ICES/IUCN-CEM FEG WORKSHOP ON TESTING OECM PRACTICES AND STRATEGIES (WKTOPS)

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International Council for the Exploration of the Sea
Conseil International pour l'Exploration de la Mer

H.C. Andersens Boulevard 44-46
DK-1553 Copenhagen V
Denmark
Telephone (+45) 33 38 67 00
Telefax (+45) 33 93 42 15
www.ices.dk
info@ices.dk

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Editors

Ellen Kenchington • Jake C. Rice • Daniela Diz • Andrew Kenny • Peter Wright • Dimitra Petza

Authors

Joseph Appiott • Elisabetta Betulla Morello • Darius Campbell • Anthony Charles • Anna Cheilari • Tom Christensen • Mark John Costello • Daniela Diz • Sarah Dudas • Kim Friedman • Susanna Fuller • Serge Garcia • Jannica Haldin • Amber Himes-Cornell • Helen Holah • Harry Jonas • Laurence Kell • Ellen Kenchington • Andrew Kenny • Marty King • Mariano Koen-Alonso • Silvia Malagoli • Llucia Mascorda Cabre • Imèn Meliane • David Miller • Francis Neat • Vedran Nikolic • Jacopo Pasquero • Kenneth Patterson • Dominic Pattinson • Dimitra Petza • Jake C. Rice • Oleg Rykov • Emma Sheehan • Victoria Sheppard • Mette Skern-Mauritzen • Despina Symons Pirovolidou • Sebastian Valanko • Mary Wisz • Peter Wright

ICES International Council for the Exploration of the Sea
CIEM Conseil International pour l'Exploration de la Mer

Contents

i Executive summary

Spatial biodiversity conservation measures are recognized by the Convention on Biological Diversity (CBD) Aichi Biodiversity Target 11 and their Criteria for Other Effective Area-based Conservation Measures (OECMs). ICES/ IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS) investigated how to evaluate areas with spatial fisheries measures in place as OECMs, aided by IUCN/CEM/FEG Guidance on OECMs in Fisheries. Six case studies from the North Atlantic were evaluated, differing in size, biodiversity features, types of measures in place, jurisdictional authority, and expected biodiversity benefits.

All six areas were found to meet subsets of the CBD Criteria and Sub-criteria for OECMs, and none were strongly at variance with any Criteria. The measures evaluated included permanent area closures, closures to specific gears or fisheries for particular stocks, and licensed uses of an area for aquaculture. All case studies were found to produce outcomes consistent with the intent of OECMs. However, WKTOPS noted that each case study had enabling conditions that were important for the effectiveness of the measures in delivering biodiversity outcomes to date. Also, some case studies documented noteworthy biodiversity benefits although the spatial measure was not adopted with the intent of producing the biodiversity outcome. Consequently, context is important to OECM evaluations.

The evaluations raised several questions about OECMs generally, and fisheries measures as tools in potential OECMs. Greater clarity is needed from the CBD on interpretation of the expected permanence of biodiversity benefits, the number of Criteria and Sub-criteria that have to be met, how jurisdictional authority is determined for an area, and how present and possible future activities of sectors other than fisheries should be considered when evaluating OECM status of areas with fisheries measures. It was also noted that no measure, including total prohibition of activity in an area, can benefit all biodiversity, so the nature and magnitude of expected biodiversity benefits also needs clarification.

WKTOPS noted that its evaluations benefited from substantial preparatory work before the workshop. The Guidance Document being used was found to be of little incremental value in cases where substantial information on biodiversity and fisheries in an area had already been collated. However, as the amount of information and prior preparation decreased, the Guidance was increasingly useful.

ii Expert group information

Expert group name	ICES/ IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS)
Expert group cycle	Workshop
Chair(s)	Ellen Kenchington, Canada
	Jake Rice, Canada
Meeting venue and dates	15–24 March 2021, online meeting (40 participants)

iii List of Acronyms Commonly Used in this Report

ABFM	Area-based Fisheries Management Measures
ABMT	Area-based Management Tool
ABNJ	Area Beyond National Jurisdiction
CBD	Convention on Biological Diversity, known informally as the 'Biodiversity Convention'
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CEM	Conservation and Enforcement Measures
COP	Conference of the Parties, the governing body of the CBD
DFO	Fisheries and Oceans Canada; Department of Fisheries and Oceans, Canada
EBSA	Ecologically or Biologically Significant Marine Areas
ENGO	Environmental non-governmental organization
EU	European Union
FAO	Food and Agriculture Organization of the United Nations; a specialized agency of the United Nations
GFCM	General Fisheries Commission for the Mediterranean
ICES	International Council for the Exploration of the Seas
IPLC	Indigenous People and Local Communities
ISA	International Seabed Authority
IUCN-CEM FEG	International Union for Conservation of Nature (IUCN), Commission of Ecosystem Management (CEM), Fisheries Expert Group (FEG)
LCCA	Lophelia Coral Conservation Area
MPA	Marine Protected Area
NAFO	Northwest Atlantic Fisheries Organization
NRA	NAFO Regulatory Area
ncMPA	Nature Conservation Marine Protected Area
NEAFC	North East Atlantic Fisheries Commission
OECM	Other effective area-based conservation measure
OSPAR	Oslo and Paris Conventions; the Convention for the Protection of the Marine Environment of the North-East Atlantic or 'OSPAR Convention'
RFB	Regional Fisheries Body
RFMO	Regional Fisheries Management Organisation
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice; an open-ended intergovernmental scientific advisory body to the CBD
UK	The United Kingdom of Great Britain and Northern Ireland
UNGA	United Nations General Assembly
VME	Vulnerable Marine Ecosystem
WCMC	World Conservation Monitoring Center
WDPA	World Database on Protected Areas
WKTOPS	ICES/IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies

1 Workshop Organisation

ICES/ IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS) participants brought a range of highly relevant expertise and included agency officers, government experts, academic experts and ENGOs with experience in science, management and policy (Annex 1). In total 40 experts participated in the deliberations. The core objectives of the workshop are reflected in the Terms of Reference (Annex 2).

As part of the process for organising WKTOPS, a call for nominations of case studies to review was made. Six case studies were chosen by the co-chairs (nominator in brackets) to use in the workshop:

1. Northwestern North Sea Sandeel Fishery Closure (Peter Wright);
2. Lophelia Coral Conservation Area (Marty King);
3. NAFO Sponge Closures (Andrew Kenny);
4. NEAFC Haddock Box (David Miller/Francis Neat);
5. NAFO Seamount (Corner Rise) Closure (Daniela Diz);
6. Lyme Bay Mussel Farm (Emma Sheehan, Llucia Mascorda Cabre).

Details of those case studies and how they were selected are elaborated on below (Sections 3, 4). Each case study nominator was responsible for collating the available information (Annex 4) required to assess their area as an OECM using the Garcia *et al.* (2020) Guidance Document (Section 2) [1] prior to the workshop and posting it on the WKTOPS SharePoint site.

In advance of the workshop, participants were assigned to one of three break-out groups, each with two contrasting case studies (See Section 3). Participants were assigned to the three break-out groups with an effort to balance multiple factors, particularly knowledge of the case studies being evaluated, types of expertise, and type of background (academic, government institution, ENGO), plus spreading multiple participants from any single institution among the different break-out groups. Break-out group leads were:

Peter Wright	Marine Scotland Science, UK (Case Studies 1, 2);
Andrew Kenny	CEFAS Lowestoft Laboratory, UK (Case Studies 3, 4);
Daniela Diz	Heriot-Watt University, UK (Case Studies 5, 6).

WKTOPS commenced with welcomes and introductions, followed by a discussion of conflicts of interest from the group (Annex 3). Conflicts of interest were declared by participants including the co-authors of the report being evaluated (Serge Garcia, Jake Rice, Daniella Diz and Anthony Charles). All of those making declarations of conflict felt that their situations would not affect their participation in the workshop and that they were not intentionally bringing biases to the discussions. The co-chairs and WKTOPS participants accepted those declarations and agreed that those declaring conflicts were welcome to contribute to WKTOPS.

WKTOPS experts, including break-out group leads, worked on multiple tasks and created a dynamic, interactive group that worked efficiently and effectively over the 8 days of the workshop. The goals of the workshop are elaborated on in Section 2, where background information that was presented is summarized.

[1] The Garcia *et al.* (2020) document covers the entire OECM identification, use, and performance cycle, including governance under multiple jurisdictions. Only their Section 2 on the sequential identification process was considered in WKTOPS.

Reference

Garcia, S.M., Rice, J., Charles, A., and 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 pp. https://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

2 Background

Aichi Target 11 and OECMs

In 2010, The Convention on Biological Diversity (CBD) adopted a Strategic Plan for Biodiversity 2011–2020, containing *inter alia* 20 Targets, referred to as Aichi Biodiversity Targets, including Target 11 in which Other Effective Area-based Conservation Measures (OECMs) were mentioned but not defined. Between 2011 and 2018, a CBD process of discussions and negotiations progressively defined the nature of OECMs and their role in Target 11. In 2018, the CBD Conference of Parties (COP), at its 14th meeting, adopted a definition of OECMs, providing key elements for their identification and use across all ecosystems. In the process, background documents were elaborated at the request of the CBD Secretariat on the potential application of OECMs in fisheries (Rice *et al.*, 2018). The first meeting regarding the use of OECMs in marine capture fisheries was held jointly by FAO, CBD and IUCN-FEG in 2019 (FAO, 2019; Garcia *et al.*, 2019). The present workshop is a follow-up to that meeting and other regional meetings on OECMs will likely be organized (by FAO and other institutions) in the near future. In addition, FAO plans to produce some formal guidelines on the use of OECMs in marine fisheries.

OECMs were formally introduced in Aichi Target 11 following intense discussions of what should or not be included in the Target. 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, and integrated into the wider … seascapes*' (https://www.cbd.int/sp/targets/). This target refers to important properties of the area-based measures concerned: (1) their importance for biodiversity and ecosystem services; (2) effective conservation; (3) effective and equitable governance; (4) ecological representativeness; (5) connectivity within ecological frameworks; and (6) integration within these frameworks.

CBD Decision 14/8, adopted in 2018 (CBD, 2018), is the foundational document for OECMs (referred to as 'The Decision'). It is mandatory for CBD State Parties, and applicable across all ecosystems and economic sectors. This Decision stresses that it should be implemented flexibly, considering the area-based measures case-by-case, within their own context. An OECM is '*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, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio–economic, and other locally relevant values*' (CBD, 2018: §2). The elements of this definition are further developed in the Principles, Criteria and scientific and technical advice and guidance provided in the Decision.

The **Principles**, contained in Annex III of Decision 14/8, provide a valuable set of considerations to be kept in mind when considering the Decision, adding important details about the dual role of OECMs in the fisheries sector (in biodiversity conservation and fisheries sustainability), their expected outcomes and their governance. OECMs are expected to demonstrate a significant contribution to biodiversity benefits and ecosystem services, and to complement MPA networks through improved connectivity and representativeness. Their governance and management by Legitimate Authorities should be transparent, knowledge-based, effective, and equitable, with special attention to Indigenous People and Local Communities (IPLC), their rights and their values. The performance of OECMs against the Criteria should be re-examined at intervals long enough that signals in the biodiversity features can be expected to be detected if present.

The Decision provides four Criteria and ten Sub-criteria to be used for the first identification of OECMS, and when performance re-assessments of identified OECMs are considered necessary. Together they intend to ensure that: (A) the area considered is not already designated as an MPA;

(B) that the area is formally delimited, governed and managed; (C) that it addresses threats to biodiversity and achieves significant biodiversity conservation benefits over the long-term; and (D) that associated ecosystem services and other locally-relevant values have been taken into account.

The Guidance Document

The Decision and its content apply to all ecosystems, terrestrial and marine, and to all economic sectors, under a range of governance systems. Their drafting is therefore generic (and possibly dominated by a terrestrial 'culture'). In order to be faithfully applied in the marine capture fishery sector, the elements of the Decision need to be translated or interpreted in the context of marine capture fisheries in order to facilitate understanding and foster implementation, under a State's or Regional Fisheries Body's (RFB) overall oversight and responsibility.

The Guidance Document intends to contribute to this 'translation' (Garcia *et al.*, 2020). It suggests how, in practice, the requirements of the CBD Decision 14/8 could be implemented, in a systematic way, in the marine capture fisheries sector. It describes information needed to be prepared for the identification, use and performance assessment of OECMs in that sector, integrating faithfully in the process, the various requirements contained in the Principles, Criteria and voluntary guidance of the CBD, from a marine fisheries perspective. It accounts for the fact that similar processes are already used in fisheries for Area-based Fisheries Management Measures (ABFMs) that may need to be adapted, or complemented, to deal properly with OECMs.

The Guidance Document covers: (1) the enabling frameworks needed for the OECM implementation process to develop smoothly in fisheries; (2) a description of the OECM implementation process; (3) the knowledge-based identification phase; (4) the integration of OECMs into the Fisheries Management Plans; (5) the monitoring, evaluation, and recurrent reporting of their performance; and (6) the potential revision of OECMs in case of insufficient performance. It provides a summary of the foundations of OECMs; a reflection on possible implications for complex fishery systems; and a source of references. It was stressed that the Guidance Document reflected the views of its authors and not those of the organizations to which they belong. It was stressed also that the mandate of the WKTOPS Workshop was to review and improve the identification process and its possible implications for OECM performance evaluation.

The Guidance Documents suggest that the proposed OECM implementation process (Figure 2.1) can be developed through a series of phases each of which is subdivided in Steps (Table 2.1) intended to facilitate an orderly conduct of the assessment. First, an initial consolidation of the information available and a rapid assessment of eligibility to identify the most likely potential OECMs. Second, the knowledge-based identification of the potential OECMs leading to recommendations to do one of: (i) reject the area and its measures as definitely not meeting the requirements; (ii) upgrade the measures to meet the requirements; or (iii) recommend the area as a compliant OECM candidate, ready to be implemented. Third, formal decisions are taken by the Legitimate Authorities. Fourth, the formally identified OECMs are integrated into an updated Fisheries Management Plan. Fifth, the OECM implementation is monitored to allow its recurrent performance assessment. Sixth, assessment reports are sent to the relevant State and/or RFB, the CBD, and the World Conservation Monitoring Center (WCMC) for future accounting against international conservation targets.

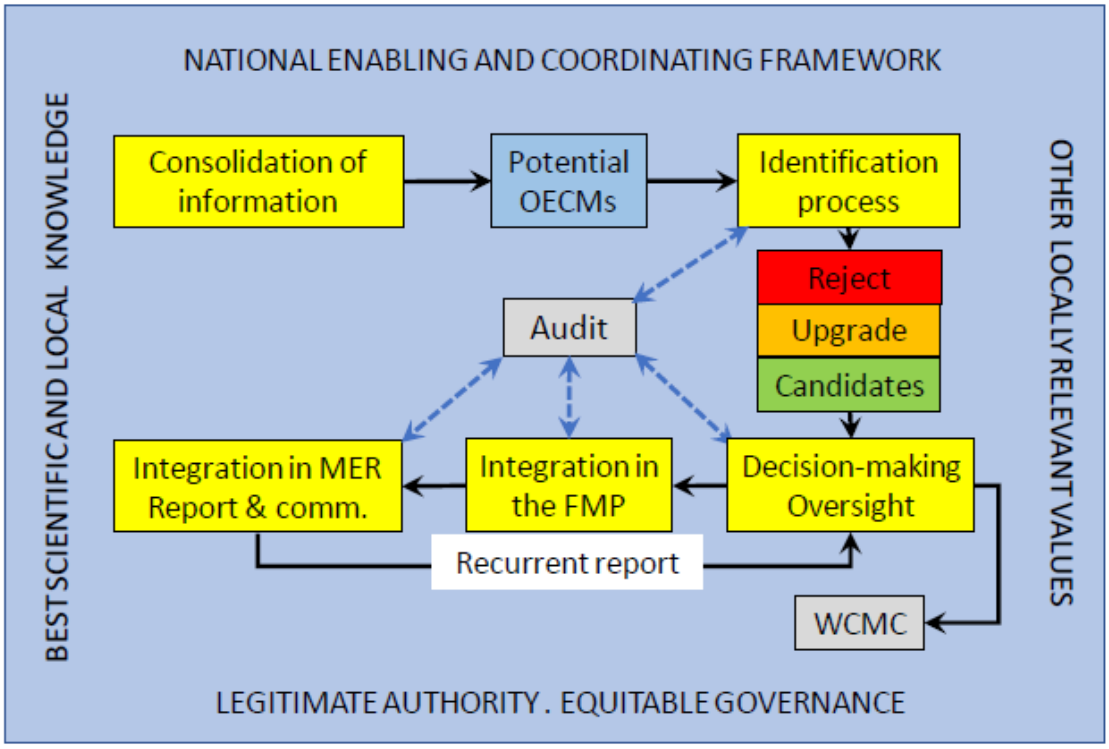

Figure 2.1. Sketch of the OECM implementation process. MER: Monitoring, Evaluation and Reporting; FMP: Fisheries Management Plan; WCMC: World Conservation Monitoring Center.

The workshop focus was on the knowledge-based stepwise process of OECM identification. Steps are identified to: (i) Consolidate the information available and establish the multidisciplinary collaborations needed; (ii) Undertake a quick screening of the available ABFM to identify potential OECMs; (iii) Identify the biodiversity features of concern in the fishery and the OECM, as well as ecosystem services; (iv) Identify pressures and threats affecting them now or in the near-future; (v) Assess the benefits to be expected from the OECM implementation; (vi) Consider the 'additional properties' of the potential OECM in relation to connectivity, representativeness, complementarity and integration; and (vii) Synthesise the assessment, for each candidate-OECM, into a single recommendation for the potential OECM to be rejected, upgraded, or formally identified. 'Additional properties' are highly desirable as they would enhance the OECM effectiveness and would strengthen the rationale for their identification. However, their absence or weakness would, alone, not disqualify an area from being an OECM when the essential properties referred to in Steps (ii) to (iv) have been adequately met. These weaknesses would, however, point to possible improvements of the OECM in the future, to further improve its effectiveness. It was stressed that, to the authors' knowledge, the absence of any of these 'additional' properties had not been used to disqualify an MPA from Target 11 reporting either.

Table 2.1. Steps detailed in the Garcia *et al.* (2020) Guidance Document in relation to the CBD Decision 14/8 Criteria and Principles.

Logical sequence of steps	CBD Decision 14/8	
	Criteria and Sub-Criteria	Principles
0. Consolidation of information	A; B1; B2; B3; C1; C2	a; b; h; j
1. Establishing ABFM eligibility: Quick screening	C1; Ca; C3; D1; D2	a; b; g; i
2. Identify biodiversity and Ecosystem services	B2; B3; C1; C3	
3. Identify pressures and threats	C1; C3; C4;	a; b; e;
4. Assessment of biodiversity benefits	C4; D1	l
5. Assess the additional properties	C4	k
6. Synthesis and report to Legitimate Authorities	C4	h; j; m

WKTOPS goals

The goals of the workshop were to: (1) Contribute to the international process of identification and use of OECMs in the fishery sector, in line with CBD Decision 14/8; and (2) Review and improve the Guidance Document (Garcia *et al.*, 2020) by testing its application to cases studies in the North Atlantic, an area with rich data systems, high-level competences and a wide range of jurisdiction.

Consequently, the agreed WKTOPS goals were to: (1) Consolidate and test the available guidance on identification and performance assessment, drawing from case studies; (2) Identify factors that affect the ability of experts and other stakeholders to evaluate OECMs; (3) Identify types of information of high value for such evaluation; (4) Provide expert feedback on the utility of the proposed stepwise approach and ways to improve its feasibility, clarity, efficacy, scientific robustness, etc.; and (5) Evaluate the format of this meeting for future similar exercises in other regions.

The overall hope is that the Guidance Document (Garcia *et al.*, 2020) will be improved to facilitate the future regional meetings on fishery-OECMs; assist States and RFBs in improving their enabling legal, institutional and scientific frameworks as appropriate (capacity-building); contribute to the development of practical experience at sectoral, national and regional levels; and consequently, lead to the elaboration of international guidelines on OECMs in fisheries.

References

CBD. 2018. Decision 14/8 Protected areas and Other Effective Area-based Conservation Measures. 14th Meeting of the Conference of the Parties to the Convention on Biological Diversity, 17-29 November, Sharm El-Sheikh, Egypt. CBD/COP/DEC/14/8: 19 pp. https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-08-en.pdf (Access date 2-5-2021).

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Rice, J., Garcia, S.M, and 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 February Montreal, Canada. CBD/MCB/EM/2018/1/INF/4: 70 pp. https://www.cbd.int/doc/c/0689/522e/7f94ced371fa41aeee6747e5/mcb-em-2018-01-inf-04-en.pdf (Access date 2-5-2021).

3 Workshop Structure

3.1 Case Study Selection

The selection of the WKTOPS case studies was intended to include diversity in a number of factors. Each break-out group was asked to document the main features of their case studies on properties including:

- size;
- the specific area-based measure(s) in place;
- time under the area-based measure(s) measure;
- primary purpose of the measures when they were implemented;
- quantity and quality of information available; and
- main features of biodiversity to be receiving enhanced protection relative to background.

For each case study, the nominators had made all readily accessible information (Annex 4) available in a SharePoint site for the workshop. The information base includes primary publications, ICES, NAFO and other agency reports, and publicly available background data sets.

3.2 Break-out Groups

Three break-out group were created and each included at least one expert knowledgeable with each case study and the information available, as well as experts in fisheries and conservation matters, not familiar with each case study. The case studies were assigned to the three break-out groups with the intent of giving each group two case studies that had some similar features but also were very different in some features. This was done for two reasons. First was that once fisheries or other bodies at national or regional scales start evaluating areas as potential OECMs, those bodies are going to have to deal with a wide range of cases, and none of the participants in their evaluations are likely to be experts in all the cases that warrant consideration, even though, for the case-by-case assessment required by the CBD Decision, all efforts should be made to bring together the most knowledgeable persons in each case. Second, the break-group group insights into the Criteria and the guidance in the Garcia *et al.* (2020) Guidance Document are likely to be broader, more informative and consistent if the groups have to evaluate contrasting cases against the same Criteria and with a common process of evaluation.

Each break-out group was asked to consider each case study using the CBD Criteria provided in the 'Mock OECM Pro Forma' (Annex 5) to match the information available with the Criteria. In the process, they were assumed to also look at the evaluation process proposed in the Garcia *et al.* (2020) Guidance Document and to fill in an Evaluation Template (Annex 6). The break-out groups were asked to approach their work in three steps:

First was to become familiar with the information available for each case study. The first break-out group session for each group began with presentations of the information by either the nominator of the case study or one of the nominator's co-workers, followed by as much discussion as the group wished.

Second was to discuss the Criteria themselves, to ensure all the break-out group participants were comfortable that they understood the intent of each Criterion, and the types of factors that would need to be considered in its assessment.

The third, and the major part of the break-out group's tasks, was a trial evaluation of their case studies relative to the Criteria, following to the extent possible the approach contained in the

Guidance Document. Separate templates were provided for both recording the main considerations and conclusions regarding each Criterion (herein referred to as the pro forma; Annex 5), relative to the information about each case study, and their experiences with using the Guidance Document's (Garcia *et al.*, 2020) process for the evaluation. Break-out groups were asked not to actually provide conclusions on the degree to which each case study was an OECM, since neither ICES nor IUCN FEG have been mandated by States or RFBs to provide such advice. However, feedback was desired on the factors found to be influential in interpreting and applying the Criteria, and the usefulness of the Garcia *et al.* (2020) guidance in navigating the complexities associated with applying the Criteria in the various case studies.

The core work of the workshop was done in the three break-out groups. Participants were provided with four key documents to use. These were the CBD Decision 14/8 adopted by the Conference of the Parties to the Convention on Biological Diversity, the Garcia *et al.* (2020) approach to identification, use and performance assessment in marine capture fisheries (both detailed in Section 2), and two templates created specifically for the workshop to guide the evaluations in the break-out groups (Annexes 5 and 6).

Reference

Garcia, S.M., Rice, J., Charles, A., and 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 pp. https://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

4 Case Studies

This section provides a brief description of each case study, highlighting particular aspects of the case study that have emerged as being unique or important to the OECM evaluation. Further details of each case study can be found in their associated pro forma in Annexes 7 to 12.

4.1 Northwestern North Sea Sandeel Fishery Closure/ North East UK Sandeel Closure – original name

Due to their importance in North Sea food webs, ICES has advised management to ensure that sandeel (primarily *Ammodytes marinus*) abundance is maintained high enough to provide sufficient food for predators. During the early 1990s a predominantly Danish sandeel fishery developed off the Firth of Forth, east of Scotland. The landings from this fishery peaked at over 100,000 t in 1993 and then subsequently fell. The Firth of Forth area is important for breeding seabirds and the removal of such large quantities of sandeels within their foraging range soon became a matter of concern as it coincided with declines in the breeding success of some seabirds at adjacent colonies (Rindorf *et al.*, 2000). Following a UK call for a moratorium on sandeel fishing adjacent to seabird colonies along the north east UK, the EU, with advice from ICES (ICES, 1999), closed an area of ~20000 km^2 west of 1^o W (see Figure 4.1.1). The European Council Regulation (Article 29a from Council Regulation No 850/98 Annex EC) was applied under technical measures for the protection of juveniles of marine organisms, although the primary purpose of the closure was intended to benefit sandeel–dependent predators by avoiding a localised depletion of this fish species. This precautionary closure began in 2000 and was formally reviewed in 2001, 2002 and 2007 (see STECF, 2007). In all these reviews and subsequent studies of the impact of fisheries on sensitive seabirds, notably kittiwakes (Daunt *et al.*, 2008), the original concern over a possible local impact of sandeel fishing expressed in 1999 did not fundamentally change. Following the exit of the UK from the European Union in 2021 the closure has been retained under UK legislation.

The evidence base that led to the closure benefitted from extensive long-term monitoring of seabird colonies (Rindorf *et al.*, 2000) and initial evidence about population structuring of sandeels within what was a single North Sea managed stock (Wright *et al.*, 1998). This evidence base has increased substantially since the closure which led ICES (2010) to eventually divide the North Sea into a number of stock areas in 2011, with the area that encompasses the closure now being called Sandeel Area 4 (SA4; Figure 4.1.1). While the closed area only covers part of the known sandeel grounds in SA4 it does encompass much of the foraging range of the breeding seabirds (Wakefield *et al.*, 2017) that were the reason for the closure.

