
6. Mechanisms by which area is established are difficult to reverse	EU legislation	100	0.06	
	RFMOs' decisions	90		
	National law	**80**		4.8
	Presidential / Royal decree	60		
	Joint ministerial decision	40		
	Ministerial decision)	20		
7. Area closure during the year is:	**Permanent**	**100**	0.11	11.0
	Seasonal: >240 days/year	60		
	Seasonal: 180–239 days/year	40		
	Seasonal: 1-179 days/year	20		
Composite score	**Moderately effective**			**65.9/100**

The proposed MCDA might be used as model for addressing the OECMs issue when other types of areas are to be assessed, e.g., using the CBD Decision set of identification criteria (or Steps) and adjusting accordingly the set of rating properties, scoring range and classed of effectiveness.

References

Petza D, Chalkias C, Koukourouvli N, Coll M, Vassilopoulou V, Karachle P, Markantonatou V, Tsikliras A & Katsanevakis S, 2019. An operational framework to access the value of fisheries restricted areas for marine conservation. Marine Policy, 102: 28-39. https://doi.org/10.1016/j.marpol.2019.01.005

Petza D, Maina I, Koukourouvli N, Dimarchopoulou D, Akrivos D, Kavadas S, Tsikliras A, Karachle P & Katsanevakis S, 2017. Where not to fish – reviewing and mapping fisheries restricted areas in the Greek Aegean Sea. Mediterranean Marine Science, 18(2): 310-323. https://doi.org/10.12681/mms.2081