The closed area was established under fishery technical measures and the area is not included in reporting to Target 11. However, part of the closed area overlaps with the Firth of Forth Nature Conservation Marine Protected Area (ncMPA) established in 2014 as part of Scotland's contribution to the OSPAR MPA network and so this is very relevant to Criterion A of the Mock Pro Forma (Annex 7). Only sandeel fishing is limited in the closed area and this type of fishing using a fine meshed light bottom trawl with a high headline is focussed on the edge of sand banks where sandeel aggregate.

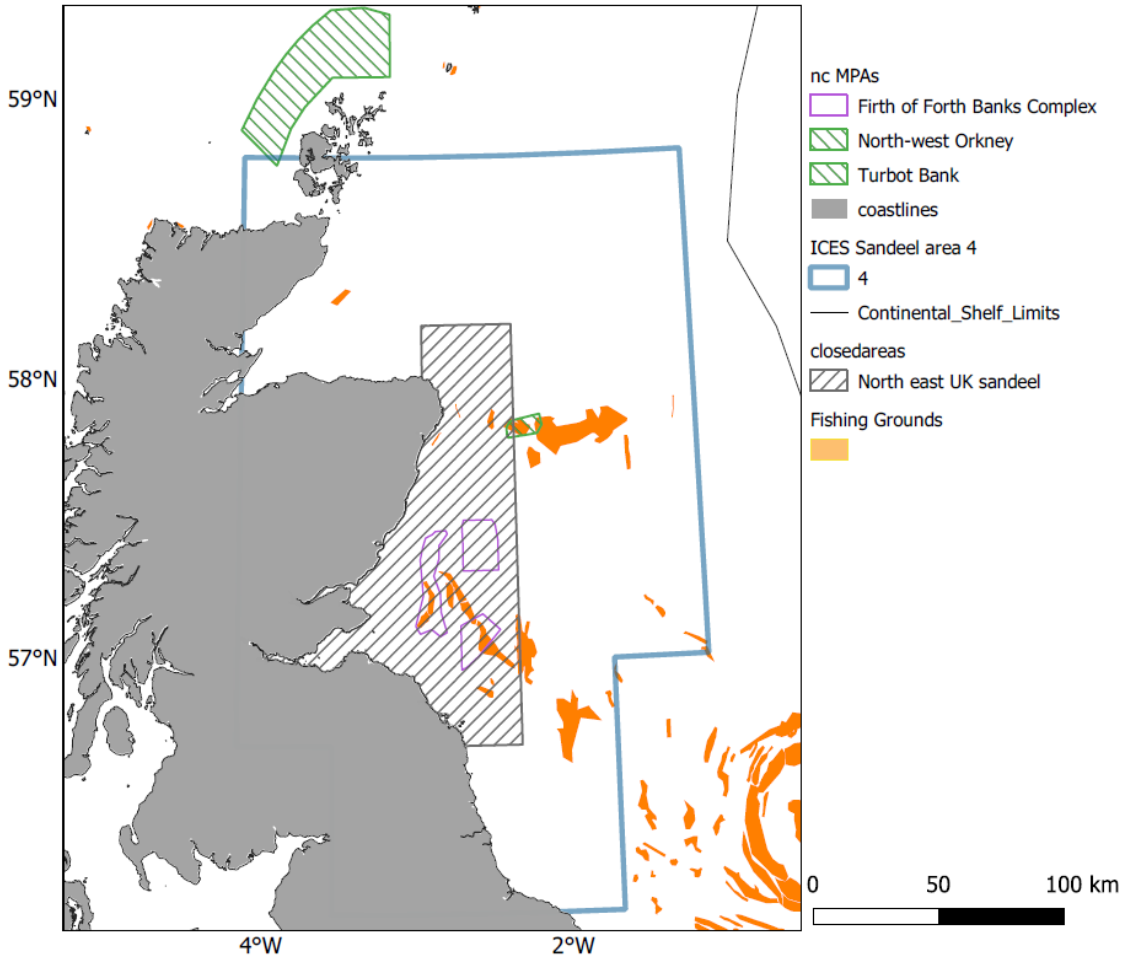

Figure 4.1.1. Chart showing the North east closed area within SA4. Nature conservation MPAs for sandeels (green hatched areas) and Firth of Forth Nature Conservation Marine Protected Area (ncMPA) also shown together with fishing grounds from Jensen *et al.* (2011).

The goals and monitoring plan proposed by ICES (1999) and implemented by UK government bodies (e.g., Greenstreet *et al.*, 2010) provided measurable success criteria, unlike most fishery management measures (STECF, 2007). While trophic conditions affecting local recruitment are the main driver of sandeel population dynamics (Régnier *et al.*, 2019), the closure did lead to a detectable reduction in age 1+ mortality of sandeel, which are prey for adult kittiwakes and many other predators. The evidence for an effect of the closure on seabirds other than kittiwakes is weak (Daunt *et al.*, 2008) and while sandeel abundance has been linked to declines in condition of other predators such as harbour porpoise and seals the overall impact on predators in the closed area is not known. Since the development of an analytical assessment for SA4 in 2017 there has been some concern about localised depletion outside the fished area as proposed TACs are based on estimates for the whole area.

The importance of recruitment to population dynamics in sandeels and other short-lived species can cause confusion when considering Criteria B.3a/C.1a of the Mock Pro Forma describing 'positive and sustained outcomes', as population variation is only partially related to fishing mortality and the reduction in fishing pressure has not ensured that sandeels are always abundant (Annex 7). However, the closed area management is consistent with CBD guidance in that the area is 'managed in ways that achieve positive and sustained outcomes for the conservation of biological diversity', in this case sandeel-reliant predators.

Marine renewal energy developments are occurring within the closed area and the introduction of fixed wind turbines are recognized as a potential threat to the key predator species identified in the closure, kittiwake. This new threat is relevant to Criterion C.1b and ongoing research is exploring the potential impact on seabirds, with a focus on kittiwakes (Annex 7). Due to the limited nature of fishing restrictions, only sandeel and their predators are likely to benefit from the closed area.

There is considerable literature on the functional role of sandeels in the northeast Atlantic ecosystem which is relevant to D.1 (Annex 7). Due to the functional importance of sandeels, they have been made a priority marine feature in Scottish waters and are a key feature in a number of ncMPAs reported to OSPAR. The siting of these other ncMPAs designated for sandeels, in both SA4 and further north, have been informed by an extensive biophysical modelling and otolith microchemistry analysis of connectivity among sand banks (Wright *et al.*, 2018; 2019) promoting a network/system effect for this species.

In terms of social value and equity arising from the closure discussed in Criterion D.2 (Annex 7), there is recognition of the importance of seabirds in the UK economy and great public support. Danish sandeel fisheries were involved in monitoring the closure and there has not been any restrictions on the TAC in the North Sea or SA4 arising from the closed area. Therefore, the economic cost to sandeel fisheries may have been small as they have just been displaced out of the area.

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4.2 Lophelia Coral Conservation Area

The Lophelia Coral Conservation Area (LCCA) was established in 2004 to protect Canada's only known living *Lophelia pertusa*[2] reef complex. It is located on the edge of the Scotian Shelf roughly 280 km southeast of the Cape Breton, Nova Scotia (Figure 4.2.1). The reef has suffered significant damage from previous fishing activities (Buhl-Mortensen *et al.*, 2017). The primary conservation objective of the LCCA is to protect the reef from further damage and allow for recovery. At 15 km^2, the LCCA is a very small conservation area compared to other coral and sponge closures in the region and elsewhere. The small size of the closed area is due to the small size of the reef feature.

Based on current knowledge, the *Lophelia* reef is considered a unique ecological feature within Canadian waters. *L. pertusa* is sessile, long-lived and fragile, which makes it highly sensitive to physical disturbance from fishing or other activities. The reef complex also serves as habitat for many other organisms so it enhances local biodiversity.

Bottom fishing is the only immediate threat to the reef. The redfish bottom trawl and Atlantic halibut bottom longline fisheries are the most active in the area. The LCCA was established by Fisheries and Oceans Canada (DFO) under the *Fisheries Act* and is closed to all bottom contact fishing activities by way of licence conditions. Stakeholders, other government agencies, and ENGOs were consulted during the design of this closure (Breeze and Fenton, 2007). Other potential future threats include oil and gas exploration and submarine cable installation. DFO works with other government agencies to ensure that the LCCA is not impacted by these activities. Climate change is another threat to the biodiversity of this area.

The LCCA is actively managed by DFO, which includes periodic scientific monitoring (Beazley *et al.*, 2021) and regular surveillance activities. Four *in situ* optical benthic surveys have occurred since the site was established. A recent analysis of data collected through three of these surveys (2003, 2009, and 2015) indicated that density and abundance of epibenthic megafaunal species increased at a greater rate inside the LCCA compared to locations outside the closure (Beazley *et al.*, 2021). This work described the area as a benthic biodiversity hotspot with 183 taxa identified. However, recruitment of *L. pertusa* was found to be low. These results suggest that the closure reduced the risk of further damage to the reef and that species diversity and abundance is increasing but more time is needed to allow for the recovery of the slow-growing *L. pertusa*. The LCCA is one of the only conservation areas in the region where baseline biodiversity data were collected prior to designation. This allows for the monitoring of changes in the local benthic ecosystem over time. The regional surveillance program for MPAs and OECMs includes: an At-sea

[2] *Lophelia pertusa* has undergone a taxonomic revision and is now known as *Desmophyllum pertusum*. As the name of the conservation area is the 'Lophelia Coral Conservation Area', we use the older name of *Lophelia pertusa* in this report to avoid confusion.

Observer Program, Vessel Monitoring System (VMS), aerial surveillance patrols and fishing log-books.

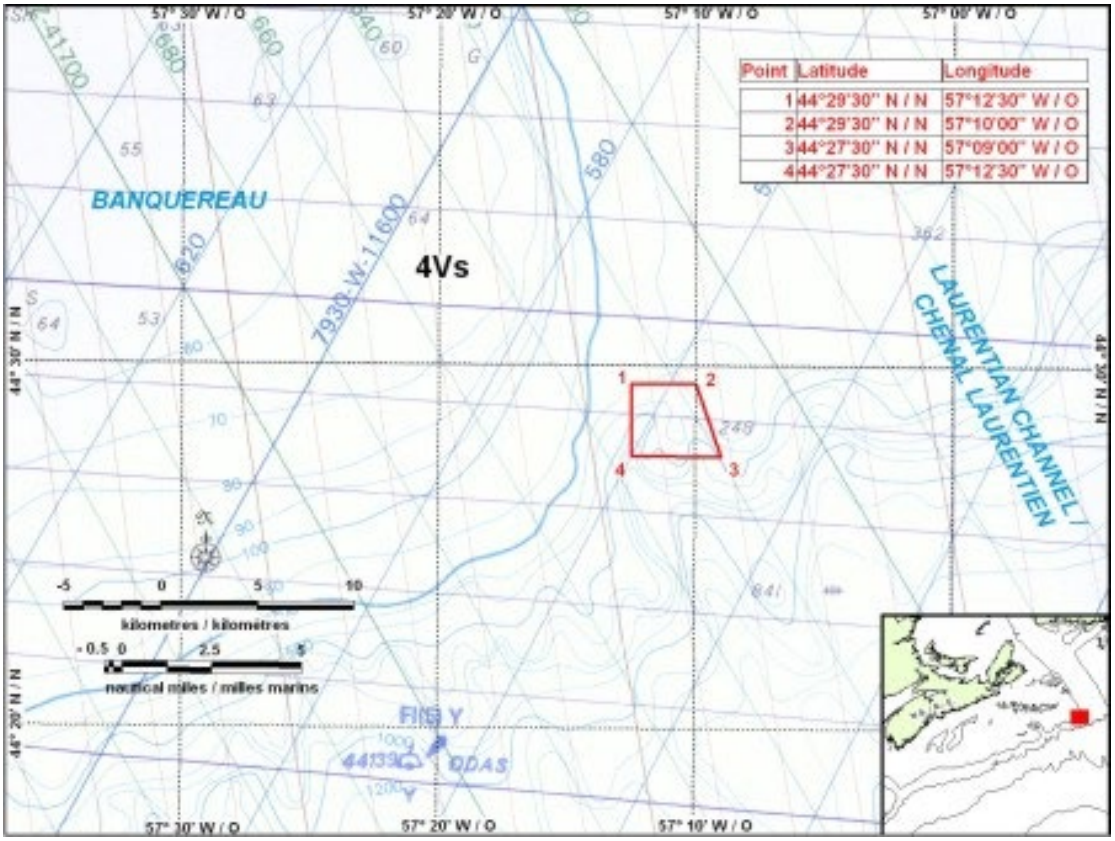

Figure 4.2.1. Map of the Lophelia Coral Conservation Area, located on the edge of the Scotian Shelf, off Nova Scotia, Canada (DFO, 2017).

The initial assessment of the LCCA against the Mock Pro Forma (Annex 8) indicates that the closure satisfies the CBD OECM Criteria and could be considered an effective biodiversity conservation measure within the context of Aichi Target 11. Evaluating this site was relatively straightforward because the key ecological, human use, jurisdictional and governance characteristics of the measure are well-defined. It was established to protect a sessile, unique and highly vulnerable ecological feature – the only known *L. pertusa* reef in Canada. Bottom contact fishing is the only immediate threat to the reef, which falls entirely within Canadian jurisdiction. Under the *Fisheries Act*, DFO has the authority to regulate commercial fishing activity and establish spatial fisheries closures to protect biodiversity. Finally, a relatively recent study of the area shows that the closure is having a positive effect on local biodiversity. Looking ahead, DFO will need to clearly define the broader management system for the LCCA to address potential future threats (e.g., offshore petroleum exploration). Another challenge for this site will be sustaining a regular monitoring program due to the costs associated with doing *in situ* surveys in remote locations. Beazley *et al.* (2021) recommend that monitoring should occur every seven years.

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4.3 NAFO Sponge Closures

The Northwest Atlantic Fisheries Organization (NAFO) started work on implementing an ecosystem approach to fisheries management in 2008 following the introduction of UNGA Resolution 61/105 which sets out the requirements for protecting Vulnerable Marine Ecosystems (VMEs) from the impacts of bottom fisheries in the high seas. The initial focus in NAFO was therefore on identifying and mapping VMEs within its jurisdiction (e.g., the NAFO Regulatory Area (NRA)), establishing VME fishery closures and developing methods for the assessment of Significant Adverse Impacts (SAI).

Accordingly, several fishery management measures have been established to protect VMEs in the NRA, but it is the sponge VMEs which have been the most studied and are now afforded the most protection, with more than 60% of the known large sponge biomass protected by six VME fishery closures (Figure 4.3.1).

NAFO is in charge of the management and conservation of most of the fishery resources on waters outside the EEZs (Regulatory Area) in the northwest Atlantic Ocean. The area described corresponds to the 3LMNO divisions of the NAFO Regulatory Area (NRA) between 600 m and 2500 m depth. This area includes the main Greenland halibut (*Reinhardtius hippoglossoides*) fishing grounds in international waters, with the highest concentration of fishing effort seen along the continental slope on the north-east side of the Flemish Cap and a smaller concentration along the southern end of the Flemish Pass and around the Tail of the Banks (NAFO, 2015).

Geodia spp.-dominated sponge grounds form a linear band following depth contours on the continental slopes in the NRA. Six areas with significant sponge concentrations have been identified based on RV surveys (NAFO, 2009; Kenchington *et al.*, 2011): a narrow band between 700 m and 1470 m depth on the north-east slope of the Grand Banks, between the Nose and the Tail of the Banks; the south-eastern corner of the Beothuk Knoll between 1000 and 1400 m depth; the south-eastern corner of the slope of Flemish Cap between 950 and 1330 m depth; the eastern slope of the Flemish Cap in a band from north to southeast between 1050 and 1350 m depth; and lastly, the north slope of the Flemish Cap and Flemish Pass in one area known as Sackville Spur, between 1250 m and 1450 m depth.

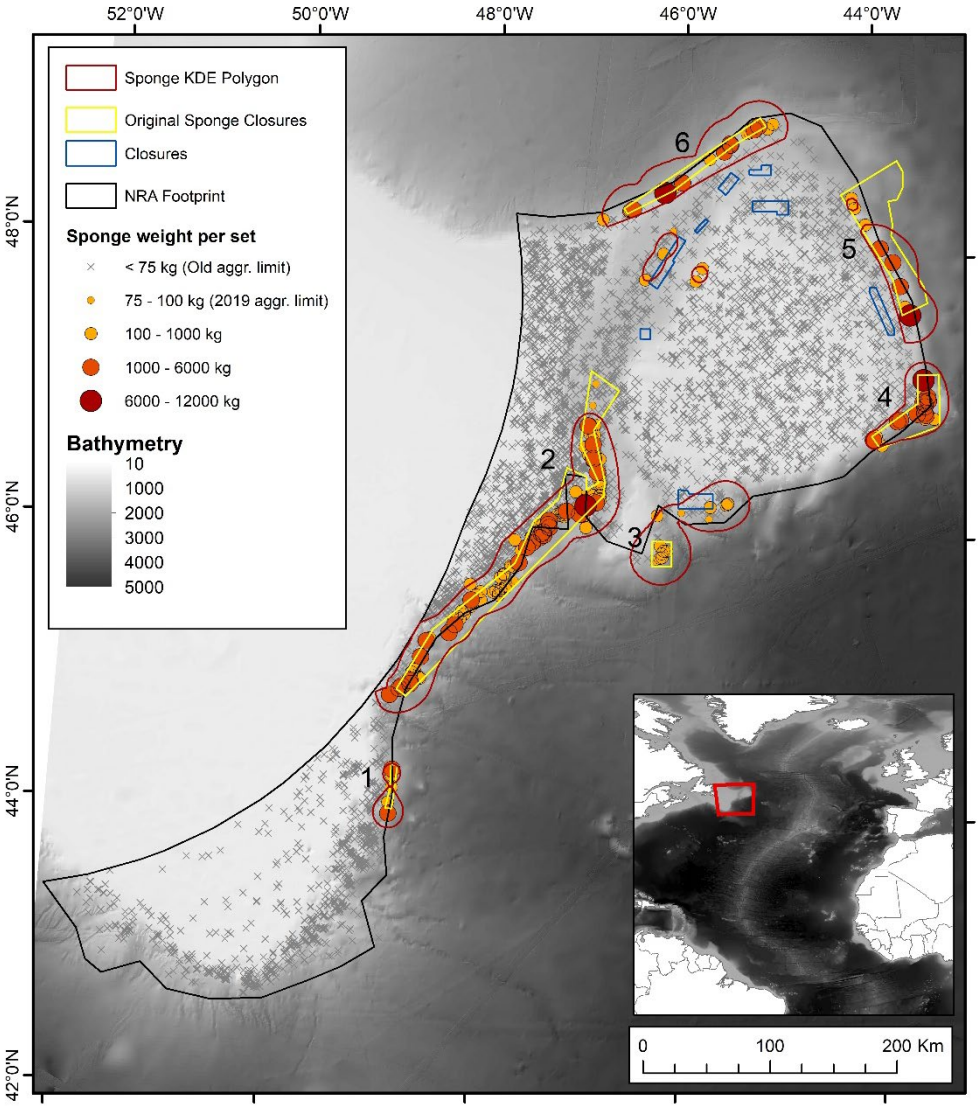

Figure 4.3.1. NAFO Sponge and coral closures as defined in the 2020 NAFO Conservation and Enforcement Measures (NAFO, 2021), the sponge closures highlighted in yellow and are numbered 1, 2, 3, 4, 5, and 6.

An increased level of biodiversity has been shown to occur in sponge grounds (Beazley *et al.*, 2013), which provide significant functions important in delivering ecosystem heath and services, such as water quality and secondary production functions, both of which are important in maintaining healthy and resilient fish stocks (Kenchington *et al.* 2013; Maldonado *et al.*, 2016; Meyer *et al.*, 2019; Pham *et al.*, 2019). For example, it has been estimated that sponge grounds (VMEs) in this region have the capacity to filter approximately 56 143 ± 15 047 million litres of seawater daily from the bottom waters encompassing an area of 135 056.82 km^2 of seafloor (Pham *et al.*, 2019). This huge exchange of water is likely to make a significant contribution to the re-cycling of carbon (chemical energy) and nutrients, giving rise to elevated levels of secondary benthic production (Maldonado *et al.*, 2016), including the potential associated benefits (via the provision of food, refugia and/or nursery grounds) for commercially-targeted fish species in the region (Kenchington *et al.*, 2013; Meyer *et al.*, 2019). More details can be found in Annex 9.

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4.4 NEAFC Haddock Box

The NEAFC fisheries measure in this case study is a restriction on the gear being allowed within an area known as the 'the Rockall Haddock Box' in the area beyond national jurisdiction (ABNJ) on the Rockall Bank in the northeast Atlantic (Figure 4.4.1). The NEAFC Rockall Haddock Box ABFM is targeted at managing impacts of fisheries on juvenile haddock but also contains some important and relatively untouched benthic habitats (see Annex 10 for more details). Multiple VME indicator species have been identified within the Rockall Haddock Box, but there are no bonafide (validated) records of VME habitats. Sea pens are the most significant VME-related feature of the box, and are found notably in the east. There are no fish species unique to the area, but the critically endangered blue skate is recorded regularly from inside the area. The Rockall Haddock Box was part of a wider area proposed as an EBSA in 2019 (CBD, 2019).

This ABFM has been in place in NEAFC since January 2002 with a ban on all fishing gear except longlines within the Rockall Haddock Box. While there are other bottom fisheries closure areas in the Rockall-Hatton region, these are focused on protection of Vulnerable Marine Ecosystems (VMEs) and fall under a different Recommendation and different measures (Figure 4.4.1). The western half of the Rockall Haddock Box itself is set within an 'existing bottom fishing area'; according to the NEAFC VME Recommendation, so both pelagic and bottom fishing is allowed around it. The Eastern half of the box is in UK and Irish (European Union (EU)) national waters, but the same protections are afforded, as the closure is a measure agreed to by the relevant Contracting Party.

Haddock is the main target species inside subarea VIb1m and haddock fisheries there mainly take place from April to August with a peak in June. The percentage of haddock caught in the NEAFC Regulatory Area varies from year to year, typically around 10% of the total Rockall haddock catch, but in certain years up to 25% being caught in international waters. Angler fish, ling and witch flounder appear as bycatch. When the fisheries appear to be targeted at other species such as grey gurnard, black scabbard fish, and round nose grenadier, then haddock, Baird's smoothhead, redfish, tusk, and skate may be in the bycatch.

The measures and coordinates of the Rockall Haddock Box have remained the same throughout the 20 year period. Although it appears that there was no agreement in 2006, it is not clear whether any fishing restarted in that year. We are not aware of any suspension of the EU Regulations in 2006 so these would have continued at least for application to the EU fleets.

In the initial years from 2002 to 2007 the NEAFC recommendation only covered the half of the box within the NEAFC Regulatory Area (international waters/ABNJ). The EU Regulations did however cover both the international and national sides of the Rockall Haddock Box. From 2008 the NEAFC regulation covered the entire area both in the Regulatory Area and in national waters.

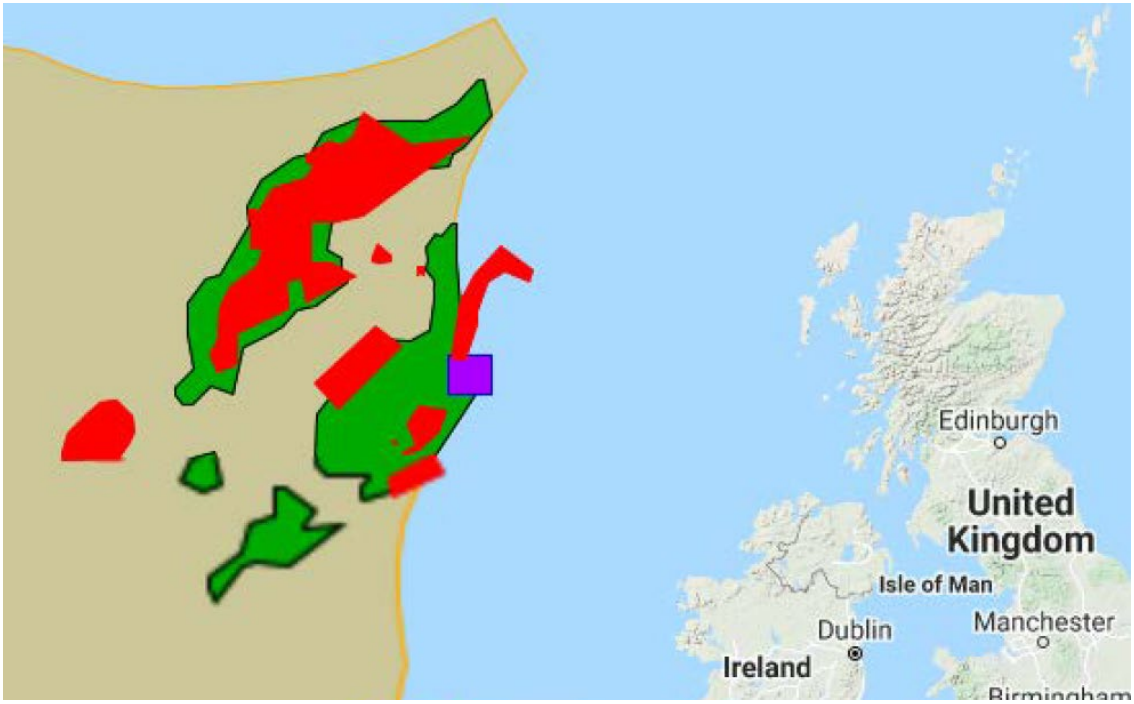

Figure 4.4.1. Map of a portion of the NEAFC Regulatory Area showing the Rockall Haddock Box (purple) under current Recommendation 4:2021; bottom fisheries closures to protect vulnerable marine ecosystems (red) under Recommendation 19:2014; and areas where bottom contact fishing is allowed under Recommendation 19:2014 (green). All other areas of the Regulatory Area (brown) are considered restricted bottom fishing areas under Recommendation 19:2014. These restricted areas require an exploratory protocol before bottom fishing is allowed.

There is no agreed management plan for haddock in this area, but a management strategy is under consideration as yet not adopted. The strategy was evaluated by ICES in 2013, with harvest rules again assessed in 2019. The EU has a multiannual management plan for the Western Waters since 2019 (EU, 2019).

While NEAFC will monitor activity in international waters, within national waters the relevant national authority carries out monitoring control and surveillance. Monitoring in NEAFC waters is only in place to look at compliance by vessels within the requirements of the Regulation, but

no specific NEAFC monitoring is in place for the impacts on biodiversity. NEAFC monitoring currently analyses the presence of vessels in the NEAFC Regulatory Area part of the Rockall Haddock Box with gear other than longlines which are steaming at speeds that could indicate fishing activity. Prior to 2020 this produced alert warnings that were sent to Contracting Parties to follow up. However, the system generated a majority of false positive warnings. This was due to the current once-a-year notification of fishing gear for vessels, and other reasons such as poor weather causing slow steaming speeds. Since 2020 the NEAFC Secretariat has been applying more detailed analysis to such false positives reducing these greatly, so that only these alerts are forwarded to Contracting Parties. In the case of the Rockall Haddock Box this has meant only 3 or so alerts being forwarded for investigation in 2020.

Current discussions in NEAFC relate to requests to ICES for evidence on the effectiveness of the Rockall Haddock Box measures in protecting juvenile haddock. In parallel, requests have been made to ICES to provide advice on the presence of VMEs so that if the rationale for restrictions from fishing changes related to juvenile haddock diminishes, NEAFC may find a rationale to continue with similar protection measures under the measures related to the conservation of VMEs.

This case study has some unique aspects which are highlighted:

1. All scientific work for NEAFC is done independently by ICES
   - The NEAFC Permanent Committee on Management and Science (PECMAS) receives and asks for clarifications on the advice;
   - Annual meeting receives the advice again and makes the decisions;
   - Ensures truly independent scientific advice.
2. There are overlapping jurisdictions:
   - The area extends into State waters (EU(Ireland) and UK) but through their roles as NEAFC Contracting Parties, these have agreed to regulate in harmony with the NEAFC regulations;
   - NEAFC and OSPAR have overlapping objectives for conservation in the area;
   - The OSPAR Convention covering the same area, has some regulatory powers;
   - OSPAR is a body that can create MPAs in the high seas;
   - OSPAR deals with some of the other human pressures not covered by NEAFC.
3. The Rockall Haddock Box has an interaction of international and national measures and it was extended to adjacent national waters when national parties agreed to the recommendations. The haddock stock is managed through a mixture of national (UK, EU) and international arrangements (NEAFC). However, a management plan has not been formally agreed upon for the stock.

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4.5 NAFO Seamount (Corner Rise) Closure

The Corner Rise Seamounts are located in the northwest Atlantic in areas beyond national jurisdiction, and under the Northwest Atlantic Fisheries Organization (NAFO) regulatory area. Other sectoral organisations have mandates in this area, including the International Seabed Authority with respect to deep seabed mining, the International Maritime Organization with respect to shipping, and the International Commission for the Conservation of Atlantic Tunas (ICCAT) with respect to tuna and tuna-like fisheries.

This seamount chain has been described as an ecologically or biologically significant marine area under two decisions of the Convention on Biological Diversity (CBD, 2012; 2014), and have been identified by NAFO contracting parties as a vulnerable marine ecosystem (VME); (NAFO, 2021). These seamounts host complex coral and sponge communities, including numerous endemic species.

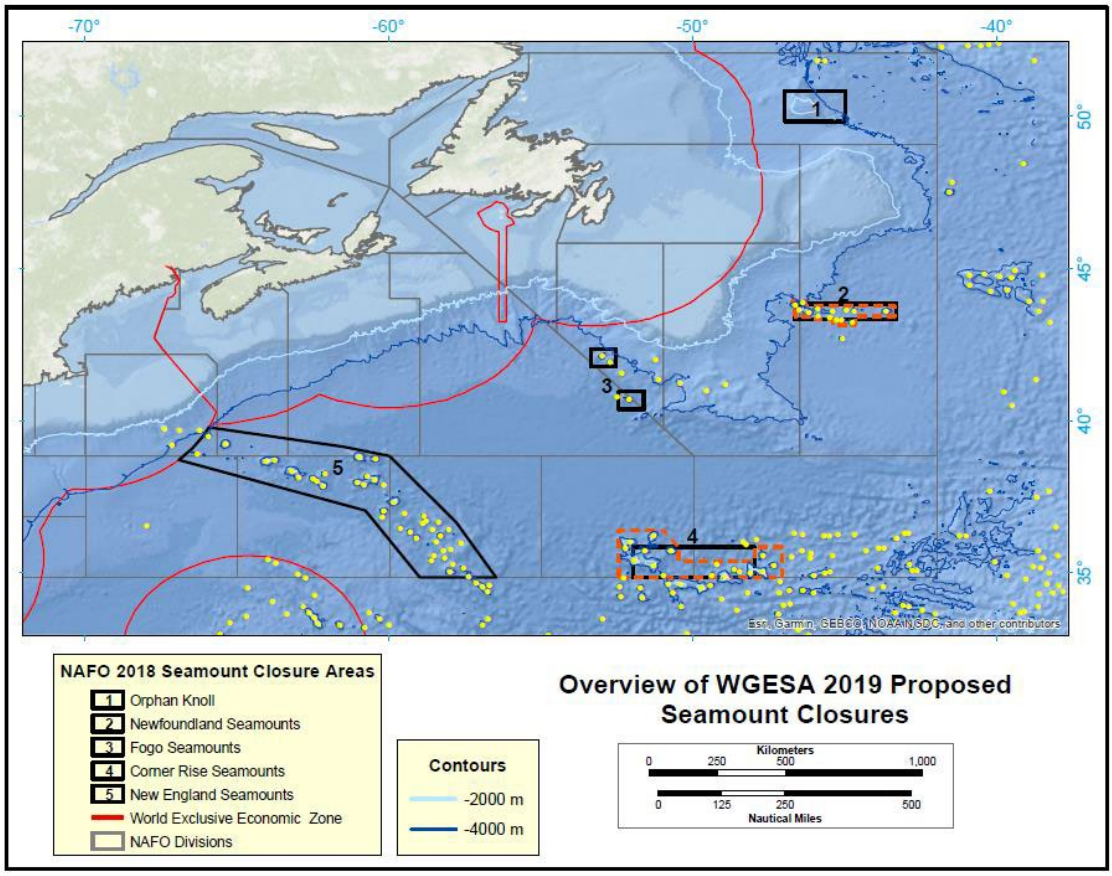

Figure 4.5.1. Map showing the location of the current area closed by NAFO to protect Corner Rise Seamounts (Area 4, black outline). The dashed line indicates a proposal tabled in 2020 to expand the current closure and this has been further extended to include all seamounts with peaks < 4000 m in 2021. Yellow circles indicate seamount peak locations. (Figure from NAFO, 2019).

Different fisheries measures have been put in place to protect these seamounts and associated species since 2006. In 2016, bottom trawling has been unauthorized to proceed (NAFO, 2021), and requirements for mid-water trawl gear modification were introduced to avoid bottom contact. The mid-water trawl fishery targets splendid alfonsino (*Beryx splendens*). Greenland shark is caught as bycatch. Uncertainties concerning the alfonsino stock status has prevented the

NAFO Scientific Council from conducting stock assessments for this stock (NAFO division 6G).[3] The second (and latest) NAFO performance review (NAFO, 2018) has recommended that NAFO '*establishes conservation and management measures for Splendid Alfonsino in Subarea 6, at the earliest opportunity*'. In 2019, the NAFO Scientific Council concluded the stock is depleted and recommended imposing a moratorium. At the subsequent NAFO Annual Meeting, Parties agreed with a moratorium, and the 2020 meeting agreed to maintain the moratorium until 2021, when the stock status will be re-assessed. In 2021, the VME measures will also be reviewed, and scientific proposals to expand the VME closure (see Figure 1 of the Mock Pro Forma, Annex 11) will also be considered.

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4.6 Lyme Bay Mussel Farm

The Lyme Bay offshore mussel farm is situated in Lyme Bay, southwest of England, UK (Figure 4.6.1). Lyme Bay is a large, open embayment with a moderate slope from the intertidal zone to up to 50 m depth (CEFAS, 2015). The mussel farm is a suspended rope type of mussel aquaculture located in an exposed area between 3 and 10 km offshore in depths of 20 to 30 m relative to chart datum (Figure 4.6.1). The farm leased 15 km^2 of seabed from The Crown Estate to deploy a specially designed technology of suspended longline ropes to cultivate the native blue mussel *Mytilus edulis*. The mussel farmers deployed the first mussel lines in Sites 1 and 2 in November 2013 and continue to deploy and develop the farm throughout the permitted area. Prior to development, Offshore Shellfish Ltd shared the plans to develop the mussel farm to the Lyme Bay Consultative Committee (previously Lyme Bay Working Group), a stakeholder collaboration initiative.

Lyme Bay is a 'marine biodiversity hotspot' (JNCC, 2010; Fleming and Jones, 2012; Singer and Jones, 2018) that contains a mosaic of substrates which are home to species of both conservation and commercial importance (Rees *et al.*, 2016; Sheehan, Cousens, *et al.*, 2013; Sheehan, Stevens, *et*

[3] Due to lack of abundance or exploitation data, no reliable stock assessment could be conducted.

al., 2013). After years of destructive fishing activity some areas of the bay are now protected under various levels of spatial management (Figure 4.6.1), protecting species and habitats of national and international conservation importance (NE, 2010). In 2008, 206 km^2 was protected from bottom-towed fishing under a statutory instrument, which was enveloped with the designation of a Special Area of Conservation (~ 270 km^2); (EC Habitats Directive), that became effective in 2011 and offically designated in 2017. The mussel farm is situated to the west of this marine protected area (MPA) in an area that was severely degraded seabed due to years of heavy bottom-towed fishing activity (Sheehan *et al.*, 2019). The area covered by the farm is adding to the total area of fishing ground that has been closed to bottom-towed gear in Lyme Bay. By deploying structure that creates habitat, food, shelter and excludes destructive bottom-towed fishing activity, the mussel farm has the potential to restore the benthic habitat and surrounding ecosystem, acting as an OECM.

The farm is located in an area of historic heavy fishing activity which has had to cease due to the introduced structure of ropes, lines, buoys and anchors into the benthic and pelagic ecosystem. As part of a Before After Control Impact study, a pre-development survey was undertaken in 2013. Results showed that the area was mainly composed of sand and mud with species characteristic of habitats under disturbed conditions. The habitat was homogenous with no hard structure showing marks of heavily fished by bottom towed gear. From 2013 until 2020, the farm and its surrounding environment has been monitored yearly through the use of a wide range of survey techniques such as underwater video towed array, remote operated vehicle, baited seabed underwater video, midwater video, plankton net trawls, benthic grabs, CTDs, bird and mammal surveys, acoustic droppler current profiler, and most lately, acoustic telemetry. This has been coupled with a socio-economic study.

Results to date show large aggregations of pelagic fishes around the mussel farm headlines which are acting as fish aggregation devices, nursery, food source and as habitat for epibiota (Figure 4.6.2 and Figure 4.6.3); (Sheehan *et al.*, 2019, 2020). A significant change to the epibenthic habitat has been observed as mussels are found underneath the farm, increasing the amount of hard structure and food to previous soft-sediment habitat (Figure 4.6.3); (Mascorda Cabre *et al.*, 2021; Sheehan *et al.*, 2019). Preliminary analysis of data from 2018 and 2019 show higher within the farm abundances of scavengers, filter feeders, planktivorous fish and predators, including important commercial species. Sediment parameters, infaunal community or the zooplankton communities have not shown to be negatively affected by the mussel farm (Sheehan *et al.*, 2019). There is yet no evidence of an increased landings in the area (Figure 4.6.3).

Given the previous homogeneity of the habitat following destructive fishing techniques, these findings suggest that the addition of structure into the environment is not negatively affecting this ecosystem but on the contrary, enhancing pelagic and benthic biodiversity (Mascorda Cabre *et al.*, 2021; Sheehan *et al.*, 2019); (Figure 4.6.2). Mussel headlines are attracting species from a wide range of phyla and trophic levels and providing a surface area for the settlement and colonisation of epibiota suggesting that the whole ecosystem is being benefited by the mussel farm, contributing to the production of the area (Figure 4.6.3). The Lyme Bay offshore mussel farm is beginning to increase the integrity of the epibenthic ecosystem, particularly through the provision of feeding areas and refuges from predation. If the increasing abundance of commercial species continues, it could increase the catch per unit effort in fishing ground around the mussel farm, known as 'spill over' enhancing wild fisheries. The farm is currently being used by anglers, benefiting of the fish aggregation devices effect and the increased fisheries available in the area. See Annex 12 for more details.

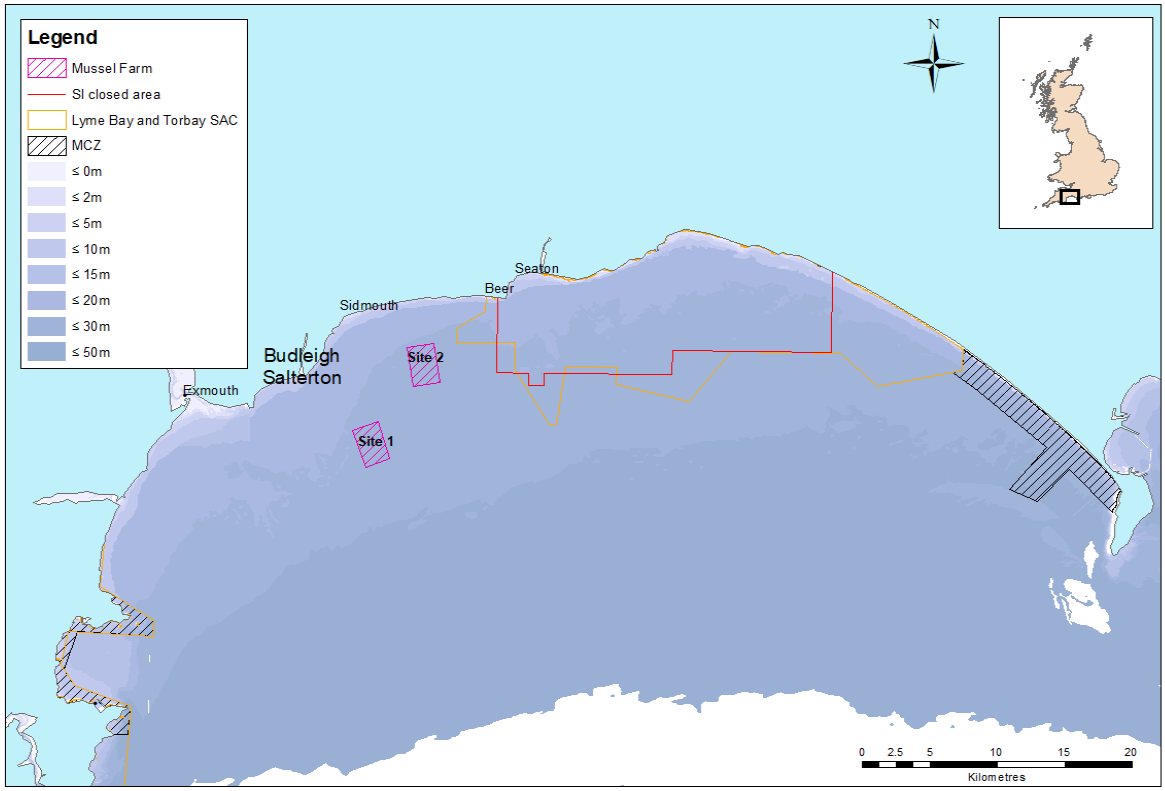

Figure 4.6.1. Map of Lyme Bay (southwest England) showing the position of the offshore mussel farm and MPA designations.

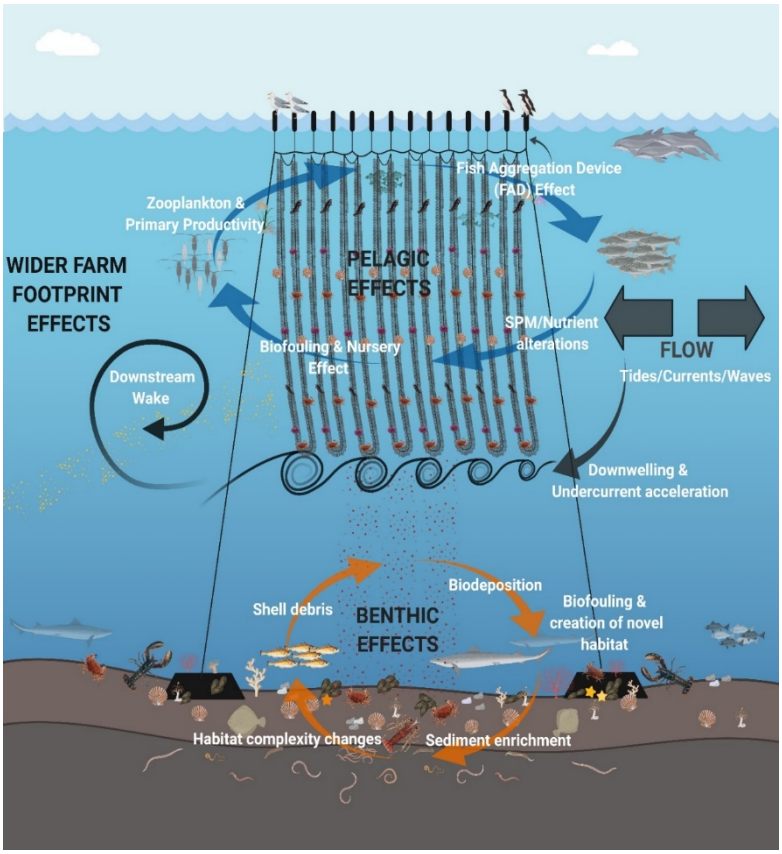

Figure 4.6.2. Main potential ecological and oceanographic effects of a longline mussel farm. The figure represents one of many designs that could be attributed to offshore longline mussel farm's constantly evolving outlines (Graphic: Mascorda Cabre 2020 created with BioRender.com in Mascorda Cabre *et al*. (2021)).

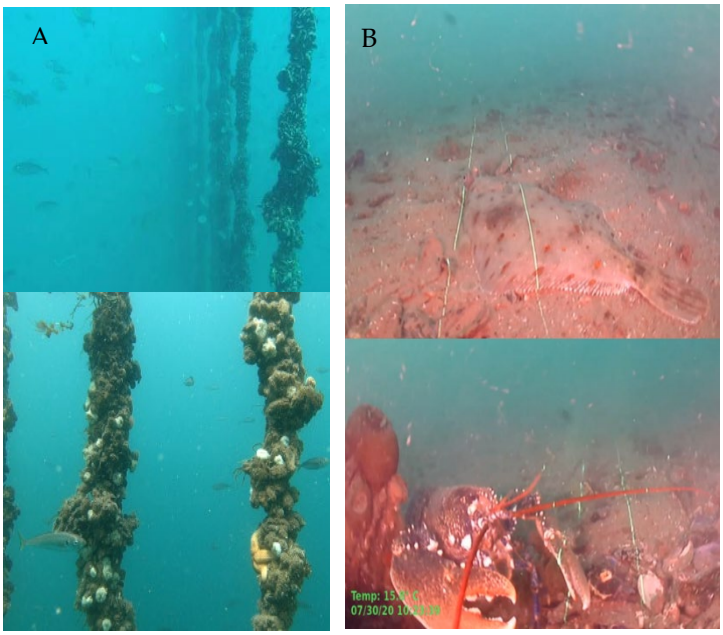

Figure 4.6.2. (A) Schools of fish have been captured in an offshore longline mussel farm in Lyme Bay, South West UK. Both frames have been taken from the recording of a non-baited midwater video (NMW) rig placed at 6 m depth. Longline ropes are full of mussels and biofouling (Mascorda Cabre 2020 in Mascorda Cabre *et al*. (2021)). (B) Remote operated vehicle (ROV) footage showing how the seabed underneath the mussel farm is being utilised by commercially valuable crustaceans and fish (Mascorda Cabre, 2019 in Mascorda Cabre *et al*. (2021)).

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5 Break-out Group Discussions

In all six areas evaluated, the rapid assessment process used was found to be effective and to produce sufficient information to warrant further consideration of each area as a potential OECM, should the appropriate jurisdiction(s) choose to move in that direction, and none were found seriously inconsistent with any criteria. However, some pitfalls and challenges emerged that would require further consideration. The diversity of case studies examined demonstrates the breadth and robustness of the OECM concept, relative to well-managed fisheries (and an aquaculture site), suggesting that OECMs may be a powerful and flexible tool for conservation of biodiversity, while incentivising higher responsibility in the conduct of fisheries.

Current best practices in using spatial measures as a component of managing fisheries appear to go a long way towards prepositioning such areas for consideration as potential OECMs. In particular, these best practices already require bringing together much of the information that will be needed for OECM evaluations, and reviewing it in consistent (but not identical) ways. The value of having both managers and scientists with broad competences in ecosystem science, conservation science and fisheries involved in the evaluations, as well as experts (from both roles), was a repeated observation. The break-out groups were constituted by both managers and scientists with a good background in both fishery and biodiversity matters which greatly facilitated the assessment of the OECM evaluation guidance.

OECM Criteria were found to set a much higher bar for evidence of effectiveness in delivering biodiversity conservation benefits (for identification as well as performance reassessment) than is set for designated MPAs, whereas MPA designations commonly (but not always) appear to require more robust evidence of biodiversity features of priority for enhance conservation and protection.

Many of the more extended debates and problematic parts of evaluations arose from a lack of clear definitions of terms and concepts used in the OECM definition and Criteria, and/or unclear benchmarks for how much of a property referenced by a Criterion or a phrase in Target 11 is 'enough'. A useful guidance document would have a section on such definitions and standards.

The stepwise guidance in Garcia *et al.* (2020) being tested in the workshop was of most use in cases when the preparatory work was in very preliminary stages. The larger the amount of information available and work done with the information prior to the workshop, the smaller the need to refer to the Guidance Document. For example, when an area had already been found to be an appropriately protected VME, there was very little value added from guidance on how to conduct an OECM evaluation. Further details of the deliberations are presented below.

Reference

Garcia, S.M., Rice, J., Charles, A., and 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 pp. https://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

5.1 Pitfalls and challenges faced when interpreting the OECM criteria

This section discusses any issues that were raised in filling out the Mock Pro Forma for each case study. These are issues that were particular to the case study and arose from its properties.

Northwestern North Sea Sandeel Fishery Closure

While collating information was not difficult for the case leader due to his experience of this case study, an attempt to fill out the Mock Pro Forma prior to the workshop by a fisheries scientist unfamiliar with the area, was unsuccessful due to the difficulty of finding relevant information. This highlights the need for good information repositories for potential OECMs, similar to that available for many MPAs. The group also recognised the importance of involving the site manager in addition to experienced experts in the OECM process.

Criterion A highlighted the need to pay attention to the wording of the CBD Criterion. Initially, the group got into discussion of which MPA definition the area should not meet. A member of the group clarified that an OECM can meet an MPA definition but the question here is whether it is recognized and reported as such. Part of the closed area overlaps with a Nature Conservation Marine Protected Area (ncMPA) established in 2014 and so this area of overlap cannot be reported on as an OECM.

Sub-criteria B.3a-d/C.1a. The term 'positive and sustained outcomes' did lead to considerable debate within the group given that stopping fishing activity only reduces a pressure and does not ensure sandeels are abundant. The group agreed that it was important to clarify the biodiversity outcomes sought by the closure, which in this case are the breeding success of seabirds. The closed area management is consistent with the CBD guidance in that it is 'managed in ways that achieve positive and sustained outcomes for the conservation of biological diversity', which is evidenced by the status of the seabird populations. The group also discussed that the notions of 'long-term' and 'sustained' both of which are difficult to evaluate for short-lived species.

Sub-criterion C.1b. New threats to the area could include the development of marine wind turbine farms, which while possibly having a minor effect on sandeels might affect populations of the main predator (kittiwake) that currently benefits from the closed area. This type of non-fishery management issue was raised in a number of other case studies as well as the different management bodies involved in fisheries and marine developments. In Scotland, licensing of new marine developments occurs within the same organisation that manages fishing so it should be possible to consider this potential new threat to the effectiveness of the sandeel closed area.

This closed area provides an example of good practice in monitoring both before and after the closure which is unusual for fishery closed areas (STECF, 2007) and many MPAs.

The issue of equity was somewhat difficult to answer with the available evidence. The closed area is well supported by local communities and those with an interest in the wildlife tourism that benefits from the closed area. Displacing fishing activity of the mostly Danish fleet from waters they began targeting in the 1990s may have led to a financial cost but it should be noted that total allowable catches advised by ICES have never been reduced on account of the closed area, either when the whole North Sea was assessed as one stock or when a smaller and more biologically realistic stock unit (SA4) was assessed.

Sub-criterion D.1 was difficult to provide precise evidence for. However, the general role of sandeels in wasp-waist food webs is well established in scientific literature, with much of that derived from studies of the closed area.

Reference

STECF. 2007. Commission Staff Working Document on the Evaluation of Closed Area Schemes. Subgroup on Management of Stocks, Scientific, Technical and Economic Committee for Fisheries, Plenary Meeting, Ispra, 15-19 October 2007. SGMOS-07-03: 145pp. https://stecf.jrc.ec.europa.eu/documents/43805/44876/07-09_SG-MOS+07-03+-+Evaluation+of+closed+areas+II.pdf. (Access date 2-5-2021).

Lophelia Coral Conservation Area

Evaluating the LCCA against most of the CBD OECM Criteria was generally straightforward because the case study itself is quite simple. The closure is designed to protect a single, sessile ecological feature, bottom fishing is the only immediate threat to the area, and there is a Legitimate Authority with effective governance mechanisms in place. Furthermore, ample information on ecological, human-use, jurisdictional and governance is available for the area. There were, however, several Sub-criteria that presented a challenge when assessing this site. For instance, *Sub-criterion B2.3* introduces the concept of equity in the governance of the site. The process to designate the LCCA was relatively inclusive and transparent but primarily focused on engaging with members of the fishing industry that could be impacted by the closure. Other government agencies and ENGOs were also consulted. When necessary, industry and other interests are consulted on the ongoing management of the site. Looking ahead, DFO is exploring ways to more regularly engage other government agencies, Indigenous groups, stakeholders and others in the management and monitoring of all OECMs in the broader bioregion. Another challenging Sub-criterion to assess was *D1.1*, which evaluates whether the area supports ecosystem functions and services. In the case of the LCCA, there is no documented evidence of the closure providing ecosystem functions and services other than biodiversity. It is assumed that the habitat provided by the reef along with the associated biodiversity support the conservation of commercial species (e.g., redfish) but there is no specific evidence to illustrate this. In this case, the ecosystem service supported by the fisheries closure is food provision.

NAFO Sponge Closures

Relevant information and data were readily available from a number of sources, primarily from the NAFO website (NAFO), where Scientific Council working group reports (SC Reports), the NAFO Conservation and Enforcement Measures (NCEM) and various GIS data layers for the NAFO coral and sponge fishery closures (GIS layers) can be found. In addition, the open scientific literature provided a valuable source of relevant evidence, data and information (see Annex 9 for details). However, whilst accessing these reports and data sets was not difficult, it required significant familiarity of NAFO and its work on VMEs by one expert in the group to identify in a timely and effective manner the most relevant sources of information for the review process.

In many instances the most relevant information for this exercise was located within the body of a much larger report, and therefore could be easily missed by those less familiar with NAFO reporting, processes, and procedures. It was suggested that it may help in locating specific information from the NAFO website, and possibly also other RFMO websites, if the NAFO website contents could be easily and widely located using internet search engines (such as Google). This is something that other organisations like ICES do to make finding specific working group reports more effective. It also increases the visibility of work that is often not published in the open scientific literature.

In addition, it was recognised that evidence compiled for the EBSA evaluation process in this region (e.g., Slopes of the Flemish Cap and Grand Banks EBSA) provided an important source of evidence and material applicable to the OECM evaluation process, especially in relation to the assessment of the bio-ecological criteria. It also ensured, where applicable, consistency in the evaluation processes between the EBSA and the OECM designations.

Due to the relatively large amount of data and evidence supporting the NAFO VME sponge fishery closures, undertaking the evaluation process against OECM Criteria using the Mock Pro Forma (see Annex 9) was relatively straight forward. There were no significant issues arising, however the group did have some observations against specific Criteria, as follows:

Criterion A. This break-out group spent a significant amount of time discussing what it meant to be already reported as a protected area. Some members of the group less familiar with the CBD/OECM process did not immediately realise this 'go/no-go' criterion relates to preventing double counting of spatial area-based measures through formally reporting to CBD as part of achieving globally recognised targets for protecting biodiversity. The NAFO VME area closures (including the sponge VME closures) are not formally reported to the CBD or the WCMC protected planet database, and therefore passed this criterion allowing them to be further evaluated against the remaining OECM criteria. It is also worthwhile noting that whilst VME fishery closures could arguably be nominated as an MPA, this would not necessarily be as effective as having OECM status. For example, not all of the OECM Criteria are explicitly (or directly) addressed in the NAFO Conservation and Enforcement Measures (CEMs), such as the commitment to ensure the long-term biodiversity benefits through sustained governance and management of the protected areas (e.g., sponge VME). By designating the sponge VME closure as an OECM, the sponge VME would arguably acquire an additional level of management protection.

Sub-criterion B1. There was a discussion in the group about whether to identify individual VME sponge closures as separate OECMs or collectively as a single OECM. The group concluded that the level of bio-ecological connectivity was an important consideration in deciding if multiple measures established to protect features of the same type should be considered as a single OECM. Clearly the spatial proximity of individual measures is related to the level of bio-ecological connectivity, but no single proximity rule-of-thumb could be provided. An evaluation would have to be done on a case-by-case basis utilising an area-specific understanding or assessment of the local oceanographic and hydrodynamic conditions. In the case of the NAFO sponge closure, there are effectively six sponge VME closures that are considered to be bio-ecologically connected. The group raised the question about whether these six VME closures should be collectively assessed and reported as a single OECM or whether they should be assessed and reported as six separate OECMs. Although a conclusion was not reached, the group preferred the option to assess the areas collectively as a single OECM specifically due to their inherent connectivity as long as this would not entail assigning any new boundaries to physically connect the separate closures. The single OECM would effectively consist of six sub-areas, with each sub-area corresponding to an existing VME sponge fishery closure. The group also considered situations where there may be more than one feature subject to fishery management control. For example, there are other VME types, notably large gorgonian VMEs which overlap, in part, with sponge VME fishery closures. However, whilst individual VME types may overlap in certain locations these are only ever protected by a single fishery management measure (closure). In these instances, the single closure would protect both the sponge and large gorgonian features.

Sub-criterion B2. There were no specific issues identified by the group; this Sub-criterion was found relatively easy to evaluate given the expertise and familiarity of the case study evidence within the group.

Sub-criterion B3. The group recognised that the primary threats, including significant new threats, stem from bottom fishing activities. As such these are managed effectively by NAFO, however activities not under the jurisdiction or management mandate of NAFO, such as oil and gas exploration and production activities, do represent a potential threat to sponge VME, and more generally VME fishery closures in this region. It was therefore considered by the group that an assessment of the relative threats arising from different sectors under different jurisdictions is an important consideration for this Sub-criterion. In the present case, it was clear that bottom fishing represents the greatest [current] threat, and that this threat is effectively managed under the jurisdiction of the potential proposer. However, the overall lack of an integration and evaluation process for cross-sectoral management in the high seas is a limitation that is not without risk.

Sub-criterion C1. There were no specific issues identified by the group, the Sub-criterion was relatively easy to evaluate given the expertise and familiarity of the case study evidence within the group. Although, it was noted that Sub-criterion C1.4 does to some extent overlap with Sub-criterion B3.4 so further elaboration in the description of these two Sub-criteria to emphasise their difference would help guide the evaluation process.

Sub-criterion C2. The definition of the term 'long-term' was a point for discussion in the group. The group consensus was that the time frame for 'long-term' very much depends on the life history characteristic of the species (or feature) that is protected and the spatial/temporal dynamics of the biological communities being assessed. However, it was also recognised that 'long-term' could apply to the services derived from food web trophic interactions within which the 'key' target feature species plays a significant role. For example, the life expectancy of the target feature species may be of short duration, along with highly variable temporal and spatial dynamics, but the overall importance of the target feature in ensuring the long-term secondary production services in the ecosystem could be significant. In the case of sponge VME, an appropriate timeframe for 'long-term' was considered to be in the order of decades or centuries. In this respect, it seems likely that the current NAFO governance and management framework is sufficiently robust to ensure the biodiversity associated with the sponge VME is subject to long-term protection.

Sub-criterion C3. There were no specific issues identified by the group, the Sub-criterion was relatively easy to evaluate given the expertise and familiarity of the case study evidence within the group.

Sub-criterion C4. The main pitfall in considering this Sub-criterion was in recognising a distinction between fishery-independent monitoring of the sponge VME status, with monitoring, control and surveillance (MCS) of the fishing activity/pressure. Whilst both of these aspects of monitoring are important and addressed within the NAFO Conservation and Enforcement Measures (CEMs), there may be instances where only MCS of the fishery is operational. The group therefore considered that MCS of the fishery should take precedence over fishery-independent monitoring when evaluating the effectiveness of monitoring systems in place (or otherwise) against this Sub-criterion.

Sub-criteria D1 and D2. There were no specific issues identified by the group, the Sub-criterion was relatively easy to evaluate given the expertise and familiarity of the case study evidence within the group.

Other Issues. The group considered that in many demersal 'bottom' fishing RFMOs, including NAFO, the establishment of a bottom fishing footprint as part of the CEMs should be recognised. For example, sponge VME located outside the fishing footprint is afforded some protection, in that no directed fishing activity is permitted outside the fishing footprint without *a priori* an appropriate assessment as part of a 'exploratory fishing protocol' being undertaken (endorsed by the Scientific Council) and permission to fish granted. Indeed, all the sponge closures extend, in part, into areas beyond the fishing footprint. Therefore, the sponge located in such areas are not only protected (in the first instance) by the fishery closure, but they are also protected by the fact that the fishing footprint is 'frozen' and fishing cannot develop in these areas without prior agreement. In one instance in NAFO (sponge VME Area 3), the entire sponge closure is located outside the fishing footprint, it is therefore afforded protection by both the fishery closure and the current extent of fishing footprint. This does raise the question of whether areas of seabed and potential VME outside areas of the fishing footprint could be considered as an OECM. This was discussed in the group and the conclusion was that it would only meet all the Criteria for an OECM if; (i) the area in question would be duly delimited; (ii) the area would be managed, through a regulation of access and any other technical measure deemed necessary, and (iii) if its

effectiveness could be properly evaluated. In this case, determining the effectiveness of the management area outside of the footprint would be difficult to achieve.

NEAFC Rockall Haddock Box

Initial discussion on the case study highlighted that the objectives of the Rockall Haddock Box were not to protect biodiversity but to protect juvenile haddock in support of the haddock fishery. Food security is a valid ecosystem service of the area. The group felt that it was important therefore to evaluate the closure with respect to its purpose, i.e., has it been beneficial to conserving juvenile haddock? If not, is there sufficient evidence that it has conservation benefits for vulnerable marine ecosystems or other species and habitats, to warrant it remaining closed to bottom fishing? NEAFC is now asking for advice from ICES if this area needed to be included under the VME regulation if it is found that the Rockall Haddock Box is not protecting the haddock juveniles.

General discussion

The Rockall Haddock Box falls within an area (Rockall-Hatton) that was evaluated as a candidate EBSA. The group considered whether it was useful to know to what extent the OECM approach can draw on the EBSA exercise (CBD, 2019) or use the same information resources. It was concluded that the two processes (EBSA and OECM identification) could draw on information from one another, but that because an area is considered an EBSA does not mean it is necessarily an OECM as EBSA Criteria do not consider the governance and management aspects that are highly relevant in the identification of an OECM.

Another aspect of this case study is the multiple authorities involved in its protection. We have focused on the NEAFC regulations governing the area in ABNJ, but with the extension into national waters of the EU (Ireland) and the UK (see Annex 10) would each State have to put forward a separate application? Could NEAFC put forward a proposal or would it need to be from the Contracting Parties? This was not clarified in the Garcia *et al.* (2020) guidance.

Criterion A:

The group questioned whether in the EU context, a Natura 2000 area is an MPA? Is an area closed under technical measures regulations an MPA? It would be useful to have guidance on this as it affects a large number of States in the North Atlantic. The group considered the degree to which overlap with an MPA should be considered and noted that in Canada, assessors used geographic information systems (GIS) to determine if the proposed OECM site overlaps partially or fully with a federal, provincial or territorial MPA. If yes, the overlap (% coverage, km^2) is described as well as the name of the overlapping MPAs. The authority undertaking the OECM review can then define the specifics of the unprotected area as long as it adheres to CBD Criteria.

Participants also were under the impression that RFMOs do not have an obligation to report high seas MPAs/OECMs and so were unsure whether the appropriate reporting mechanisms are functional in areas beyond national jurisdiction (ABNJ)[4]. RFMOs are composed of States who themselves may be signatories of the CBD. No mechanisms have been designed for implementation

[4] Garcia *et al.*, (2020: 11) indicate: However, States can decide to consider the relevant elements also for the use of OECMs 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).

of any spatial measures related to biodiversity in ABNJ so this remains an outstanding issue for policy-makers to resolve.

Criterion B:

Are separate VME areas occurring at short distances from each other on a common ecosystem structure considered together as one or as individual OECMs? In Canada such areas are reported separately because threats other than fisheries may apply differently to each area, e.g., oil and gas may only impact on one of the closures only rather than the whole overall 'composite' OECM. However, there can be ecological connections between the individual closures (e.g., the VME closures in NAFO). In such cases, impact on one has impact on all. Consequently, the group preferred to consider them as a collective OECM and suggested providing an index of connectivity in the reporting and if the areas are reported separately making sure that their linkages are clear. Many area-based management tools (ABMTs) put in place under fisheries regulations group different closures in regional areas, particularly when the species under protection have a broad distribution. Step 5 of the Guidance Document (Garcia *et al.*, 2020) regarding assessment of 'additional" OECM properties talks about connectivity and this should be made more prominent for such cases of linked OECMs.

Criterion C:

Do closures prevent monitoring? The group noted that in the NAFO area the research surveys tend to avoid the closed areas but that there is no formal prohibition from undertaking research vessel surveys in the closures. There are still some surveys and research being conducted in Rockall. Only Marine Scotland has information from inside and outside the closed area (trawl surveys, bycatch of benthos, sediment samples, and TV surveys). Specific questions raised were:

- Do closed areas require less evidence for biodiversity improvements?
- Can it be assumed that they are doing well by monitoring the level of fisheries?

The group discussed the need for inclusivity by the Legitimate Authority undertaking the OECM evaluation so that stakeholders are part of the identification, decision and follow-up processes.

Other Issues:

The group noted that the order of the Criteria in the CBD Decision document may not work sequentially, e.g., answer to B1 could depend on B2.

Whether equity considerations are reflected in the Rockall Haddock Box governance would need to consider the ways in which equity is addressed in NEAFC, EU (Ireland?) and UK governance.

Some Criteria appeared difficult to meet (e.g., in terms of 'external impacts' or in the 'long-term' requirement. It is recognized that the CBD guidance advises to use these Criteria flexibly and case-by-case, but the difficulty and uncertainty remains.

A key issue that emerged was that of the area beyond the fishing footprint/existing fishing area in the NEAFC area. In NEAFC's case the RFMO regulates a large area, but only a small fraction of that is an existing fishing area (where fishing currently takes place). No fishing is allowed outside the existing area except under exploratory fishing licence conditions (impacts assessments required etc.). Therefore, areas outside the footprint are effectively regulated but unlikely to be fished and often impossible to fish with present technologies (too deep). Hence, according to the Criteria, in theory, the whole area beyond the existing fishing area could be considered an OECM. It is managed using ABMTs and likely has conservation benefits. Although not treated here as a case study the issue arose during the discussions of the Rockall Haddock Box and so have been documented.

References

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Garcia, S.M., Rice, J., Charles, A., and 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 pp. hhttps://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

NAFO Seamount (Corner Rise) Closure and Lyme Bay Mussel Farm

The group had generic discussions regarding interpretation of each Criterion, prior to the evaluation of each case study (Corner Rise Seamounts and Lyme Bay Mussel Farm) against the Criteria. Major topics discussed were:

Criterion A:

Definition of a (marine) protected area under the CBD, Article 2. The group decided that the most straight forward way to assess whether or not an area is an MPA or not is to verify if it is listed in the World Conservation Monitoring Centre (WCMC) World Database on Protected Areas (WDPA).

The intent of Criterion A is to avoid double counting: The group decided that for a potential OECM partially overlapping with a MPA, the overlapping area would only be counted once.

Criterion B:

Sub-criterion B1 on geographically defined space is straightforward, but there should be mention of the 3-D nature of ocean area (i.e., indicating what part of the water column is considered as part of the OECM).

Sub-criterion B2 (legitimate governance authorities) poses questions such as:

- What makes an authority 'legitimate', including how to treat self-governance by local communities?
- How to deal with multiple authorities that have separate sectoral competence in the area (also discussed under Criterion C)?
- How to address any disparity between the seabed and water column governance, including permitting activities?
- What constitutes equitable governance, and if transparent and inclusive decision-making processes explicitly considering trade-offs is necessary and/or sufficient?

Sub-criterion B3 - managed in ways that achieve positive and sustained outcomes for the conservation of biodiversity, the discussion noted that:

- Relevant aspects include:
  (i) A management plan;
  (ii) Measures in place;
  (iii) Monitoring and enforcement capacity;
  (iv) Enabling conditions (e.g., legislation, finance or resources) to deliver *in situ* conservation;

- Governance includes that relevant authorities and stakeholders be identified and involved in management, and consideration of what interests if any were excluded;
- The details of 'management' of activities in the area;
- The difference between active 'involvement' and 'consultation';
- That sustaining the *in situ* conservation of biodiversity was consistent with the definition of *in situ* conservation under CBD Article 2, which states that:

"In-situ conservation" means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties (CBD Art. 2).

Sub-criterion B3 implies that there is a need:

- To have hard evidence prior to designation (which can be very difficult to obtain);
- To define 'positive outcome', 'sustained', and 'consistent';
- To have pre-established baselines;
- But NOT a need for *a priori* explicit intention to manage in ways that achieve biodiversity outcomes;
- For management to be adaptive, consistent with the ecosystem approach; able to achieve expected biodiversity conservation outcomes, including long-term outcomes, and able to manage new threats.

The group discussed that long-term conservation measures should be aligned with the features of the location and biodiversity components to which the measures apply (acknowledging the time-bound nature of measures such as fishery closures).

Criterion C poses questions regarding:

- How biodiversity should be considered – e.g., what is positive biodiversity (Annex III, Ae of the CBD Decision)?
- How much reduction of threats or restoration of degraded ecosystems is sufficient?
- How robustly should baselines and benchmarks be supported by historical data;
- The power and readiness of management to deal with most likely new threats, and in particular climate change;
- The range of threats and pressures from both inside and outside the area that need to be considered;
- The value or scope for adoption of new, or strengthening existing, tools for integrated management of the area, such as integrated oceans management and the use of buffer zones around area-based management measures;
- The complexities of different policy and legal frameworks applicable to areas within and beyond national jurisdiction (ABNJ), the potential to evaluate 'long-term' from the perspective of asking if there is reason to believe any measures are only short-term;
- How to apply all Criteria but particularly Criterion C and its sub-components in data-poor areas.

Criterion D regarding *Maintains ecosystem functions and services, and upholds locally relevant values*

- Several considerations under Criterion C apply to Criterion D as well, including:
    - ecosystem function as an indicator for an effective area-based management measure;
    - all the considerations under B2, B3, C1 and C4.

- There is a need to assess the contribution of certain species and habitats as ecosystem services, using local or extrapolated evidence and/or models. Clarity on previous discussions on 'baseline', 'positive outcomes' or 'what change is' would help inform this point, especially in data poor areas.

In addition to these commonalities between the evaluations for the two case studies, there were additional comments that only applied to one or other case study. Those are documented below:

Corner Rise Seamounts

Criterion A: The Corner Rise Seamounts are not a protected area, and are not included in the WCMC WDPA database. The group noted however, that there could be confusion as some initiatives list this area as protected.[5]

Criterion B: Although NAFO is a Legitimate Authority for regulating and managing bottom fishing in the area, these seamounts and associated species can still suffer pressures from other sectors. However, efforts are being made to increase coordination or at least information sharing with other competent authorities in the NAFO regulatory area (e.g., with ISA). There is a memorandum of understanding in place with the Sargasso Sea Commission. The NAFO Scientific Council is requested to provide updates on relevant research related to the potential impact of activities other than fishing in the Convention Area from time to time.

Although it was noted that areas beyond national jurisdiction can be of interest for Indigenous Peoples and Local Communities (IPLCs), governance by IPLCs on these seamounts has not been identified.

On Sub-criterion B3 (managed in ways that achieve positive and sustained outcomes for the conservation of biodiversity), measures in place under NAFO for protection of VMEs are reviewed every 5 years in light of the long-lived organisms that it aims to protect, e.g., cold water corals and sponges). The group did not reach a conclusion on whether this would be considered long-term, but noted that a more explicit statement about the long-term commitments would strengthen the protection. Other associated measures include a current moratorium on the mid-water trawl fishery for *Alfonsino* spp. as the stock appears to be depleted (NAFO, 2019), and the need for bycatch for Greenland sharks in this fishery to be addressed before the fishery re-opens.

Criterion C: In applying Criterion C on the achievement of sustained and effective contribution to *in situ* conservation of biodiversity, the group noted that sustained outcomes are expected from the measures in place, although the comments from the Criterion B section also apply to Criterion C. There is some, but incomplete, evidence of recovery of heavily fished sites in the past on those seamounts (Lapointe *et al.*, 2020). There is also a potential disconnect between the fisheries measures applied to the pelagic zone above the seamounts and the benthic measures in place to protect the VME; allowing potential bycatch of other long-lived species (e.g., Greenland sharks). Consequently the group reached no decision on whether the measures in place are sufficient to guarantee the biodiversity conservation outcome further into the future, nor if the frameworks applicable to other sectors in the region are sufficient to manage less well understood potential threats from pressures such as deep seabed mining plumes. However, it was noted that NAFO and its Scientific Council were making efforts to cooperate with other competent organisations in the region (through memoranda of understanding, and other means), and provide information on other threats and pressures in the region, to contribute towards a more integrated management.

Criterion D: On the associated ecosystem functions and services and cultural, spiritual, socio-economic and other locally relevant values (*Maintains ecosystem functions and services, and upholds*

[5] See https://marine-conservation.org/high-seas-protection-portal/

locally relevant values) it was also noted that it is not clear whether the Corner Rise Seamounts provide cultural services (cultural, spiritual values).

Lyme Bay Mussel Farm

Criterion A: It was clear that the offshore mussel farm is not in an MPA.

Criterion B: The discussion gave substantial consideration to what is accepted as 'governance' in areas governed by local communities but not recognised as governmental institutions. In the case of a licensed mussel farm operator the central governance authority grants a license to develop the structures put in the seabed for the mussel farm. However, the mussel farm occupies the entire water column, hence, while the license on the seabed is given by a governmental authority, the water column is governed by the farmer, whose activities exclude others by default. A wider discussion highlighted that the physical structures of the mussel farm itself is excluding certain fishing activities, such as trawling, from taking place. In the absence of direct management measures such exclusion could be taken as a management measure. This seems to be consistent with a fishing ban and probably more effective as it has in-built enforcement.

Sub-criterion B3: The mussel farm was developed on historical fishing grounds hence the automatic removal from that pressure means that there is scope for the area to recover. Although there are surveys of the area before the farm development, there is no information on the state of the area prior to any fishing activity. Consequently, there is substantial scope for debate about an appropriate ecological and biodiversity baseline. The farm is having a range of interactions with the area and its biodiversity due to the exclusion of bottom fishing gear but also the introduction of a physical structure (the system of ropes). Such interactions could be seen as 'positive' or 'negative' outcomes depending on the perspective and baseline adopted.

Also, the meaning of 'involvement' of stakeholders led to considerable debate. Following consultation, all fishers were excluded from the area of the farm. Some relocated their fishing effort, others are receiving employment, and recreational fishing and seabird watching have increased in adjacent areas. Authorities such as Natural England, the UK Centre for Environment, Fisheries and Aquaculture Science or the UK Environment Agency, review and monitor the farm's environmental effects and water quality and can intervene if necessary.

Further discussion focused on interpretation of the terms 'systems', '*in situ*', and 'long-term' with more clarification needed.

The case of the mussel farm underscores that there is no need for providing evidence of the intention to generate biodiversity conservation benefits if there is robust evidence of positive biodiversity outcomes complementary to the strict aquacultural intent of the measure. The farm's license grant for 20 years was considered long-term, especially when compared to other fisheries measures that are reviewed yearly (in an open-ended time scale) or certain MPA outcomes. Exclusion of other activities due to the farm's structures was also seen as management.

Criterion C: With respect to C1 in the case of the mussel farm, it was agreed that following the information available, there was a positive outcome. It would be difficult to control some types of threats coming from the outside, given that management is done by the farmers. However, due to the license, any type of seabed activity such as dredging, mining, etc. is not allowed within the licensed area although potting and trawling happen close by, but not inside.

In addition, recreational angling occurs within the farm. Currently this is at low levels but a plausible scenario would be that the OECM is enhancing biodiversity and this is then exploited by increasing recreational fishing levels, limiting the positive biodiversity outcome from the farm. This scenario could be eliminated if the Inshore Fisheries and Conservation Authority license-holder could exclude all activities in the license area.

On Sub-criterion C2, the 20 year term of the license ensured the duration would be for the full license term, as there is a low likelihood that investments in infrastructure needed for a mussel farm would be made for only a part of the term of the license agreement unless it was due to major forces.

With regards to Sub-criterion C3, monitoring in the mussel farm is performed on a yearly basis since pre-development in 2013 (eight years of data).

Criterion D: With respect to Sub-criterion D1, the monitoring undertaken on the mussel farm also includes analysis of ecosystem services provided by the development.

Other Issues: Further clarity was needed to understand the role of OECMs as part of an MPA network. The farm is adjacent to an MPA and it is not clear where in the criterion this should be discussed and assessed. It was thought to be an important characteristic of the offshore farm especially due to its offshore nature and the fact that the farm is across two separated sites. The size factor highlights that the OECM status of areas managed by local communities also needs to be clarified as relevant to these types of infrastructure-based OECMs.

References

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5.2 Evaluations of the Garcia *et al.* (2020) Guidance

This section documents the discussions on how useful the Garcia *et al.* (2020) guidance on the identification process[6] was in completing the evaluation for each case study. We highlight the main issues discussed and offer any recommendations for improving the framework from the group's perspective. The completed evaluation templates for each case study are in Annex 13, with the exception of the NEAFC Rockall Haddock Box where there was insufficient time to complete the evaluation template.

Northwestern North Sea Sandeel Fishery Closure and Lophelia Coral Conservation Area

This section was completed for the two case studies: Northwestern North Sea Sandeel Fishery Closure and Lophelia Coral Conservation Area. The Garcia *et al.* (2020) report was helpful in terms of understanding what the OECM process was about to those with little prior knowledge, such as the case study lead of the sandeel closed area. In contrast, the case study lead for the Lophelia Coral Conservation Area was already experienced in applying the OECM process used in Canada and didn't find the guidance particularly clear, although information on Step 0 had already been implemented during the information preparation requested by the ICES workshop convenors. Another member of the group had found that for data-poor study areas, going

[6] The Garcia *et al.* (2020) document covers the entire OECM identification, use, and performance cycle, including governance under multiple jurisdictions.

through the Steps was a valuable thing to do which helped in preparation for undertaking an assessment.

The group acknowledged the importance of pre-screening guidance but felt that that the Steps provided may need some further development, possibly by means of a preliminary workshop for those required to undertake this process. It was also discussed that focussing on 3 or 4 essential Criteria that an area must fulfil to become a OECM would help more than determining the percentage threshold suggested, as for example, in the Garcia *et al.* (2020) document. In the ensuing discussion, it was also clarified that (1) the CBD Decision did not rank the Criteria and (2) **all** Criteria needed to be considered.

The Steps were clear enough and in general provided a good overview for someone with little background to gain some understanding. However, the group felt the Steps could have been more helpful in filling out Criterion A. The CBD Decision and Mock Pro Forma were fairly self-explanatory and Garcia *et al.* (2020) Step 1 did not mention the importance of whether the area was already reported in the World Database on MPAs, which is key.

There was concern that the utility of the Steps was limited because they do not follow the Criteria, which caused confusion about the intent of the proposed Steps. Guidance is missing in the CBD document, but many felt that the Steps did little to help to fill the Criteria template in the 'Mock OECM pro forma' (Annexes 7 and 8).

The Steps were more useful to some Criteria than others. For example, Steps 2, 3 and 4 were helpful in evaluating B.3 and C. However, 'biodiversity features of concern' does not mirror CBD terminology, highlighting the need for greater consistency with CBD terms. Another example of this was that the term 'threat' is used in the CBD but not 'pressure', while both are used by Garcia *et al.* (2020).

The group recognised that CBD Criteria A-D have overlapping aims, which makes it difficult to offer guidance by Criterion, and that the Garcia *et al.* (2020) tries to deal with this problem. The group recognised that a stepwise approach is very useful in guiding a process to prepare for an assessment. However, it would have been easier to fill out the Mock Pro Forma if concise explanatory notes for each CBD Criteria were provided, and a more specific guidance on how to interpret the CBD Criteria would be useful to guide the assessment exercise. This was a common concern and indicates that the Steps would have be more useful if they had been better aligned to (to mirror) the CBD Criteria, even though this will lead to some repetition. Aligning content and integrity of definitions with CBD was considered important to the group.

In summary, the group thought that assessment of OECM Criteria should be better done through an expert group process engaging the managers, and experts from biodiversity and fisheries. The Garcia *et al.* (2020) guidance on the identification process is helpful for whomever needs to coordinate the group but may not be the most helpful as a tool for filling out the Mock Pro Forma Criteria during the actual group assessment.

References

Garcia, S.M., Rice, J., Charles, A., and 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 pp. https://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

NAFO Sponge Closures and NEAFC Rockall Haddock Box

In general, the group found the Criteria relatively easy to evaluate given the expertise and familiarity of the case study evidence within the group, so referring to the Garcia *et al.* (2020) assessment framework[7] for guidance was largely unnecessary. Indeed, the Garcia *et al.* (2020) report sets out a logical and clearly defined set of Steps as a framework for the effective assessment of spatial management measures to protect biodiversity. In this respect the overall approach is not too dissimilar from other tried and tested assessment frameworks such as the Drivers, Pressures, State, Impact, Response framework first introduced by the Organisation for Economic Co-operation and Development (OECD) in 1993 to support integrated environmental assessment (OECD, 1993).

However, in the few instances where the group required specific guidance on how to interpret and address the assessment Criteria, the Garcia *et al.* (2020) report proved less useful. For example, under Step 1, the Guidance indicates the need to **confirm that the area has not already been designated as an MPA** (or does not overlap with an existing MPA) to avoid confusion and double counting (Criteria A). However, it was not clear that in Criterion A the term 'double counting' related to whether or not the spatial area-based measure is already formally reported in part fulfilment of meeting globally recognised targets for protecting biodiversity under the CBD (e.g., Aichi Target 11), and in particular whether it is already registered as an MPA in the WCMC Protected Planet MPA database.

Furthermore, there is an apparent overlap between some of the criteria, for example, Sub-criteria B1.2 and C4.2 appear to be requesting the same types of information/evidence on the effectiveness of the OECM in protecting biodiversity. The group therefore considered the utility of the Guidance Document could be improved if there were some explanatory notes to support the interpretation of the OECM/CBD criteria, as well as providing more effective cross-walking between the Steps and the OECM/CBD evaluation criteria. This would be especially useful for those that have less familiarity of the OECM/CBD process and supporting texts.

In the present 'data and information rich' case studies, Steps 1 and 6 of the Guidance Document were considered to be the most useful. For example, Step 1 describes the importance of convening a dedicated group of experts from a wide range of disciplines who have familiarity of all aspects of the management measure evidence and the Legitimate Authority processes, including the OECM/CBD process to undertake the evaluation. Also, the guidance recommends undertaking an initial rapid review and screening of the OECM/CBD Criteria by the group to ensure a common approach and understanding is achieved in the types of evidence required to address the criteria. The benefit of having a wide range of expertise in the group was certainly observed in the present evaluation process, which effectively made redundant the need to refer to Steps 2 – 5 in the Guidance Document as all the information required was already available and compiled before the meeting, and the necessary expertise and competence to interpret the evidence correctly was available in the group. Furthermore, Step 6 was useful, especially in describing how to synthesise the available information in a way to help guide the overall evaluation process, but the group considered this section could provide more practical guidance to assist in the interpretation and understanding of the Criteria intentions (as noted above).

In summary, the group found the Garcia *et al.* (2020) report provides both a framework for the effective management and assessment of proposed OECMs, whilst attempting to provide specific guidance to assist in the synthesis of evidence to complete the OECM/CBD evaluation process, essentially to complete the OECM/CBD Mock Pro Forma template. The distinction between

[7] The Garcia *et al.* (2020) report, is also referred to as the 'Guidance Document' in this text.

these two objectives could possibly be made clearer in the guidance, in essence to recognise that the guidance will be used by a wide range of authorities that have greatly varying levels of experience, expertise and supporting evidence. In the present case, the Legitimate Authority has considerable expertise, including well established governance, management and assessment processes which are subject to periodic international performance review. As such, the group considered the 'real' value of the Guidance Document in the present case studies would be in helping to synthesise and guide the presentation of available information in the most effective way to address the specific OECM/CBD criteria. However, in this respect, the Guidance Document was lacking in some expected detail, including detail regarding elements of the CBD Decision itself.

References

Garcia, S.M., Rice, J., Charles, A., and 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 pp. https://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

OECD. 1993. OECD Core Set of Indicators for Environmental Performance Reviews. Environment, Monographs No 83, OCDE/GD(93)179. Organization for Economic Cooperation and Development, Paris, France. 39pp. https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD(93)179&docLanguage=En (Access date 2-5-2021).

NAFO Seamount (Corner Rise) Closure and Lyme Bay Mussel Farm

There was no consensus on whether the guidance should be formulated on a Criterion-by-Criterion basis. While some thought it would be a logical order to follow, others noted that the repetitive nature of some of the criterion would make this a difficult endeavour. The group noted the need to find an easy way to invite the competent authorities to this type of exercise. A participant recommended framing the guidance around who (authority), what (is it protecting), why, where (e.g., B1), when (e.g., annual basis decisions/5 yr. cycle reviews), and how (are the plans implemented) system.

On the specific points concerning Criteria B and C (e.g., on whether the 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), the group noted that the Guidance Document (Garcia *et al.*, 2020) has insufficient detail on management, and that it should provide some indication of how to measure long-term conservation outcomes.

Lyme Bay Mussel Farm

The group had extensive discussions about the Criteria and descriptions and struggled to find answers to these within the Garcia *et al.* (2020) document (explicitly focused on marine capture fisheries) or the CBD documents. This, in addition to the fact that the mussel farm case study raised many questions, resulted in the group falling behind and not being able to complete the Mock Pro Forma as a group. The group found that many terms in the Criteria needed clarification as they could be evaluated in many different ways depending on the person/institution hence some terms needing to be described and further explained. The experts felt that addressing the Criteria and applying the Steps could be done even if no direct evidence was available for specific aspects of an area, or independently of the quality/quantity of the site specific infor-

mation. For example, we don't have site-specific information on the mussel farm sites from before the farm was put in place, but we do know that the area was heavily fished and so can infer that the ecosystem had a certain amount of degradation.

The Steps in the Guidance Document were not applied in a stepwise manner, but followed the order of the Criteria. The discussion was influenced by the range of expertise from both the case study leads and the wide range of experts from different backgrounds while following the Criteria table. No bias was discussed during the break-out groups.

It was not clear to the group what would happen if one, few or half of the Criteria were not met. It was discussed whether the Criteria were expected to receive a no/yes answer to the assessment and how, failing to do this would be reflected when this exercise was performed by the competent authority. The group thought it would be useful to have a 'yes', 'yes with conditions', 'no', 'no with conditions' type of approach.

Reference

Garcia, S.M., Rice, J., Charles, A., and 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 pp. https://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

5.3 Expectations of the Garcia *et al.* (2020) Guidance

This Section captures further reflections from participants on the expectations from the Guidance Document.

Northwestern North Sea Sandeel Fishery Closure

The guidance was useful in understanding the context of OECMs and in pulling together the necessary input from the mock pro forma, although the summary from the conveners was more helpful. As later discussed, it would have been really helpful if the guidance had provided a series of notes for each Sub-criteria of the pro forma down to the finest level. Examples of completed pro forma may also have been helpful. Knowledge of the essential Criteria for an area to be regarded as an OECM would have helped the group ensure the key aspects were covered in the review of information, or identified as required gaps for future research.

NAFO Sponge Closures

It was clear, to the case study 3 lead and sub-group members, from reading the workshop background documentation that the primary objective of the workshop was to review and test the effectiveness of the guidance in Garcia *et al.* (2020) in support of the evaluation of existing fishery management measures as potential OECMs. Accordingly, two questionnaires (or templates) were provided before the workshop commenced that were required to be completed during the workshop by each sub-group:

i. a Mock pro forma template for Scientific and Other Information to Evaluate Area-based fisheries management measures (ABFMs) as Potential Other Effective Area-based Conservation Measures (OECMs), on which we summarized the information available on the NAFO Sponge case study and attempted to match it to the CBD Criteria for identification, and
ii. an Evaluation template to provide Comments on the Performance of the Stepwise Approach of the Garcia *et al.* (2020) Document (also referred to as the Guidance Document) in helping the WKTOPS Break-out Group Discussions and Decisions. It was the understanding of the case study lead that the review of the Guidance Document would be in

relation to evaluating its usefulness in guiding the completion of the Mock Pro Forma template, i.e., in compiling the information available and matching it against the Criteria.

However, it was soon apparent that the Guidance Document was structured around a stepwise approach describing the generic requirements for the appropriate identification, assessment and management of spatial fishery management measures as potential OECMs. In the example of the NAFO sponge VME the guidance was essentially not required, as the methods for the assessment of VMEs, including the assessment of Significant Adverse Impacts caused by bottom fishing activities, are well established in NAFO and have been applied over many years. Therefore, extensive experience and information was already available and compiled for the case study. Indeed, since 2017 the NAFO Convention (NAFO, 2020) commits the organisation to implement an ecosystem approach to fisheries management including the protection of biodiversity. Furthermore, like other RFMOs/As, NAFO is subject to the UN Code of Conduct for Responsible Fisheries (FAO, 2011), and the governance and management systems in NAFO are subject to periodic performance review (NAFO, 2018) which ensures the requirements of the various UN General Assembly Resolutions, including UN Code of Conduct for Responsible Fisheries are followed. Such commitments are enshrined within the NAFO Convention. Under such circumstances, it was rather easy, with the information available to the experts, to review the characteristics of the case study against the CBD Criteria, without following the stepwise approach proposed in the Guidance Document. Nevertheless, the Guidance Document is useful in reaffirming the suitability and robustness of the established NAFO assessment and management procedures with respect to the evaluation of VMEs as potential OECMs, however, the Guidance Document could be improved in terms of informing the interpretation or explaining the intent of the OECM/CBD Criteria as outlined in the Mock Pro Forma template.

Going through the process did, however, highlight the value of having a relatively small group of experts representing a diverse set of skills and experiences of both the CBD/OECM Criteria and the case study evidence. Convening such a diverse group of experts is therefore considered essential in conducting an evaluation of fishery management measures as potential OECMs, a point highlighted in Step 1 of the Guidance Document.

The Break-out Group felt that the inclusion of a set of guidance 'notes' specific to each OECM/CBD Criteria would have been useful in facilitating the completion of the Mock Pro Forma template. Many of these clarifications were obtained in the meeting discussions, from the authors of the Guidance document or from the CBD participant, but could usefully be inserted into the Guidance Document. In addition, the set of 'emergent issues' identified as a result of the group discussions (Section 6) of the evidence needed to identify OECMs (against specific criteria) could be cross-referenced, or reproduced, in the suggested guidance notes, as its likely the same issues will arise when others try to address the OECM/CBD Criteria for their own assessments in the future.

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Corner Rise Seamounts

While the guidance contains a lot of important information and details, it was difficult to go through the guidance when filling out the Mock Pro Forma during the break-out groups (also given the virtual setting of the meeting). Steps 0 and 1 were particularly helpful and cross-referencing could have helped find the needed information across the remaining steps. Further guidance on the temporal aspect of the measure (e.g., the long-term intent) vis-à-vis the ecosystem/biodiversity/species that is being protected would add value to the guidelines.

Lyme Bay Mussel Farm

Before the workshop the case study nominators were told to start populating the Mock Pro Forma but it wasn't clear that was already part of the stepwise approach. It was later, upon reading the Garcia *et al.* (2020) document, that we understood this section was part of Step 0. Although the guidance is clear that the first Step is to collect all the information available, the Garcia *et al.* (2020) document doesn't actually provide guidance on the best ways to organize the knowledge and information available (which in many cases might be spread along a wide range of documentation) in order to help inform the Criteria. However, the exercise that was done as part of the data compilation onto the SharePoint (organizing documents by topic) for the workshop, and the exercise to summarize the case study and answer the sections of the Mock Pro Forma before the Criteria table was incredibly useful for the assessment process. It might be useful to incorporate this type of exercise as part of the stepwise approach as it helps collate the most important evidence which will then be used to perform the Criteria assessment together.

Although Step 1 was supposed to be a quick screening, this was the Step approach we expected as it related to each Criteria in a more orderly fashion. In fact, during the workshop we mainly followed the Criteria order with help from Step 1 and then jumping back and forth to other Steps as we needed to find more detail description of what the Criteria meant and what was expected in terms of each case study. What we would have expected from a quick screening would have been 3 or 4 main questions that should be yes/no answer and if those are not met then you can rule out the site (i.e., Is it an MPA? Is it geographically defined?). If the answers are yes, or yes with conditions, then you carry on. The guidance contains a lot of important information and detail but it was difficult to follow the guidance and find what was needed when filling the Criteria table. We would have benefited of a Step that followed the Criteria table with clearer description of what the Criteria means with cross-referencing to the remaining Steps and definitions of terms within the Criteria that needed further clarification to avoid confusion. Further guidance on the definition of terms such as 'positive outcome', 'long-term', 'governance', etc. would add value to the guidelines and we think would help standardise the process.

Reference

Garcia, S.M., Rice, J., Charles, A., and 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 pp. https://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

6 Emergent Themes from Group Discussions

This section documents some common issues that emerged from the evaluation of a number of case studies. They represent issues that are likely to be encountered in other OECM evaluations as they are not specific to one particular area.

6.1 Data richness, data gaps

The identification Steps outlined in the Garcia *et al.* (2020) guidance (4.2. 0: Information consolidation) are relatively clear in regard to the type of data and information required for the quick screening and assessment processes. In addition, the work undertaken by WKTOPS explored a series of case studies and highlighted relevant, region specific, sources of publications in greater detail.

For many potential OECMs, site-specific fisheries or ecosystem data typically used by science experts will be unavailable. In these instances, a variety of sources could be used to identify information available for other sites that are assumed to be similar; in a sense 'borrowing' information. For example, the relative impacts of fishing gears on benthic fauna are well documented and assumptions of the state of benthos in the potential OECM could be made using supporting evidence of such impacts in comparable sites. Care should be taken to ensure that the pressures and environments in question are sufficiently similar when making such assumptions to fill data gaps, and that relevant expertise is present in the assessment meeting to evaluate such inferences.

Available data and information identified for use in a potential OECM assessment will likely have varying spatial and temporal coverage. The spatial extent of available data could be much greater than the OECM area or conversely only cover part of the OECM. This should be taken into account when assessing whether there is sufficient evidence for the specified ABFM within a larger but perhaps more sparsely sampled data set, or if there is enough evidence for the current geographical boundaries of the ABFM, or only a smaller area.

In addition the knowledge of local community members and of people from cultures indigenous to the area should be acquired and used in any OECM evaluation. Particularly, but not solely, for small-scale coastal fisheries, the knowledge systems of the local communities and local indigenous people will complement scientific data on the biodiversity and history of fisheries and other uses of an area, and depending on the specific case, may be sufficient to fill gaps in the scientific data that is available.

Reference

Garcia, S.M., Rice, J., Charles, A., and 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 pp. https://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

6.2 How to accommodate new information

Well-structured monitoring, evaluation and reporting systems for each OECM should plan to inform adaptive management as new information becomes available or monitoring indicates a change in state. Periodic evaluation and reporting schemes should evaluate whether the content of new material warrants additional protections or whether the existing management measures

are sufficient. This evaluation should be transparent and take into account the interests of stakeholders and governance bodies in regard to the new information. In addition a more frequent reporting scheme allowing for short reports in cases of significant change in information or management affecting the OECM would be beneficial.

To maintain its status, the periodic evaluations should conclude that the OECM continues to meet the definition and Criteria adopted in The Decision. New information about pressures or threats may require rapid evaluation and, where existing measures are insufficient to manage the threats, additional regulatory measures could be put in place outside of the full OECM evaluation process to ensure the objectives of the OECM are not jeopardised. Effective integration of OECMs within cross-sectoral integrated management would enable the legitimate governance authorities to be adaptive to the inclusion of new information. Pre-agreement on adaptive responses to particular signals can makes responding to new information particularly efficient.

6.3 What types of expertise should be present?

The assessment group will need to consider a broad range of subject matter including fisheries, the ecosystem, biodiversity features, external pressures and threats, as well as socio-economic and cultural values. In addition to scientific and technical experts covering all of these bases, holders of indigenous and local knowledge of the area are also important (as highlighted in 6.1). In addition to natural scientists, climate change specialists with a particular focus on the fisheries-climate science interface could be useful in taking into account projections relative to current status and new information from monitoring, evaluation, reporting. Along with those assessing the current state of the OECM, social scientists and economists could bring knowledge of how any changes to the management objectives and measures of the ABFM as a result of alignment with OECM objectives, could affect fisheries. For example, adding OECM objectives to fisheries management plans might lead to changes in efficiency or revenue as a result of displacement of activities, which might lead to local opposition to OECM status if not taken into account. Possible trade-off scenarios could have wide ranging implications to the ecosystem within and outside the OECM, as well as to traditional users of the area.

The assessment process should be inclusive of 'culturally important local communities' as broadly as possible, including fish harvesters and those involved indirectly in fisheries-related employments, as well as other stakeholders and rights holders particularly in small-scale fisheries. As noted in 6.1, incorporating the knowledge of IPLCs should be undertaken early in the assessment to fully incorporate their knowledge and achieve equity and transparency of the process.

The lack of cross-sectoral frameworks in some regions could pose challenges to assessing, achieving and maintaining OECM outcomes. Whereas experts within fisheries and conservation biology may have knowledge of the short-term developments of cross-sectoral interests local to the OECM, the future threats from other sectors may be unknown. Where possible expertise from other sectors should be made available to the assessment team and cross-sectoral collaboration between all agencies operating in the OECM, surrounding area, and functionally connected areas should be a priority.

6.4 How much evidence is enough evidence?

If there is evidence to evaluate whether the agreed objectives for fishery sustainability, biodiversity status, and related conservation goals have been achieved by fisheries measures that have been in place or can reasonably be expected to be achieved by current measures, and additional measures newly implemented or agreed to be adopted, then that should certainly be considered

'sufficient evidence'. However, some objectives may be inherently challenging to evaluate, particularly for biodiversity features that are not routinely monitored. In such cases the question of 'How much evidence is enough?' may be applied first relative to each Criterion or Sub-criterion in The Decision, and then collectively to how many Criteria and Sub-criteria should be met to justify a positive OECM status, and how Criteria and Sub-criteria that may not be considered relevant to the objectives and particularly ones that may be relevant but are not met should be treated.

The Garcia *et al.* (2020) guidance suggests several scoring methods (Step 6.1 Synthesis) which recognise that the individual pieces of evidence for assessment of an OECM against individual Criteria are likely to fall along a continuum between 'strongly positive' and 'strongly negative' relative to the specific Criteria or Sub-criteria for which the information is relevant. There is also a potential for these evaluations to be un-certain if the evidence itself is weak (e.g., derived from a poor monitoring design) or its relevance is unclear or disputed.

Once all the evidence relative to each Criterion or Sub-criterion has been evaluated, typically even a few strongly positive pieces of evidence are sufficient to support a decision that the individual Criterion or Sub-criterion is met. Comparably even a few strongly negative pieces of evidence should be sufficient to conclude that a Criterion or Sub-criterion is not met. As the strength of the evidence weakens, the confidence that individual Criteria or Sub-criteria are met weakens correspondingly.

The next level of evaluating whether 'there is enough evidence' asks whether sufficient Criteria are met, for the area to fulfil an OECM. The CBD has not provided any explicit standards for how many of the Criteria or Sub-criteria must be met for an area to be an OECM. Rather it calls for flexibility and stresses the importance of the effectiveness of the OECM, as elaborated in Sections 6.11 and 6.12 In that context of flexibility, assessment teams can decide to differentially weight the properties considered under each Criterion, as well as the number of Criteria and Sub-criteria that have to be met, as long as the rationale for doing so is clearly documented. As stressed in Garcia *et al.* (2020), the Steps beyond Criterion 1 can be considered as being convergent towards significant biodiversity benefits and the assessment team should consider the evidence as a collective body of work towards demonstrating this.

Reference

Garcia, S.M., Rice, J., Charles, A., and 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 pp. https://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

6.5 Are there 'better' and 'less better' biodiversity benefits?

The concept that there is natural variation across space in the richness of biodiversity is generally accepted (e.g., life-form hotspots versus depauperate areas). This variation in life's types (and biomass) is related both to natural processes which influence the ability for an area to support life and for life to flourish, and to features of biodiversity that have been lost or added due to human pressures.

In the scope of recognizing that an area could be considered an OECM, the group felt that a key consideration should not be the presence or absence of a specific *amount* of biodiversity. No area should be disqualified based on its current biodiversity richness, whether it is naturally rich or depauperate in life forms. From a biodiversity perspective any area(s) not degraded to the point

where it has no capacity to recover in reasonable timescales — timescales one can reasonably expect for normal biodiversity colonization of a viable social-environmental system — can and should be considered eligible.

Considering an area from a biodiversity perspective might yield one of the following (or potentially other) responses with regard to the adequacy of the biodiversity to justify an area as an OECM:

- No - The biodiversity in an area is subject to significant on-going pressure(s) with irreversible impacts, e.g., from persistent chemical pollution;
- No, but Yes with improvement - The biodiversity in an area is currently being impacted by pressures that can be managed, and the biodiversity can be improved by mitigating those pressures, e.g., land based pollution that could be countered prior to the acceptance of an area as an OECM;
- Yes, but requires ongoing improvement of biodiversity values – The biodiversity in an area is being impacted by manageable pressures, but has not yet been seriously degraded, and that the pressures should be further mitigated over time, e.g., land-sourced outflows of pollution could be and should be further countered for an area that is accepted as an OECM; or
- Yes -The area has valid measures in place to ensure on-going conservation of structure and function of biodiversity, there are no reasonably predicted future threats, and present biodiversity is either healthy or documented to be improving.

Beyond consideration of the *amount* of biodiversity present in an area, discussions of 'better' and 'less better' biodiversity can also lead to discussions of 'better' and 'less better' *types* of biodiversity. This complex consideration is addressed in several of the following subsections, particularly 6.6 and 6.12.

6.6 What values are relevant in evaluations of benefits? What are the implications of the intent of the measure (for biodiversity or fishery outcome)?

It is generally accepted that actions to maintain and (or) recover biodiversity should be considered through an ecosystem approach. As ecosystems are social–environmental systems, the full scope of the triple bottom line of values are relevant, i.e., ecological, economic and social values, as well as governance, in evaluating enduring success.

Consistent with an ecosystem approach, it is unlikely that any conservation initiative approached through only environmental values or only socio-cultural values would deliver a robust and enduring on-ground improvement of degraded biodiversity or maintenance of healthy biodiversity. Consequently, developing or evaluating OECM provisions requires consideration of both local conditions of the natural environment and community acceptance and support.

Due to the fact that the key interest for CBD is conservation of biodiversity and its sustainable use, positive outcomes in evaluating benefits for biodiversity (environmental concern) are an essential part of OECM evaluations, and the maintenance of the OECM status. However, the CBD Decision on OECM status refers to 'ecosystem health' measures as a benefit for which measures should be collected (Criterion C, Information and Monitoring). In practice there is no universally agreed way to determine ecosystem health, nor a particular status that is a universally applicable boundary between 'healthy' and 'unhealthy' within a chosen measurement system. In addition, particular aggregate ecosystem components are commonly used as 'values' to evaluate (e.g., fish communities, coral reefs, algal communities, etc.). Their status must be evaluated over time in order to capture shifts in environmental conditions that may be associated

with achieving a biodiversity outcome. Fisheries science has substantial experience in addressing these challenges, such as with identifying stock-specific reference points, and accommodating environmental variation that affects stock productivities. This experience can be used as foundations for addressing these aspects of 'value' of biodiversity in OECM evaluations.

With regards to the implications of the intent of a measure, fish populations are in themselves an environmental asset, as fish comprise a major part of aquatic biodiversity. Consequently measures to improve the condition of fish stocks are in themselves a direct benefit to biodiversity. In addition, action to restrict or remove fishing has flow-on effects to other aquatic life previously impacted, or indirectly impacted by the activity of fishing. Whether fisheries measures that are only documented to benefit the target stock(s) of a fishery have sufficient 'value' to justify OECM status for an area will depend on how strongly those stock-specific benefits meet the Criteria and Sub-criteria in the CBD Decision. However, as the magnitude of those flow-on effects on additional biodiversity components increases, the strength of evidence that OECM Criteria are met also increases.

6.7 Options to deal with patchy/contiguous biodiversity

There may be instances where a biodiversity feature is not restricted within a single spatially contiguous area. Indeed, many biodiversity features are likely to be patchy in their distribution, so understanding what is driving the patchiness is an important consideration when deciding how best the feature should be assessed and managed. For example, an important consideration which may arise when developing management measures to protect multiple biodiversity features of the same type in a single fishery is whether or not the separate locations of the biodiversity feature should be evaluated individually, or if they should be protected collectively by a single measure. If a single measure is used, assessment for OECM status is straightforward with the area treated as a single OECM. However, when each area is protected separately, with the fishery able to operate in the areas between the closures, the assessment becomes more complex. This question was raised in the present assessment in relation to the evaluation of sponge VMEs in the NAFO Regulatory Area (case study 3 of the present report) which has 6 separate VME closed fishery areas protecting fields of large ('Ostur') sponges – should they be evaluated collectively as a single OECM or should they be evaluated individually as multiple OECMs?

Accordingly, the group discussed some of the more important factors that ideally should be considered when evaluating multiple measures of the same type, implemented for a common intent (i.e., they protect the same biodiversity feature) as either single or multiple OECMs.

The realised *versus* fundamental niche size. The interplay between the environment (abiotic factors) and species (biotic factors) plays an important role in determining the amount of patchiness observed in a species or biodiversity feature distribution in any given area. Such interactions are typically described in terms of niche partitioning between fundamental and realised niches (Hutchinson, 1957). The fundamental and realised niches refer to the environmental position, or location in space and time, that an individual species occupies in an ecosystem. Fundamental niches represent all the environmental (or abiotic) conditions where a species is able to live, whereas the realised niche is essentially where the species is actually observed (Hutchinson, 1957). Any ecologically-based discrepancy between the extent of the fundamental and realised niches is often attributed to negative (biotic) interactions between species competing for limited resources (e.g., space) which results in the realized niche of each species often being much smaller in extent than their respective fundamental niches, a process which largely drives the observed patchiness in the biodiversity feature.

It is therefore important to try and determine how much of the patchiness observed is caused by patchiness in the habitat *versus* patchiness caused by biotic interactions or fishing erosion. In

instances where the patchiness is considered to be largely determined by natural discontinuities or fragmentation in the habitat (or environmental conditions), then assessing the individual patches as separate OECMs may be appropriate. However, a final decision should not be taken without first considering the potential ecological connectivity between the individual patches, the patch size and their proximity to one another, as this may justify treating the individual patches as a single inter-connected feature despite the habitat being naturally discontinuous or fragmented. Furthermore, where it can be shown that the individual patches are located within and connected by the same habitat type (see below), then the likelihood increases that the patches may be representative of the same ecological feature. In such cases, the consideration of potential bottom fishing activities as a driver of the patchiness should be investigated and possible adjustments to the boundaries of existing measures made to ensure the ecological integrity and spatial continuity of the biodiversity feature is maintained, and to facilitate the bio-ecological recovery of the seabed in areas fished. The potential for such adjustments has implications for OECM status.

The areal extent of the habitat feature. Quantifying the area of habitat, or the spatial extent of the environmental conditions which support the biodiversity feature as a contiguous feature, is important in determining the potential sustainability of the feature. In general, the larger the spatial extent of the habitat the more likely the biodiversity feature associated with the habitat will be self-sustaining.

The use of habitat suitability and predictive habitat models (PHM) in this respect, can be very useful. There are many examples of PHMs developed for use in the marine environment, indeed several have been developed in the North Atlantic (Robert *et al.*, 2016) and South Pacific (Georgian *et al.*, 2019) which has resulted in a much better understanding of PHM limitations especially when determining the extent of the 'fundamental' habitat supporting the biodiversity feature in question (Gonzalez-Mirelis and Buhl-Mortensen, 2015; Robinson *et al.*, 2017). In this respect, applying PHMs to assess what proportion of the area covered by the spatial management measure actually overlaps the area of 'fundamental' habitat can give a potential indication of the viability of the relevant area as an OECM, e.g., the larger the overlap, or matching, of the 'fundamental' habitat with the area covered by the management measure, the better.

The ecological connectivity between individual patch features of the same type. Ecological or 'functional' connectivity generally refers to processes by which genes, organisms (adults, juveniles, gametes and larvae), nutrients and/or energy, transfer between habitats (both pelagic and benthic) in space and time, connecting populations and communities of marine organisms (NOAA, 2017; O'Leary, *et al.*, 2018; Kenchington, *et al.*, 2019).

An understanding of the ecological connectivity between biodiversity features (of the same type) is particularly important when establishing management measures such as networks of OECMs or MPAs, since the number, extent and location of the areas receiving protection will underpin the sustainability of populations of the relevant biodiversity features at levels which maintain their essential functional processes (Baco *et al.*, 2016).

The development of bio-physical models which aim to replicate the larval dispersion patterns of key taxa are increasingly used to assess the ecological connectivity between spatially discrete habitat areas (Hilário *et al.*, 2015; Kenchington *et al.*, 2019). However, model parameter uncertainties (especially in relation to biodiversity feature reproductive biology and larval ecology, e.g., planktonic larval durations) currently limit their full utility in designing appropriate networks of marine protected areas (Hilário *et al.*, 2015).

However in some areas, such as the Flemish Cap area of the northwest Atlantic where the NAFO VME closures are, the physical currents and their topographic forcing are amongst the principal factors that determine the patterns of population connectivity in the corals and sponges (Wang

et al., 2020), thereby allowing for realistic connectivity models to be produced (Kenchington *et al.*, 2019; Wang *et al.*, 2020). Where such information exists it can be invaluable in combination with PHMs in determining whether OECMs should be evaluated individually or collectively. If two or more OECMs are connected through larval transport, then it becomes less important that fishing activities are prosecuted in between the areas.

The condition (or density/biomass) of the biodiversity feature. Recent research suggests that, at a broad-scale, temperature, chemical energy (food supply), seabed substrate type and depth are especially important drivers of biodiversity in the marine environment, with the availability of food playing an increasingly important role at greater depths (e.g., >2,000 m; Woolley *et al.*, 2016; Wei *et al.*, 2019;). Identification of such areas that would enhance biodiversity in an area could be used to infer biodiversity properties. For example in the case of VMEs, the UNGA resolutions refer to areas where they are known or likely to occur and identify geophysical features (e.g., seamounts, steep slopes) as proxies for the VMEs. In addition, biodiversity features of potential significance for fish and fisheries tend to possess some level of habitat structural complexity, including the presence of 'significant concentrations' of individuals (or biomass), that support a high diversity of organisms which typically cover an area of seabed habitat greater than the space occupied by the feature itself (Beazley *et al.*, 2015; Kenchington *et al.*, 2019; Rowden *et al.*, 2020). Although advances have been made in the quantitative determination of what constitutes a 'significant concentration' of species giving rise to a biodiversity feature, defining 'significant concentrations' of indicator or keystone species in the context of identifying and delineating the extent of a biodiversity feature remains a challenge for many management organisations (Kenchington *et al.*, 2015; Rowden *et al.*, 2020). Nevertheless, areas with high biomass of structure-forming species are likely to have enhanced biodiversity which could be treated as an inferred property of the system.

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6.8 Options to deal with short-lived biodiversity

Typically, biodiversity features supporting conservation efforts are somewhat associated to long-lived species, especially those linked to long-lived biogenic habitat-forming features such as coral reefs or sponge grounds. However, biodiversity features justifying enhanced conservation efforts can also be part of, or benefit from, an assemblage of short-lived species. For this reason, it is important to distinguish between functional diversity and species diversity. When assessing the range of biodiversity attributes contained within the area-based fishery management measure, the fact that species diversity is low or dominated by short-lived species assemblages should not be a motive to disqualify the area as an OECM. Instead, the overall functional diversity of the feature in conjunction with its ecosystem function and services should be assessed.

Functional diversity outcomes of short-lived species assemblages may be highly correlated to the scale of the feature as discussed in emergent topic 6.7 'Options to deal with patchy/contiguous biodiversity', as well as the duration of time since the implementation of the relevant fisheries measures. Before OECM recognition, specific fisheries measures must be present for sufficient time to allow possibly impacted features to show evidence of recovery, to certify the effectiveness of the measure in place, and to demonstrate the consequent delivery of biodiversity and ecosystem service benefits. This is especially relevant when the feature(s) have suffered from intense disturbances. With this in mind, seasonal ABFMs should be assessed with care for evidence that long-term positive functional diversity outcomes really can result from the area-based measure and so justify accepting the area as an OECM.

Further, short-lived species often show fluctuations in density and area occupied, making it difficult to assess the effectiveness of an OECM unless a long time-series of data are available. This

was seen in the case study for the sandeel closure (Section 4.1) where the sandeel populations are naturally highly variable.

6.9 Options to deal with static/mobile biodiversity

Generally static benthic biodiversity is well-suited to spatial management measures. However, mobile species and habitats (e.g., Sargasso Sea) that utilize the water column pose challenges for area-based management measures, especially those with broad ranges and high mobility and/or species that may be redistributing due to climate changes. Dynamic spatial management tools are needed, so that appropriate conservation measures move with the mobile species and habitats, and spatial restrictions do not have to remain in force in places where they no longer protect important biodiversity features. OECMs with their in-built periodic reviews (often annual) enable an element of dynamic management to be used to address some aspects of mobility. The periodic reviews allow changes in the distribution of biodiversity features intended for protection to be documented at regular intervals, and for dialogue among managers and stakeholders about moving the boundaries of the spatial measures to match the updated distributions. Such periodic reviews and updating is already routine in some fisheries jurisdictions, as some species' mobility has been a challenge to management for decades, and is increasing with climate change.

Evaluating the *overall* effect of an ABFM, based on the biological characteristics of the species concerned and the nature of the managed fishery, is crucial for the assessment of its performance. Indeed, the success of an ABFM for broader biodiversity protection can be limited, if its effect is merely to displace fishing activity, not decrease overall mortality of the populations intended to receive enhanced conservation, and possibly increase mortality of other species or life stages elsewhere. Species that are mobile and move between the protected and the adjacent unprotected areas may, in fact, gain little protection from many types of spatial measures (FAO, 2003).

In the case when an ABFM is evaluated as a potential OECM, the mobility aspect related to the life cycle and behaviour of both the target species of the managed fishery (as an element of the biodiversity) and the other biodiversity components present in the area should be taken into consideration, when assessing the effectiveness of the measure. To be appropriate as an OECM, the size and placement of the area receiving enhanced conservation should have functional significance for the targeted biodiversity components, and ideally enable self-sustaining populations of species of biogenic and conservation importance.

In the case of highly mobile populations the standard in the paragraph just above could only be met by areas encompassing much of the range of those populations. However, there are options that could allow area-based fisheries measures to contribute meaningfully to the protection needs of such mobile biodiversity within a potential OECM. As described in the first paragraph of this section, the limits and placement of a static-area-based measure could be regularly re-adjusted based on changes to the spatial distribution of the mobile species. If much of a population's movement is among different habitat patches or among seasonal centres of distribution, a network of distinct areas receiving protection might be established. In such cases it is also important to consider if the vulnerability to fisheries of the mobile population is higher during its periods of migration among areas or when it is staying within one of the preferred areas. The appropriate strategy of protection might include different suites of spatial and other types of measures, each set matched to the respective vulnerability of the population in different parts of its range. The time element would be addressed through periodic reviews in our current management systems. Area could be achieved by averaging across years.

Reference

FAO. 2003. The ecosystem approach to fisheries. *In* FAO Technical Guidelines for Responsible Fisheries, No. 4, Suppl. 2, Rome FAO. 112pp. http://www.fao.org/3/y4470e/y4470e.pdf (Access date 2-5-2021).

6.10 Implications of many/few biodiversity features

The exercise of identifying the range of biodiversity attributes contained within the area may evidence a range of possibilities from depauperate ecosystems to biodiversity hotspots. Areas rich in biodiversity and where spatial measures support an abundance of features may present robust evidence for OECM recognition. Areas with moderate to high biodiversity but the spatial measures support only a small number of biodiversity attributes may focus the evaluation on the importance and role that the features receiving enhanced conservation have on the wider ecosystem functions and services and their role on achieving expected biodiversity conservation outcomes. Spatial measures applied areas with low biodiversity much be evaluated with regard to whether the measures might allow a depleted biodiversity to recover, or if the area is inherently low in biodiversity but the spatial measures nevertheless contribute importantly to ensure the biodiversity characteristic of the area is not degraded.

Given these different situations, and following from Section 6.5, Are there 'better' and 'less better' biodiversity benefits?, when considering an area as an OECM no area should be disqualified solely based on its current biodiversity richness. However, the case-specific evaluations may be quite different, depending on the type of situation encountered. Nevertheless, in all cases effort should be placed in identifying the range of ecosystem functions and services provided (e.g., ICES, 2019), and considering the effectiveness that those present have on the wider ecosystem or food web and the outcomes of the measures to be placed. They also should consider the uniqueness and rarity of the biodiversity features present in the area and expected to benefit from the spatial measures.

Identification of biodiversity attributes might produce (but are not limited to) the following range of circumstances:

- Presence of an abundance of biodiversity attributes;
- Presence of a moderate number of biodiversity attributes;
- Paucity of biodiversity attributes but the area provides ecosystem functions and services;
- Current lack of biodiversity attributes and with no known important ecosystem functions or services, but the spatial measures when in place could enhance biodiversity or increase provision of ecosystem functions or services;
- Currently no significant biodiversity attributes, ecosystem functions or services have been identified and the measures in place will not correct this (or on-going pressures will deter this from happening);
- Currently no important ecosystem functions or services have been identified for the area and the measures in place are not expected to change this, but some of the biodiversity features present are unique or rare, and would benefit from the spatial measure;
- Currently only a few significant biodiversity attributes have been identified and the measures in place are not expected to change this, but some of those biodiversity features present are rare or unique.

It is not possible to specify levels and boundaries between any of the categories of abundance above, however, with the current CBD language in Target 11 and Decision 18/4 any of these cases could be OECMs, depending on the measures in place and their effectiveness (see Section 6.14).

Reference

ICES. 2019. Norway request on identification of ecological special/valued areas in the Barents Sea. *In* Report of the ICES Advisory Committee, 2019. ICES Advice 2019, sr.2019.16, https://doi.org/10.17895/ices.advice.5354.

6.11 Implications of sound/absent assessments of biodiversity

The assessment of the biodiversity features of concern present in an area is of great importance during the OECM's identification process, as these features figure strongly in many of the CBD 14/8 Decision's Guiding Principles, Criteria and Sub-criteria. The biodiversity features of concern typically include elements of biodiversity other than solely the target species of the ABFM because they are either:

- potentially impacted by fishing operations and for which conservation measures are required to eliminate, reduce, mitigate, or keep from increasing the impact, restore healthy conditions, or compensate the residual impacts, or
- identified by a mandated agency, or widely supported social process, as a conservation priority.

For data-rich areas, where extensive scientific information regarding the biodiversity is available, the assessment typically features the identification, retrieval and compilation of the full spectrum of scientific knowledge available for the specific area, and evaluated by scientific experts in the area and in relevant scientific disciplines. Possible sources of data for these parts of the evaluation include, *inter alia* the peer-review literature, institutional reports, datasets obtained by official databases, research projects deliverables etc. Even in data rich areas, however, all assessment processes are increasingly acknowledging the value of the knowledge systems of local communities, experienced resource users, and Indigenous Peoples and cultures. Their engagement in such evaluations is always appropriate, and the knowledge they provide is to be fully integrated with the knowledge of scientific experts. This increases the comprehensiveness of information available for the evaluation (e.g., in cases when scientifically collected data sets do not extend as far back in time as the dynamics of the biodiversity features and ecosystems being evaluated) and makes the information base more credible to the full range of interests in the outcome of these evaluations.

In data-poor situations (or even in no data areas) the process of assessing the biodiversity features of concern to test an area against the OECMs CBD Criteria is much more demanding in terms of both time and effort. However, no or low availability of scientific data should not be considered as an excuse for not considering an area as a potential OECM if there are strong indications that the area could potentially qualify as an OECM. In such cases the indigenous and local knowledge becomes particularly central to the evaluations.

Particularly in areas poor in scientific data, all the following sources of data can be considered, with effort expended to ensure each is tapped as fully as available:

- **Single surveys** specially designed for the biodiversity assessment of the area. Such surveys do not have to be sophisticated, expensive or intensive, but they can provide a large amount of information for the area of concern;
- **Remote sensing applications and image interpretation methodologies**. It involves a wide array of tools and techniques on orbiting satellites and flying aircraft. It enables direct observation of large-scale ecosystems and large organisms, depicting the broader environmental context for biodiversity, tracking climatic and other drivers of biodiversity change (often for use in ecological models), and making consistent observations across time and space for biodiversity monitoring (Horning *et al.*, 2010). Remote sensing is increasingly complemented by *in situ* sensing with cameras on stationary objects or small drones, sound recorders, cell phones, electronic tags, and fragments of genetic material sampled directly from the environment (Turner, 2014);

- **Maps of species distribution** which may provide little qualitative data but have good spatial extent. The FAO Aquatic Species Distribution Map Viewer (FAO, 2021) is a representative paradigm of such source of data for the marine realm. Using a GIS approach, maps of distribution of a large number of aquatic species are accurately reproduced and disseminated. Geographic terms and habitat descriptions were extracted from the FAO Catalogues of Species and combined with global databases from authoritative sources;
- **Habitat suitability modelling** aims at defining, for any chosen species, the 'envelope' that best describes its spatial range limits by identifying those environmental variables that correlate with its distribution. They are built by relating current species' distributions to current environments. Future species' biogeographical ranges are modelled by projecting these relationships to selected environmental change scenarios (Thuiller and Münkemüller, 2010);
- **Citizen science**. Where properly executed, citizen science can provide robust science and high-quality data that can be used for policy and decision-making (McKinley, 2017) more cost-effectively than traditional forms of science (Hyder, 2015). Kelly *et al.* (2020) have undertaken a global overview of the extent and potential of marine citizen science and its contribution to marine conservation, reviewing among others the potential of citizen science in enhancing current understanding of marine biodiversity;
- **Traditional knowledge** refers to the knowledge of indigenous and local communities around the world. Indigenous (Berkes, 2018) and local communities (Charles *et al.*, 2020) contribute to the conservation and sustainable use of biodiversity by acting as natural resource managers, by providing valuable information to the global community, and a useful model for biodiversity policies. As on-site communities and/or long-time users of the resources with extensive knowledge of local environments, they are most directly involved with conservation and sustainable use (CDB, 2021);
- **Fishers' Local Ecological Knowledge** (LEK). In areas where data and resources often are lacking, the practical relevance of LEK to obtain useful information has been highlighted (Cowie *et al.*, 2020). The potential roles of the LEK varies from direct applications such as gathering environmental information to a more participative involvement of the community in the management of resources they depend on (Berkström, 2019).

Regardless of the sources of information used in an OECM evaluation, it will be common that decisions on OECM status are not 'black and white'. Consistent with the many considerations and options in the various parts of Section 6, decisions on OECM status will often require a 'weight of evidence' approach. Factors can include support for different Criteria and Sub-criteria may be of different strengths, evidence of effectiveness may be incomplete, future trajectories of both almost all biodiversity features and of other pressures on biodiversity will be uncertain as well, and many other concerns.

Consequently it is increasingly acknowledged that expert judgement plays a role in all knowledge systems. The image of scientists relying on hypothesis testing to use empirical data to definitively refute all but the 'correct answer' is increasingly acknowledged as inappropriate in the current world. In the ecological disciplines, that image is an inadequate approach in response to the growing need for rapid decisions on choices with possibly serious consequences, when information is incomplete. Any choice must be implemented under strong resource constraints, and choices need to be embraced by local communities and others affected by the decision. Consequently even science experts are called on to exercise **Expert Judgement** and use of the best information available, including information that may not be local to the area of concern. Moreover, the scientific experts in the evaluation processes are not the only participants applying Expert Judgement, as judgements based on experience and weight of evidence are inherent in all knowledge systems.

Because judgements are almost always required in these evaluations, transparency in the full evaluation process is essential. For uses of scientific information, transparency in the methods applied allows confirmation of methodological rigor and study repeatability, which are key Steps towards promoting the acceptance of outcomes (Drescher and Edwards, 2018). More broadly key issues that should be considered in use of any knowledge system include engagement of the most appropriate expert, how to effectively elicit the best knowledge from the experts present, and how the knowledge is evaluated and integrated, as (Drescher *et al.*, 2013) present for scientific knowledge. Petza *et al.* (2019) provide one paradigm for an expert-based study, undertaken in a data poor area for assessing the contribution of fishery restricted areas to marine conservation under the OECMs concept. Such a paradigm may be a foundation for a more complete approach, engaging all relevant knowledge systems.

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6.12 Factors relative to evaluating 'effectiveness'

Measuring effectiveness of a spatial biodiversity conservation measure(s) is difficult. The management actions taken typically either diminish or remove a local threat(s). The difficulty arises because determination of the impact(s) of that removal or diminishment are usually impossible to separate out from the impacts of a range of other ongoing events occurring in a complex social-environmental system. This requires the proponent to disentangle the impact(s) of the removal of certain pressures, from the natural fluctuations of the biodiversity in question and the impacts that other pressures are having. In many cases this includes pressures outside of their control (including natural pressures), pressures operating at scales larger than the area's boundaries (broad-scale one(s)), and pressures acting in concert (synergistic pressures). Ultimately, this is often an unrealistic requirement. This means that biodiversity may be declining in an area despite the implementation of management measures. Consequently evaluations of effectiveness of OECMs is not as simple as saying that if biodiversity is increasing all measures in the area are effective and if biodiversity is decreasing any measure applied in the area is ineffective. Background trends and context of management and governance will be considerations in all sound evaluations.

Despite these complexities, various approaches are recognized as foundational for a comprehensive approach to evaluation of management and management measures. These could be considered when translating theories and concepts into action — characterized as acting with effectiveness in mind.

The Steps suggested below would not necessarily be conducted sequentially, would not all require the same levels of effort, and any combination would require iterative establishment and implementation:

- A limited number of key conservation assets (ecosystem components) have been identified and described. Their status has been assessed or there is on-going assessment. The assessments consider the degree to which biodiversity condition and pressures are understood, including describing the range of natural variation in each important component of both condition and pressure;
- There is a chain-of-causation and/or conceptual model to conceptualize and prioritize management actions for conservation of each biodiversity feature;
- There are short- and long-term targets, with strategies and timelines articulated, that describes ongoing or likely shifts in the condition of the biodiversity features or limits to human pressures;
- Resources and capacity needed for accomplishing objectives are available;
- Monitoring is conducted to determine whether proposed objectives are being achieved;
- There is a process for sharing information on progress relative to the biodiversity targets in place, and management can be shown to be adapting to the lessons learnt.

Setting targets for achieving biodiversity conservation is not the same as setting a threshold for 'effectiveness'. Effectiveness relates to how well words are translated into actions, and where the actions take the system. Whereas targets are likely to be end-points an authority or society aspires to achieve for biodiversity, thresholds for whether the task of implementing management

actions within a candidate OECM are effective will need to be flexible to current local conditions, taking into account costs and opportunities, given the environmental and broad governance contexts.

To show effectiveness, OECM proponents are expected to provide evidence that pressures impacting biodiversity have been diminished under the fishery Legitimate Authority, acknowledging the management system proposed or being implemented. There needs to be a consideration of the chain-of-causation and/or conceptual model employed to achieve a biodiversity outcome. If no fishery pressures are removed from within the area, this would require increased evidence from the sectoral managers that the fishing activities did not inhibit or reverse biodiversity benefits that could have been achieved and sustained within the area. If some level of fishing continued to be allowed by the sector, independent monitoring or external validation of sectoral monitoring might be considered a necessary practice.

Within the workshop it was clear that experts differ in their expectations for what consequences are necessary for a measure to be considered 'effective'. Possibilities include:

- Showing that a pressure having a negative impact on biodiversity is being reduced;
- Showing that a pressure having a negative impact on biodiversity is reduced to a level where its impact on biodiversity is no longer negative;
- Showing that a pressure having a negative impact on biodiversity is reduced to a level where the biodiversity feature(s) are no longer declining;
- Showing that a pressure having a negative impact on biodiversity is reduced to a level where the biodiversity feature(s) is increasing;
- Showing that a pressure having a negative impact on biodiversity is reduced to a level where the biodiversity feature(s) is increasing at a rate that will achieve an identified target within an identified time frame.

Moreover for each option in the list above, there could be differences in views on whether 'biodiversity feature' can be interpreted as one or a few species if they are of particular conservation concern and/or functional importance to the ecosystem, or if 'biodiversity feature' should be interested as the general state of overall biodiversity. This is important, particularly in light of a study using data for 25,780 species, where conservation successes were shown to slow the rate of deterioration, noting that even the best conservation efforts can remain insufficient to necessarily offset biodiversity losses completely (Hoffman *et al.*, 2010).

Obviously the higher the bar that is set for 'effectiveness' of a set of management measures the less likely that any particular area will be evaluated as appropriate to be called an OECM. Presently there is insufficient clarity in Target 11, Decision 18/4 and associated CBD documents to know the consensus intent of the CBD with regard to how 'effectiveness' should be interpreted, or even if a consensus on that point exists. Nevertheless OECM evaluations have been conducted and more will occur. Consequently the workshop considered possible ways forward with the policy guidance from the CBD that is currently available, and reporting in Section 6.13.

Reference

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6.13 What constitutes 'effective management'?

Effective management of OECMs will be dependent on the initial rationale for the creation of the area, which may or may not have biodiversity as an intended outcome. Requirements for man-

agement will also impact how effectiveness is assessed, and such requirements may be dependent on whether or not the area is expected to be integrated into a system of MPAs and OECMs in accordance with Aichi Target 11. There could potentially be a higher bar being set for OECMS vs MPAs, and this discussion will have to be resolved between fisheries management agencies and biodiversity protection organizations, at the local, national and international level. This is another case where further clarity from the CBD about the intended outcomes from OECMs would assist the necessary dialogue among managers and the wide range of stakeholders and rights-holders in these discussions.

Both internal (i.e., objectives, resources) and external factors (i.e., threat assessments, MPA network management, governance) need to be considered to assess management effectiveness. In the context of fisheries related protections, enforcement and compliance can be important factors of effectiveness and may be taken as informative, but their outcome is what really matters in assessing effectiveness. Fisheries governance agencies or bodies then need to have the ability and capacity to cooperate with other organizations, particularly where threats from other activities may not be under the jurisdiction of the fisheries management agency. There should be documentation of what is being done towards ensuring effectiveness, however a statement of management intent alone does not demonstrate effectiveness. Any assessment of effectiveness must take into account information from all knowledge systems, but should be expected to become increasingly quantitative rather than qualitative as the area being considered becomes increasingly rich in data and knowledge.

The entire screening process of a fisheries management measure to become an OECM may require screening by multidisciplinary knowledge holders, i.e., local best informants as well as scientists from the ecological, social and economic disciplines. The final decision may need to involve multiple levels by multiple authorities in case of cross-sectoral issues. Within their respective areas of competence experts and local knowledge holders can contribute to the identification of OECMs, following the CBD Decision guidance. Nevertheless, evaluation of factors of a more political nature or related to cross-sectoral issues may need to also engage higher, or different, government authorities. Greater clarity on what are questions for the fisheries authorities vs other authorities would be helpful so that the fisheries bodies don't feel like they need to respond to all of the criteria.

Examples:

- For fisheries measures in the General Fisheries Commission of the Mediterranean (GFCM), impacts of fishing on protected areas must be managed. However, these areas could be opened to other activity not under the jurisdiction of the GFCM, such as deep-sea mining. The GFCM would need to identify the cross-sectoral issue and its potential impact on the benefits GFCM is seeking, and, perhaps, suggest an arrangement that might resolve the conflict. GFCM may also consider that an OECM with new activity is not worth the additional trouble of cross-sectoral management and may drop the status of OECM, remaining an ordinary ABFM;
- For Vulnerable Marine Ecosystem (VME) protections through fisheries measures, other industrial threats are not addressed but could be complimented by measures undertaken by non-fisheries bodies. For example, in NAFO areas closed to bottom fishing but open to oil and gas drilling that is governed by Canada. Coordination between the Canada Newfoundland Offshore Petroleum Board and NAFO could ensure that drilling not be authorized;
- The Central Arctic Ocean Fisheries Agreement is neither an MPA nor an OECM. There is no fishing taking place and it does not require enforcement neither MPA nor OECM. Biodiversity is being protected until industrial activity commences, and Arctic jurisdictions are also discussing possible Agreements for other sectors in the

Arctic. The nature of these agreements, if developed and adopted, could have implications for fishery OECMs in the Arctic as well.

There may be threats that cannot be managed or are not managed such as climate change. It is important to consider what happens when a fixed OECM may need to change because the resource has moved (i.e. stock specific measure). Are there other aspects of biodiversity that would then be not protected if the OECM was spatially adjusted? Some of these considerations are discussed in other sub-sections of Section 6, highlighting the need to view Section 6 comprehensively.

Effectiveness should also consider relative cost/benefit effectiveness of an OECM through a fisheries management measure vs an MPA. For example, where there is an OECM not designed for biodiversity protection but effectively achieves that result and does not require the legal and technical work to establish an MPA, the benefits of the OECM may outweigh the overall costs to establish an MPA that could achieve a similar result. At least under current global governance, RFMOs are the only international bodies that are making globally binding area-based regulation in the ABNJ to stop a major (and often only) significant impact on biodiversity, so it is worth going forward even if an MPA designation could be a better option in the future after BBNJ governance is decided.

6.14 What constitutes sustained management/governance?

Sustained management is impacted by the reason for the spatial measures in the first place, and takes into account of the considerations in Sections 6.7 – 6.9. For example, VME closures are meant to be over the long term, to protect long lived species in perpetuity from the threat of bottom fishing. Other areas that are in place for a period of years to achieve a non-biodiversity related outcome (e.g., juvenile fish protection) could be opened within 20 years. It may still be worth considering the biodiversity protection outcomes over that period. However, a measure does not necessarily have to be in place year-round, as in certain cases, it could be seasonal (e.g., long-term measures to protect seabirds). Consideration needs to be given to adaptive management that updates the measure over time. This may be particularly important when climate change is taken into account.

6.15 Implications of different degrees of monitoring

Fisheries measures that result in an area considered to be an OECM are not equivalent to an MPA, and hence monitoring may not be equivalent to what is expected for an MPA. There may be more of a focus on monitoring the threat that is being managed or removed, rather than the biodiversity outcome itself. The fisheries management entity or sector would be responsible for monitoring the fisheries threats. The more encompassing the monitoring is in coverage of biodiversity features as well as fishing effort, and in space and time, the greater the credibility of the OECM status and ease of evaluation in the periodic reviews of performance.

Threats from other sectors should be monitored as well in order to avoid impacts on the biodiversity that is being protected from fishing activities, but these threats will not be under the jurisdiction of fisheries management. If other activities commence within the OECM, these need to be taken into account and assessed as to whether or not they are interfering with biodiversity protection. This may or may not be feasible without cooperation from the other sector, and coordination of monitoring efforts among sectors can provide greater efficiency and lower costs for each.

6.16 Options to take non-fishery threats into account; Implications for different degrees of sectoral and/or inclusive governance

Where an OECM has been identified or accepted, it is important to ensure that the Legitimate Authority communicates this status to other sectors. How this is done will vary depending on if the OECM is within State waters or in Areas Beyond National Jurisdiction. Where OECMs are designated by fisheries managers and relevant governance mechanisms, it is assumed that fisheries staff will engage with staff involved in biodiversity protection. Depending on the governance structure, this may be within the same or a separate government / management entity or department. National or sectoral reporting may be to the WCMC to register the area and also included in other reports under CBD and potentially for SDGs 14.

OECMS can be considered part of the ecosystem approach to fisheries management or ecosystem-based management. They may be integrated as part of MPA networks or through broader planning such as marine spatial planning, integrated coastal zone management or integrated ocean management. Cross sectoral issues may be more effectively addressed when such overarching plans or processes exist. However it is recognized that there are relatively few jurisdictions where large-scale marine planning exists or functions effectively. Where an overarching framework is not in place, coordination with other sectors requires action on a case-by-case basis.

In areas where biodiversity is currently under pressure from other (non-fisheries) sectoral activities, measures applied by fisheries agencies need overlapping management measures in place for these other sectors, such that cumulative risks to biodiversity are sufficiently mitigated within the area or it is not / no longer an OECM.

6.17 Implications of 'equity'

Concerns relating to equity are at the heart of many of the above considerations. Three forms of equity are noted by the CBD (CBD, 2018 Annex II): 'Equity can be broken down into three dimensions: recognition, procedure and distribution'. These relate to (1) the fundamental recognition of and respect for all the various rights-holders in a given situation, (2) how decision-making processes do or do not have equitable and fair participation arrangements, and (3) how the benefits accruing from resource use and from management measures (as well as the costs of the latter) are distributed among people, and groups.' The latter involves, according to CBD, 'Provisions for equitable sharing of benefits and costs'.

Equity is also a concern in fisheries circles. For example, the Small-Scale Fisheries Guidelines of FAO highlight the need for 'promoting justice and fair treatment – both legally and in practice – of all people and peoples, including equal rights to the enjoyment of all human rights' and potentially 'using preferential treatment where required to achieve equitable outcomes, particularly for vulnerable and marginalized groups'. Those Guidelines include a number of points of relevance to OECM discussions:

- 'States should where appropriate grant preferential access of small-scale fisheries to fish in waters under national jurisdiction, with a view to achieving equitable outcomes for different groups of people, in particular vulnerable groups.'
- 'States should involve small-scale fishing communities – with special attention to equitable participation of women, vulnerable and marginalized groups – in the design, planning and, as appropriate, implementation of management measures, including protected areas, affecting their livelihood options.'

- 'All parties should pay specific attention to the need to ensure equitable participation of women, designing special measures to achieve this objective.'

It is well established that equity, both around participation in decision-making, and on the distribution of benefits and costs, is important to developing and maintaining MPAs. It is also fundamental to OECM-like measures (e.g., Locally-Managed Marine Areas (LMMAs)) implemented in many contexts, notably at a local community level. More broadly, equity should be a fundamental ingredient of all OECM discussions. In considering issues of equity, a key element is to recognize that special considerations may be needed for Indigenous People.

Reference

CBD. 2018. Decision 14/8 Protected areas and Other Effective Area-based Conservation Measures. 14th Meeting of the Conference of the Parties to the Convention on Biological Diversity, 17-29 November, Sharm El-Sheikh, Egypt. CBD/COP/DEC/14/8: 19 pp. https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-08-en.pdf (Access date 2-5-2021).

7 Policy and Future Considerations

This section of the report covers discussions of topics in CBD Decision 14/8 and in the Guidance Document (Garcia *et al.,* 2020) that WKTOPS found particularly challenging in considering the case studies. Although the WKTOPS ToR to explore the extent to which Garcia *et al.* (2020) efficiently helps evaluate if a potential OECM meets the CBD criteria, was intended to be a technical exercise, many discussions encountered sensitive and complex issues of governance and policy interpretations. When these interpretational issues are encountered in OECM evaluations, participants with different perspectives can hold strong but differing views, whether the participants are experts in any of the knowledge systems or decision-makers. The practical application of the Garcia *et al.* (2020) guidance at WKTOPS helped to clarify some of the implications of the CBD Criteria for OECMs justified by existing fisheries measures, and bring out places where interpretation of policy-sensitive language in the Target and Decision are encountered. Even with the guidance in Garcia *et al.* (2020), however, WKTOPS discussions brought out cases where there is scope (and possibly necessity) within the process to make decisions that reflect policy judgements or interpretations. Several of these cases will be explored below.

Objectives

One interpretation-sensitive aspect considered was the implications of the objectives underlying the measures used (or proposed) by the relevant authority within the area being evaluated as an OECM. Several legitimate objectives may be present. The most obvious is simply meeting international commitments regarding the total area considered protected by a mixture of MPAs and OECMs, and reported to the WDPA. As long as any single place in the ocean is not double counted, and as long as relevant MPA or OECM Criteria are being met, this can be considered as a legitimate aim and should be straightforward to evaluate. The interpretations required in pursuing this objective are simply that the same area has not been reported independently multiple times, and the fundamental decision that the relevant Criteria have been adequately met.

Another family of objectives could be to maximise (or at least significantly increase) the actual biodiversity protection present over a certain area. This implies a much more detailed and nuanced analysis of the full suite of biodiversity protections in place, and the incremental protections provided by the specific OECM. These analyses require interpretation many specific phrases in the Targets and decisions, as introduced in the discussion below.

Another aspect the overall objectives of OECMs (and MPAs) was the degree to which a specific OECM had the provision of the relevant biodiversity benefits (1) as intended objectives or unintended consequences, and (2) if intended, were they presented as primary or secondary objectives. This will often need further unpacking in that a fisheries measure in itself may have no reference to biodiversity benefits other than those accruing to the target species themselves (and possibly their bycatch). However, although the evaluation of the area as an OECM would naturally need to be more explicit about such additional benefits, intended or not, there is broad scope for interpretation of how secure such benefits will be if the relevant authority does not make them explicit objectives. The guidelines and subsequent evaluations could focus on ways to assess whether the measures delivered (or are intended to deliver, if the measures are new) real benefits to biodiversity or not, and what factors would influence their future security. In addition, greater efforts by fisheries jurisdictions to be explicit about biodiversity objectives relevant to management plans under their authority would contribute substantially to reducing the need for inference and interpretation on these important considerations.

Lifetime of the Measures

The question of the time/renewal period of the fisheries measure itself recurred in several WKTOPS discussions. In general, the understanding in the fisheries sector is that annual or 5-yearly renewals of regulations are not inherently contrary to the long-term intent of the measure, but rather reflect the established practice of the sector for recurrent review. Nevertheless, even when the nature of the fishery measure's objectives were protecting (elements of) ecosystems over the long-term the measures are likely to have specified timespans of 10, 20 or 30 years rather than explicitly in perpetuity. These issues of duration of measures was another of the interpretational challenges at WKTOPS, where participants expressing a strong conservation biology perspective sometimes had low confidence in lasting biodiversity benefits being delivered by fisheries measures that were open to frequent adjustments.

The length of time the measures remain in place and the requirement of the Decision to sustain the measure and maintain benefits in the long-term may not have a single resolution, particularly in light of the many factors that affect the duration of fisheries measures. Typically, measures targeting stock recovery or keeping harvest of healthy stocks sustainable tend to be short in horizon and frequently adjusted as stock status varies. In contrast fisheries measures targeting long-lived or emergent biodiversity feature such as vulnerable marine ecosystems may have longer time horizons, often indefinite. Consequently, fisheries measures intended to manage harvest of a stock considered to be healthy can be interpreted as either compatible or incompatible with the 'long-term' requirement of OECMs, depending on their context. They could be considered compatible if such measures were viewed as central to keeping the stock in a healthy condition and therefore expected to persist as long as the fishery keeps sustainability as an objective (very long-term). They could also be considered as incompatible in scenarios such as the management plan allowing large increase in effort if the target stock were to have a period of strong recruitment or to change allocations among different fishery sectors, with the greater or redistributed effort having different consequences for the biodiversity benefits.

Fishery measures could also be too 'short-lived' to be OECMs if used in fish stock recovery programmes which may be enforced in law. Recovery programmes usually specify the rebuilding target (e.g., at or above the MSY level; no significant adverse impact) and the maximum rebuilding time permitted to avoid too weak implementation. The rebuilding time may be fixed (e.g., 10 years) or could be specified based on the biology of the species, based on stock productivity and degree of depletion. However, the more restrictive measures in a rebuilding plan typically can be removed when the rebuilding targets are met, after which an ordinary management regime for the stock is adopted. In such cases restrictions in the rebuilding plan may have been important to the OECM biodiversity benefits. In this case the area could only be considered as potential OECM if (1) it had demonstrable biodiversity co-benefits and (2) there was assurance that the measures associated with the biodiversity benefits would be maintained after rebuilding, to maintain its broader biodiversity benefits.

In fisheries management, spatial measures aiming to protect habitats (sea-grass beds, coral reefs, etc.) or life stages (juveniles, spawner refugia) have no reason to have 'expiration dates'. In the North Atlantic many such measures may have been in place for decades, even though their efficiency may have not always been recurrently assessed. In such cases, if fisheries management plans have explicit habitat protection objectives, there should be less interpretational concern about duration of any associated benefits to marine habitats.

Overall, the interpretation of 'long term', in an OECM identification process would benefit from considering (i) the intended lifespan of the spatial measure; (ii) how often the measure will be reviewed with a potential for adjustment, (iii) whether the adjustments could result in changes in the spatial measure or other provisions that enable its effectiveness that their consequences for biodiversity might be affected; and (iv) in case of such changes to the spatial measure or at

the end of its specified lifespan, how likely are the acquired benefits to be reversed, and to what extent.

The guidance should, therefore, encourage and assist nominations to demonstrate in each case that the biodiversity and ecosystem benefits are likely to be maintained for the long-term, even when the lifespan of measures justifying the OECM is not explicitly stated to be 'in perpetuity'. This could involve providing feedback to fisheries management authorities who are supportive of OECM identification, that they embed in their fisheries management plans some degree of temporal security for spatial measures important to the OECM status. The guidance could also help with interpreting 'long-term' if it encouraged provision of information that could address the question 'will the ecosystem or its biodiversity be in a more robust and resilient state at the end of the OECM being in place?'.

These interpretational considerations would also be aided by clearer specification, by the CBD, of whether measures are required to be locked-in effectively in 'near-perpetuity'. To do so would increase long-term security of the biodiversity benefits but would also create a brake on progress in nomination of a wide variety of OECMs currently delivering real biodiversity benefits. Thus, if CBD policies were clearer on the flexibility permitted in interpreting 'long-term', commitment to biodiversity outcomes under OECMs could be accelerated, even if these outcomes might not guaranteed for the very long-term. This greater clarity might also be linked to clearer expectations for reporting on the biodiversity outcomes from the OECMs as a means to address uncertainties about the future of the biodiversity benefits from an OECM. Subject to appropriate safeguards, this could ultimately create more protection and benefits, and greater opportunities for further integration of social, economic and environmental objectives both now and in the long-term future.

International waters/Areas Beyond National Jurisdiction

One key interpretational consideration is the potential difference in implications for OECMs (and MPAs) in national waters versus international waters. In national waters one national or sub-national (e.g., a provincial) jurisdiction usually has sufficient authority to integrate OECMs with other measures such as MPAs and other sectoral pressures, for instance through marine spatial planning. The interpretational considerations focus on evidence that national authorities will exercise those powers, such that once established as an OECM the State could make decisions to protect the biological features from other human pressures in the same area.

For international waters, the situation is further complicated by the difference in the scope of international fisheries and biodiversity/environmental protection instruments. In international waters regional fisheries management organisations (RFMOs) are only able to formally regulate fisheries pressures on biodiversity (including by use of an OECM) but not the pressures from other sectors, which have other regulatory authorities, often with overlapping but not identical memberships of Parties. Under the 1995 United Nations Fish Stocks Agreement (UNFSA), fisheries management measures, including for biodiversity protection, can be imposed by RFMOs on all fleets operating within the sea-area falling under their jurisdiction. Some Regional Sea Conventions can regulate specified sectors under their competence for their own Parties and have designated MPAs in areas beyond national jurisdiction. However, there is no comparable agreement to UNFSA that allows conservation measures to be simultaneously imposed on all operators by all Regional Seas Organisations, many of which have no mandate in Areas Beyond National Jurisdiction, for their regional high-seas MPAs. There could therefore be added value if the policy foundations, Criteria and guidance for OECMS and MPAs could enhance intersectoral cooperation and coordination in international waters.

Measuring Benefits

Another interpretational issue discussed in the application of the Guidance to the case studies was the measurement of the benefits to biodiversity. In the case of MPAs, good biodiversity/ecosystem assessments in theory should be central to their selection and design, but the biodiversity benefits of MPA designation are often largely assumed. For choice and design of fisheries measure, in contrast, good evidence of effective management (including control and enforcement) is a priority for all measures, and this facilitates consideration of spatial measures in OECM evaluations. This means evidence that a measure is effective in the removal/reduction of a pressure on the stock is usually good in fisheries, providing a sound evidence base for inference of enhanced protection of biodiversity. However, direct evidence of the impact that fishing pressure exerts on aspects of biodiversity other than the target stock(s) is variable and sometimes weak, and the evidence on subsequent recovery of ecosystems is often weaker yet. This is partly because much of the relevant biodiversity evidence is frequently generated incidentally by the fishing activity (e.g., through catch and bycatch monitoring). It is exactly that fishing activity which may be displaced by the very measures argued to make an area an OECM, removing therefore an important source of data. But, additionally, this simply reflects the current reality that fisheries management authorities typically focus resource investment in fisheries stock science and management, to secure direct social and economic benefits. However the resources available for detailed biodiversity/ecosystem assessments may be more variable, spread among diverse demands, and accountabilities for evidence of current or future status and trends of biodiversity features are not as clearly established. Tasking any single user sector, such as fisheries, with full responsibility for monitoring and assessing the status and trends of local or regional biodiversity (beyond the species and essential habitats they specifically impact) is widely resisted as unfair by fishery authorities, who argue costs related to broader biodiversity monitoring and assessment should be shared equitably among the number and diversity of users that can benefit directly from such information once it is available.

These are particularly challenging circumstances in less fully developed economies, where investments, both in the fishery resources and biodiversity features are even less available. The strategy of coordinating monitoring between even solely fisheries and biodiversity resources (not considering other user sectors) may also be more challenging in less developed economies, if much of the funding comes from supra-national donors, as is often the case with support for biodiversity monitoring. Overall, evidence for fisheries measures benefiting biodiversity may be extrapolated from other studies on the consequences of reduction or removal of fishing pressures. However, the extent of such extrapolations will always require case-specific interpretation, taking into account factors such as whether the evidence is that sources of direct damage, such as from bottom contact gear, are no longer ongoing, or simply that sources of potential mortality may have been displaced in space or time. However, it seems likely that there are potentially large increases in efficiency of evaluations, effectiveness of monitoring (and conservation measures), and credibility of outcomes, through finding opportunities for greater cross-sectoral cooperation. These opportunities could be manifested among fisheries, conservation sectors and, where relevant, other user sectors. Working together these sectors could generate complementary evidence to support assessments of both candidate and fully operating OECMs, not only in fisheries but in other user sectors, as well as the actual benefits arising from MPAs in the area where the information from such collective efforts is available.

OECMS and Marine Protected Areas

The discussions at WKTOPS exposed multiple aspects of considering the political context, overarching structure, Criteria and guidance for both OECMS and MPAs. As an example, VME closures and MPAs should not be double counted when reporting total coverage. Nevertheless, in some areas of an identified VME, protection provided by the legitimate fisheries administration may strongly overlap with MPA designations where the same fisheries VME protections may be

important (sometimes the only) measures to actually protect biodiversity within the MPA. Even if there is clear guidance on the factual question of how much area in total should be reported as receiving protection from a combination of MPAs and OECMs, there are implications for every user sector and conservation agency in these cases, as well as implications for any subsequent management changes within the areas so designated or identified. Because these implications are important to interpreting OECM status there is a need for serious exploration of the respective value-added for the OECM identification or MPA designation processes when potential areas may overlap.

Another difference between the OECMs and MPAs that would also benefit from explicit treatment in CBD Decisions and standards is that MPA designation is focused on first establishing the biodiversity value of an area. However, there is not a formal requirement for measures applied inside the area to be clearly identified or in place before designation. The identification of OECMs comes from the opposite direction, in that the area under consideration is delineated at the outset and the management measures inside it, typically, are already in place, with the possibility that they could be improved to strengthen the OECM case. The CBD Decision 14/8 focuses on assessment of the likely biodiversity consequences of these sectoral or cross-sectoral measures (even if the assessment does not require direct measurements) before the area is evaluated as an OECM. Of course, where States are identifying these areas, they are relatively free to interpret such guidance as they wish and can reduce the differences between OECM and MPA identification. Nevertheless, it would seem within the existing CBD frameworks that OECMs would nearly always have management structures and measures in an advanced state of implementation, whereas even after an MPA has been designated, the process of identifying and putting in place measures could stretch some years into the future.

This difference in the relative roles of evidence of biodiversity features (MPAs) and evidence of biodiversity benefits from implemented measures (OECMs) has significant implications for interpreting OECM status. The difference could be interpreted as calling for a higher 'bar for acceptance' to the benefits from biodiversity protection measures put in place by the economic sectoral managers than for acceptance of 'benefits' from simply the designation of an area as an MPA, even if the management plan for the MPA is in very early stages of development – a perception suggested at the workshop to already exist amongst some fisheries managers and experts. There is a contrasting concern amongst some others that loose interpretations of the OECMs definition, principles and Criteria could lead to lowering conservation standards and threaten the expected benefits from progress in area-based measures coverage. The establishment of poorly designed and enforced 'paper OECMs' could lead to: (i) a degradation of the quality of the conservation efforts (e.g., of conservation per unit-area) in Target 11, already significantly affected by 'paper parks'; (ii) a general risk (and a precedent) of weakening conservation standards as socio-economic and pressures from demand for ecosystem services (including food security) increase with demography and economic globalization; and (iii) a decrease of States' efforts towards increasing the coverage of strict MPAs (No-take-zones) in fisheries and MPAs networks. Ideally, to meaningfully achieve the overarching goals of the Aichi Biodiversity Targets, the evidentiary requirements for reporting both MPAs and OECMs against CBD targets should be consistent and equally rigorous in demonstrating accrued conservation benefit. Greater clarity of these issues of evidence and strength of management measures in place in CBD documents would increase consistency of interpretation and ease of dialogue among perspectives.

Noting the different processes behind the identification of OECMs and designations of MPAs, nevertheless Aichi Target 11 merely asked Parties to report just the total area under both OECMS and MPAs. Consequently, even if not explicitly intended, this results in reporting on Target 11 treating the value of each type of area in conserving biodiversity, when properly identified and managed, as additive and therefore interchangeable. At the least this can be interpreted as the

CBD expressing confidence that the aggregate protection offered to biodiversity through area-based measures, if soundly applied, is more important than the precise measures being used. It can additionally be interpreted as implying confidence that there is comparable strength of evidence for both the state of the biodiversity and intensity of the human pressures and impacts in the relevant areas.

Such equivalence will always be hard to demonstrate empirically, however, ensuring that the Criteria and guidelines encourage intersectoral cooperation to identify OECM - MPA connectivity would help move towards greater comparability of benefits, and would be an important Step towards harmonizing the measures across the governance participants and strengthening their network properties. The guidelines could help identify opportunities, from small tweaks in measures to full additional identifications and designations, which could improve the net effectiveness of a network of the different types of protection.

Collaboration and Trust

Following on from the above points on how the Criteria and Guidance can interact with policy objectives, a broader question is: How will the guidance for establishing OECMs create opportunities and trust for cross-sectoral cooperation, and avoid creating barriers to this - particularly when 'cross-sectoral' includes the agencies that manage MPAs in a region?

As discussed earlier, depending on perspective the objectives for creating OECMs can include simply more favourable reporting on progress towards Targets, maximising ecosystem benefits, determining combinations of OECMs and MPAs that can enhance levels of biodiversity protection, and improving representativeness, connectivity and complementarity to deliver broader system or network goals. These objectives also need to be looked at in light of simultaneously taking due consideration of social and economic objectives for the same areas and considering unavoidable trade-offs as well as potential for synergies. This again implies going beyond the Criteria to look at how guidance for each user sector, including fisheries, can enhance opportunities for both MPAs and OECMs to achieve multiple objectives.

A part of cooperation on common objectives in OECMs and MPAs could be in terms of maximising the opportunities for the expertise on management measures, control and enforcement on the fisheries side, and biodiversity and ecosystems monitoring and assessment on the conservation side to work effectively together rather than in an uncoordinated fashion or even in antagonistic ways. Such actions, including the development of common data systems and joint assessment groups, could help build the trust that is essential for intersectoral cooperation.

Next Steps

There are aspects of OECMs in marine waters that the workshop did not explore in detail. Some were simply reflective of Aichi Target 11 overall having a more terrestrial than an oceanic vision, and certainly terrestrial applications have received far more attention in implementation. Although some of the key case studies offered to the workshop to test the guidelines intentionally came out of regional fisheries management organisations operating in the high seas, WKTOPS did not explicitly discuss the general question of application of the OECM concept in areas beyond national jurisdiction and the challenges in identifying OECMs in such parts of the ocean (although the issue is addressed in many parts of the Garcia *et al.* (2020) Guidance Document). Instead, the workshop simply tested the OECM Guidance Documents with respect to the identification process in fisheries managed with measures designed by RFMOs or national jurisdictions. Neither did the workshop consider whether or how intergovernmental or other bodies, could identify OECMs. This has also been a question terrestrial sectors face with some important continental biodiversity features that would need national management authorities to cooperate internationally to realize benefits from their measures. Also, as summarized in other parts of this Section, there could be substantial improvements in the effectiveness of conducting evaluations

of OECMs, if there were greater clarity and specificity from the CBD with regard to how factors such as the intent of management measures, the explicitness of time horizons, interactions with other user sectors, and related considerations, should be treated in evaluations.

Communication on the WKTOPS findings would be boosted by the organization of side-events at important international meetings. The European Bureau for Conservation and Development (EBCD) and FEG who have been active in promoting communication between FAO, CBD, IUCN and ICES might help organize some collaborative presentations at the coming meetings.

Reference

Garcia, S.M., Rice, J., Charles, A., and 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 pp. https://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

8 WKTOPS Summary

WKTOPS met virtually on 15–24 March 2021, working approximately half the time in plenary and half in three subgroups. Each day had between 30 and 35 participants, with a mix of science experts with backgrounds in conservation biology and in fisheries, as well as experts with management and policy roles. This diversity of expertise and perspectives was maintained in subgroups as well as plenary sessions. Activities focused on evaluating six case studies with regard to possible OECM status, taking account of the language in both Aichi Biodiversity Target 11 and the CBD COP Decision 14/8 and with a regular cycle of in depth discussions in subgroups and reports out to plenary with more integrative discussions of progress and emergent insights.

The case studies were intentionally selected to include a diversity of sizes of areas, biodiversity features, fisheries, management measures and governance; a *Lophelia* reef in the Canadian Atlantic closed to trawl fishing, the sandeel fishery closure on the east coast of UK (both evaluated in Subgroup 1); a large area in the NAFO area where sponges occur that is closed to bottom trawling, and a large area in the Northeast Atlantic NEAFC area closed to trawl fisheries to prevent bycatches of juvenile haddock, (Subgroup 2); the Corner Rise Seamount in the Northwest Atlantic closed by NAFO to all bottom fishing, and the Lyme Bay mussel farm on the southern English coast (Subgroup 3). Information on all these case studies can be found in Section 4. The diversity of case studies and time for in-depth consideration of the OECM Criteria possible in this range of conditions was invaluable in the progress made in understanding the many aspects of OECM evaluations and the usefulness of the available guidance from in the Garcia *et al.* (2020) document.

The workshop was sponsored jointly by ICES and the IUCN/CEM/FEG, and with strong interest and input from both the wide expert community and relevant policy and management agencies including FAO, NEAFC, NAFO, GFCM, the EU Directorate-General for Maritime Affairs and Fisheries (DG Mare) and DG Environment, and national ministries, two IUCN Commissions (CEM and WCPA) and ENGOs. All perspectives concurred that the issue of OECM identification was of high and growing policy profile, and consistent interpretations of OECM status is important to the credibility and implementation of OECMs in contributing to global biodiversity targets and as a bridging tool between conservation biology and sectoral management. As a workshop, the Terms of References (Annex 2) were an important guide to discussion, but dialogue was inclusive of many considerations and perspectives, and the workshop agenda (Annex 3) was revised flexibly, to build on promising lines of discussion.

An important emergent message from the workshop is that evaluating areas as possible OECMs can be complex for three different types of reasons. The discussions leading to this message are reported in depth in Section 6, but are summarized as:

1. The biodiversity issues associated with the evaluations can be inherently complex and in a variety of possible ways. Illustrations of the underlying complexities are:

- Biodiversity features possibly benefitting from the fisheries measures may be so long-lived that demonstrating benefits from the fishery measures can take several decades, or so short-lived and intrinsically highly variable in status that even a 'healthy population' is going to vary greatly in abundance on decadal times scales, such that ensuring a consistent benefit might be very difficult;
- Fishery measures may be used in ways such that biodiversity benefits are produced, but only experienced by a specific type of biodiversity (e.g., protect one or few Endangered, Threatened, or Protected species), whereas fisheries measures also may be applied in

ways that produce more general but widespread benefits to biodiversity - or any set of consequences in between;
- Some benefits from fishery measures can be intentionally for –and targeted at– specific identified biodiversity features (e.g., avoidance of specific bycatch such as sharks or turtles), whereas other benefits, can be indirect via trophic pathways, or provision of habitat, even though those benefits were not initially identified and intended when the measure(s) were adopted.

2. The OECM evaluation must consider aspects of management and governance in addition to just the presence or absence of potential biodiversity features in the area, which are a focus of VME and EBSA evaluations. Illustrations of the complexities that can arise include:

- Fisheries may be just one of several current threats to biodiversity in an area. Regardless of how effective a management measure may be in controlling threats from the fishery sector, how other threats are managed (or not) should be taken into account in an OECM evaluation;
- Fishery management measures may have the delivery of specific or generic (unspecified) biodiversity outcomes as a core intent (objective), when adopted. Alternatively, such measures may not have been adopted with production of biodiversity benefits as an intent at all, but may nevertheless be found to produce benefits to biodiversity features other than solely the target species of the fishery;
- Fishery management measures generally have much greater flexibility in the processes needed to adopt or modify their application, when compared to establishing or modifying a marine protected area. This greater flexibility can be an asset in allowing management and governance to respond quickly to changing conditions, but can also be a liability if it results in frequent changes to the reliability or effectiveness of the measures in producing the identified biodiversity benefits;
- Aspects related to equity are not commonly considered in offshore, large-scale fisheries management (beyond dialogue among RFMO members) and may be challenging to evaluate, particularly for coastal areas, when a broader set of stakeholders needs to be considered.

3. Some aspects of Target 11 and the Annex III of CBD Decision 14/8 offer substantial breadth of interpretation when they are applied, making consistency within and across assessments hard to maintain, and sometimes making consensus in specific applications hard to achieve in expert groups where participants may have differing risk tolerances for various possible outcomes. Illustrations of these types of interpretational issues include:

- How much evidence is sufficient to support a decision on any specific criterion?
- How many Criteria and Sub-criteria have to be met for an area and measure to be considered an OECM?
- Are there specific Criteria and Sub-criteria that, if met, make an area highly appropriate to be considered an OECM even if other Criteria and Sub-criteria are met weakly or not at all, as long as they are not actively violated, and if so, which Criteria and Sub-criteria?

The workshop stressed that none of these complexities are necessarily encountered in an evaluation and would largely depend on the specific case of the OECM in question. This stresses the need to evaluate the OECMs on a case-by-case basis. It was found that the more complete and in-depth the advance preparations for an OECM evaluation, the more tractable any or all of these complexities would be in practice. The types of scientific data used in the standard assessments of harvested populations and biodiversity features by ICES, fisheries agencies at national or regional scales, and expert groups in biodiversity conservation are highly valuable and can serve as core of OECM evaluations. The workshop discussions were consistent with the view that credible evaluations might be conducted in less data-rich circumstances (e.g., using proxy data from

other regions, expert views, local knowledge, etc.). In all cases, it is important to make the best use possible of the best and most complete information available. What those 'best uses' and 'best and most complete information' may be is always going to be specific to the individual application.

This potential complexity of OECM evaluations highlights the value of guidance documents on OECM evaluations, and that there would be value in both the type of generic guidance provided in IUCN WCPA (2019) OECM and the more fishery-specific guidance provided in Garcia *et al.* (2020). Both types of guidance, when used with the CBD Decision itself, can help to both avoid some complexities through facilitating adequate preparation of appropriate information, and navigate through complexities when they cannot be avoided. Such guidance might be of even greater value when OECM evaluations are done for parts of the world's oceans which are less rich in scientific data and diversity of experts than the North Atlantic.

The workshop also stressed the need to develop a more specific guidance for the fisheries sector that helps interpret the CBD Criteria in the fisheries context. The workshop participants concurred that such guidance documents would be most useful if they included clear definitions of some of the terms used in the Criteria that could be defined in universally appropriate ways, and when single definitions were inappropriate to guide how interpretation can be done in ways that would be consistent with the CBD Decision (both across cases within a region and across regions for specific types of cases). Although the IUCN-WCPA (2019) guidance document was not considered in detail, the subgroups did make use of the Garcia *et al.* (2020) document in diverse ways and in different contexts. Several potential areas in which the latter could be strengthened were identified. This feedback is present more fully in Section 5 and Annex 13, but illustrations of such areas for greater clarity or specificity of guidance include:

- The need to fully mirror the CBD Criteria and provide essential definitions and interpretations to the CBD-used terminology in the fisheries context;
- The need to provide guidance on which Sub-criteria or indicators are essential for the area to meet, and guidance on how to judge when enough information is being provided.

In addition, the workshop concurred that the diversity of experts, and particularly the mix of science (and other knowledge systems) experts, managers, and policy makers was extremely valuable in both Subgroup and Plenary discussions, and should be encouraged in any OECM evaluation processes. A third point of concurrence was that evaluations of OECMs will always be case specific, not just with regards to the information available but in context of the measures, the fisheries and the biodiversity of the area. Therefore, generalizations about best practices, standards and benchmarks should be done with great care. Finally, a fourth point of concurrence was that the tasks for workshops like WKTOPS are not over, and a number of follow-up possibilities were identified. These are reported in Section 7.

References

Garcia, S.M., Rice, J., Charles, A., and 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 pp. https://ebcd.org/wp-content/uploads/2022/01/Garcia-et-al-2020-systematic-approach-identification-use-V9.pdf (Access date 2-5-2021).

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8.1 Lessons Learned. What could be done differently?

WKTOPS was the first regional workshop organized to test the usefulness and content provided in the Guidance Document. Given that the FAO and other organizations expect to host additional regional workshops aimed at helping countries go through OECM assessments and develop guidance to guide the assessment process, WKTOPS provided useful lessons learned about what worked well and did not work well for a workshop of this type.

Given the current circumstances of the COVID-19 pandemic, WKTOPS had to take place virtually. Regardless of this constraint, the workshop was successful in meeting most of its goals. Participants were able to identify factors that affect their collective ability to assess OECMs, determine which types of information have the highest value for this type of assessment, and provide feedback on the utility of and ways to improve the Guidance Document. The only WKTOPS goal that was not fully met was testing the details of the content of the Guidance Document. Ultimately, given the limited time available for discussion (a product of the diverse starting points of participants and the time needed for each to come to the same level of understanding, as opposed to the length of the workshop which 24 hours of discussions spread over 1.5 weeks), the participants were not able to take full advantage of the stepwise approach presented in the Guidance Document. Instead, each of the break-out groups focused on going through the criteria, Sub-criteria and indicators in order, as laid out in the pro forma. Participants noted that the Guidance Document was most useful as a preparatory document to help oneself prepare to conduct an assessment, but that in the context of a workshop, it had too much detail. Participants shied away from referring back to the document due to the limited time available. A suggestion from the participants was to reformat the structure of the Guidance Document as a preparatory document, and then to create a new guidance document that focused just on guiding someone through the actual assessment. Given its new mandate from the Committee on Fisheries, COFI 34, FAO will be taking the lead on developing this type of guidance and hosting additional regional workshops.

The use of case studies was very helpful to give participants real world examples of spatial measures that were managed through ABFM and shown in the workshop to provide biodiversity benefits. Workshop participants focused on applying the OECM Criteria to each of the six case studies used in the workshop. The resulting discussions were very helpful in identifying emerging issues, interpretation issues with the criteria, and areas where the Guidance Document either were extremely helpful or where there were gaps that would be helpful to fill.

At the start, some participants found that it wasn't perfectly clear whether the aim was to fill in the pro forma to assess the case studies as if we were the competent authority, the Criteria as case study experts, assess the specific Steps in the Guidance Document, the full Guidance Document, or all of the above, and it was difficult at times to do all of it with the time given and the online setting. A suggestion from the break-out group leads for future workshops was to spend more time at the beginning going over the instructions so that the discussions could be more focused. Also, it was clear that not all participants had been able to read the documents in advance of the meeting, which is also likely to arise in similar workshops going forward.

In an ideal world, future workshops would take place in person so that participants are able to work more closely together, get immediate responses to questions, and get into the workshop objectives. Such person-person meetings also facilitate coffee-break discussions and other unstructured communications between participants that was unfortunately lost in the online meeting format imposed by necessity on WKTOPS.

Annex 1: List of participants

Name	Institute/ Country	Email
Amber Himes-Cornell	FAO Fisheries and Aquaculture	amber.himescornell@fao.org
Andrew Kenny	CEFAS Lowestoft Laboratory, UK	andrew.kenny@cefas.co.uk
Anna Cheilari	European Commission, DG Environment	Anna.CHEILARI@ec.europa.eu
Daniela Diz	Heriot-Watt University, UK	D.Diz@hw.ac.uk
Darius Campbell	The North East Atlantic Fisheries Commission	darius@neafc.org
David Miller	International Council for the Exploration of the Sea	david.miller@ices.dk
Despina Symons Pirovolidou	European Bureau for Conservation and Development	Despina.SYMONS@ebcd.org
Dimitra Petza	University of the Aegean Department of Marine Sciences, Greece	d.petza@marine.aegean.gr
Dominic Pattinson	OSPAR Commission	dominic.pattinson@ospar.org
Elisabetta Betulla Morello	GFCM Secretariat of FAO	Elisabetta.Morello@fao.org
Ellen Kenchington (Chair)	Fisheries and Oceans Canada (Maritimes Region), Canada	ellen.kenchington@dfo-mpo.gc.ca
Emma Sheehan	University of Plymouth, School of Biological and Marine Sciences, UK	emma.sheehan@plymouth.ac.uk
Francis Neat	World Maritime University	fn@wmu.se
Harry Jonas	Future Law	harry@futurelaw.org
Helen Holah	Marine Scotland Science, UK	helen.holah@gov.scot
Imèn Meliane	World Commission on Protected Areas	imeliane@me.com
Jacopo Pasquero	European Bureau for Conservation and Development	Jacopo.Pasquero@ebcd.org
Jake C. Rice (Chair)	Fisheries and Oceans Canada (Emeritus), Canada	jake.rice@dfo-mpo.gc.ca
Jannica Haldin	Helsinki Commission (Baltic Marine Environment Protection Commission)	jannica.haldin@helcom.fi
Joseph Appiott	Secretariat of the Convention on Biological Diversity	joseph.appiott@cbd.int
Kenneth Patterson	European Commission Directorate-General for Maritime Affairs and Fisheries	Kenneth.Patterson@ec.europa.eu
Kim Friedman	FAO Fisheries and Aquaculture	Kim.Friedman@fao.org
Laurence Kell	SEA++ UK	laurie@seaplusplus.co.uk
Llucia Mascorda Cabre	University of Plymouth School of Marine Science and Engineering, UK	llucia.mascordacabre@plymouth.ac.uk
Mariano Koen-Alonso	Fisheries and Oceans Canada (NWAFC), Canada	Mariano.Koen-Alonso@dfo-mpo.gc.ca

Mark John Costello	Nord University, Norway IUCN WCPA	mark.j.costello@nord.no
Marty King	Fisheries and Oceans Canada (Maritimes Region), Canada	Marty.King@dfo-mpo.gc.ca
Mary Wisz	World Maritime University	msw@wmu.se
Mette Skern-Mauritzen	Institute of Marine Research, Norway	mette.mauritzen@hi.no
Oleg Rykov	Russian Fisheries	rusfishery@mail.ru
Peter Wright	Marine Scotland Science, UK	peter.wright@gov.scot
Sarah Dudas	Fisheries and Oceans Canada (Pacific Region), Canada	sarah.dudas@dfo-mpo.gc.ca
Sebastian Valanko	International Council for the Exploration of the Sea	sebastian.valanko@ices.dk
Serge Garcia	IUCN-CEM-FEG	grcsgm@gmail.com
Silvia Malagoli	University of Strathclyde Department of Mathematics and Statistics, UK	silvia.malagoli@kcl.ac.uk
Susanna Fuller	Oceans North, Canada	susannafuller@oceansnorth.ca
Tom Christensen	Aarhus University Department of Arctic Environment, Denmark	toch@bios.au.dk
Tony Charles	Saint Mary's University, Canada	tony.charles@smu.ca
Vedran Nikolic	European Commission, DG Environment	Vedran.NIKOLIC@ec.europa.eu
Victoria Sheppard	Pew Charitable Trusts Brussels Office	vsheppard@pewtrusts.org

Annex 2: Resolution

ICES/IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS)

2020/WK/HAPISG09 The ICES/IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS), chaired by Ellen Kenchington, Canada, and Jake Rice, Canada, will hold an online meeting on 15–24 March 2021 to:

a) Consolidate and test the available elements of the guidance in Garcia *et al.* (2020) on identification, use, and performance assessment of Other Effective Area-Based Conservation Measures (OECMs) for marine capture fisheries, drawing on case studies using Area-based Fisheries Management Measures (ABFMs), in line with the CBD Decisions and general guidance regarding Aichi Biodiversity Target 11.

b) Identify factors (e.g., data availability, knowledge gaps) that affect the ability of experts to evaluate areas against the four CBD OECM criteria, particularly Criterion C: Achieves sustained and effective contribution to *in situ* conservation of biodiversity, and Criterion D: Achieves associated ecosystem functions and services and upholds, where applicable, cultural, spiritual, socio-economic, and other locally relevant values.

c) Identify types of information of particular value for evaluation of areas against the CBD OECM criteria, in particular Criteria C and D noted above.

d) Provide expert feedback on the utility of the stepwise approach presented in Garcia *et al.* (2020) as a framework for determining whether ABFMs may qualify as OECMs.

WKTOPS will report by 15 May 2021 for the attention of ACOM and SCICOM.

Supporting information

Priority	A successful outcome of this workshop will be the operationalization of OECMs, an area-based management tool with potentially significant biodiversity benefits, taking examples from circum- North Atlantic/Mediterranean countries to a global setting. This workshop is considered a high priority as there is need to develop a systematic approach to the identification of OECMs prior to the next review of the CBD Aichi Biodiversity Targets and the UN SDGs in 2025 and 2030 respectively. The workshop fits within the ICES Science Plan – Conservation and Management Science, the goal of which is to develop tools, knowledge, and evidence for conservation and management — to provide more and better options to help managers set and meet objectives.
Scientific justification	There is considerable interest in the scientific community and among fisheries managers and policy-makers in exploring the extent to which ABFMs may contribute significantly enough to biodiversity conservation to be identified as OECMs, and included in States' reporting of their contribution to global biodiversity targets and Sustainable Development Goals (SDGs). Just as for other ABFMs, OECMs would be integrated in fisheries management plans, improving their likelihood to effectively generate the expected biodiversity benefits, reducing the risk of establishing 'paper OECMs', and ensuring regular review of their performance. Hence there is a growing demand to operationalize the identification of OECMs. The IUCN-CEM Fisheries Expert Group (FEG) has led the development a guidance document for evaluating areas against the OECM Criteria articulated in the CBD (CBD/COP/DEC/14/8/Annex III), to make the evaluation process efficient and scientifically sound, but the guidance has not been applied to actual cases that may be OECM candidates. This workshop will allow that guidance to be tested for clarity and efficacy of structuring the evaluation process and for the usefulness of the products in informing decisions of OECM eligibility of specific area-based fishery management measures. Preparation for the workshop

	A background document for the workshop has been prepared by the IUCN-CEM Fisheries Expert Group (FEG) entitled Systematic Approach to Identification, Use and Performance Assessment, of Other Effective Area-based Measures in Marine Capture Fisheries. Co-chairs from ICES (E. Kenchington) and the IUCN-CEM Fisheries Expert Group (FEG) (J. Rice) have been identified. A second background document outlining the objectives of the workshop has been drafted and will be used to create the workshop announcement webpage. We anticipate posting the announcement and making a call for nomination of participants by 16th November, including a call for candidate areas to evaluate; invitations will sent at the same time as the meeting announcement is posted. Selection of participants and areas to be evaluated will be completed by 20 December 2020. Participants will be notified of their acceptance and given access to the WKTOPS SharePoint where all background documents will be made available. Consolidation of information from the selected candidate areas by will be put onto the SharePoint 2 weeks before workshop at the latest, in order to be available for review by participants of the meeting. Expected outputs from the workshop The outcome of this workshop will be an ICES Scientific Report which will address ToR a-d and elaborate on: (i) the eligibility of each selected area as an OECM; (ii) the properties of the biodiversity, fishery, and/or management procedures that were influential in the evaluation of eligibility (iii) the factors that were influential in each Step of the identification, including data and scientific capacity available (iv) the effectiveness of the guidance in the Background document in structuring the evaluation, (v) the usefulness of the stepwise approach in the guidance document in evaluating the area relative to the OECM Criteria and Additional Considerations.
Resource requirements	All the preparatory work will be developed by web conferences.
Participants	Up to 30 participants, including 1-2 invited experts (TBD), 2 co-chairs
Secretariat facilities	None
Financial	No financial implications
Linkages to advisory committees	ACOM
Linkages to other committees or groups	SCICOM, HAPISG, EPDSG, IEASG; we anticipate strong interest from WGBIODIV, WGMPCZM, WGDEC, and linkages with WGECO and WGCERP.
Linkages to other organizations	NEAFC, NAFO, GFCM, CBD, FAO, OSPAR, DGMARE

Annex 3: Agenda

ICES/IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS)

Dates: 15-24 March 2021
Venue: Online meeting

Chairs: Ellen L. Kenchington, Canada, and Jake C. Rice, Canada
Professional officer: Sebastian Valanko, ICES, and David Miller, ICES
Supporting officer: Maria Lifentseva, ICES

Monday, 15 March 2021

	Set-up	
1240	WebEx Meeting Open [all participants to familiarize themselves with platform and check their audio and video links]	
	Opening Remarks	
1300 CET	Opening of Workshop and Welcome	Ellen Kenchington/Jake Rice
1305	Welcome, Advisory Committee (ACOM) Chair	Mark Dickey-Collas
1310	Roundtable Introductions/Conflict of Interest	All
1430	*10 min health break*	
1440	Introduction to ICES	Sebastian Valanko/David Miller
1500	Background and goals of the workshop	Serge Garcia (IUCN-FEG)
	Getting Started	
1545	Workshop Procedural Plan/ToR	Ellen Kenchington
1600	Close of Day 1	
1600-1630	Ice-breaker online Chat	All

Tuesday, 16 March 2021

	Plenary Session	
1300	Introduction to Break-out Groups and case studies	Jake Rice
	Break-out Group Tasks	
1330	Break-out sessions with group members: Review of Pro forma and Step Assessment Templates; Provision of Basic Descriptive Information to Template; Review of ToRs	
1450	*10 min health break*	

Plenary Session

1500 Round table from Break-out Group Leaders on Progress; Documentation of Suggested Changes to Pro forma/Step Assessment Based on Experience

1600 Close of Day 2

Wednesday, 17 March 2021

Break-out Group Tasks

1300 Break-out sessions with group members: Continued work on Descriptive Information; Assessment of Criteria A, B for each case study (Management focus criteria); Discuss Suggested Changes to Pro forma/Assessment

1500 15 min health break

Plenary Session

1515 Round table from Break-out Group Leaders; Review of Assessment of Criteria A and B; Documentation of Suggested Changes to Pro forma/Assessment; Consolidate Responses

1600 Close of Day 3

Thursday, 18 March 2021

Break-out Group Tasks

1300 Break-out sessions with group members: Review of Assessment of Criterion C (Biodiversity conservation outcomes) for each case study; And D (Ecosystem functions and services, and values) and 'Other Criteria' for each case study Discuss Suggested Changes to Pro forma/Assessment

1500 15 min health break

Plenary Session

1515 Round table from Break-out Group Leaders on Progress; Review of Assessment of Criterion C; and D Documentation of Suggested Changes to Pro forma/Step Assessment; Consolidate Responses and Discuss Workplan for Friday

1600 Close of Day 4

Friday, 19 March 2021

Break-out Group Tasks

1300 Wrap up of the review of Criteria and completion of report templates for each case study: Document details of experiences, conclusions and lessons learned regarding what properties were influential and what information was important in applying the Criteria to each case study. Results of evaluations will be presented Tuesday.

1450 10 min health break

Plenary Session

1500 Presentation of Draft Report and discuss content and structure (Ellen Kenchington)

1530 Emergent topics arising from the sub-group discussions and use of the Guidance Document (Jake Rice)

Assignment of tasks. Plans for next week and wind up.

1700 Close of Day 5

Monday, 22 March 2021

Break-out Group Tasks

1300 Break-out sessions with group members: Draft writing on each of the emergent topics for distribution Tuesday

1450 10 min health break

Plenary Session

1500 How do we package the information provided in the evaluation template in preparation for work on Tuesday?

1530 Discussion of any problems or concerns with process and plans

1600 Close of Day 6

Tuesday, 23 March 2021

Break-out Group Tasks

1300 Break-out sessions with group members: *How do we package the results of the evaluation of each case study into a report out?* Prepare 2-3 Powerpoint slides outlining what was concluded and the rationale behind the conclusions. Discussion of Writing Tasks and Report Sections; Discussion of main features from evaluations.

1430 10 min health break

Plenary Session

1440 Presentations of the PowerPoint slides prepared on packaging the results.

Discuss impressions of how the different groups came up with their different views

1540 Brief presentations (5 min) of main features from the Guideline Evaluation Template from each Subgroup for each case study

1600 Close of Day 7/ Steering Committee Meeting (1 hour)

Wednesday, 24 March 2021

Plenary Session

1200 Discussion of text on synthesis messages and agreement on the key points for the report

13:30	*Health Break*
13:40	Review text for ToR for Report and agree to remaining writing tasks and timelines
	Future Considerations
	Discussion of lessons learned from all participants about the workshop structure
	Wrap-up
1500	Close of Meeting

Supplementary Meeting of WKTOPS

Thursday, 29 April 2021

Plenary Session

1300-1600	Review of draft report

Annex 4: Information on Case Study Areas Collected in Advance of the Workshop

In every case we need to use the best information available, however much or little that is, and information on several aspects of the area and measure being reviewed. Note that in all cases it is expected that scientific studies and documentation of management measures will comprise much of the information base, but evidence from other knowledge systems (indigenous knowledge, knowledge of local communities etc.) is welcome.

The bio-ecological context for the area-based measure. This would include, as available:

- Studies describing the known biodiversity attributes of the area, including listed species, key biodiversity areas, areas providing key ecosystem functions etc.;
- Studies describing the known or reasonably foreseeable pressures and threats on the biodiversity features;
- Assessments of the stocks that are managed under the Plan containing the area based measure;
- Assessments or other comparable efforts to evaluate and track the status of the biodiversity feature(s) – either or both species and habitat features - expected to benefit from the area-based measure;
- Integrated ecosystems assessments or comparable efforts to describe the larger ecosystem setting in which the measure is applied;
- Studies and reports used as a basis for inferring the area-based measure would be appropriate for the particular fishery and biodiversity features(s) expected to benefit from the measure;
- Any other such reports as are considered informative for the workshop.

Properties of the measure itself, these could include:

- The Fishery Management Plan itself, with the area-based measure highlighted, but showing all the measures included in the Fisheries Management Plan;
- Some record of for how long and over what spatial extent the measure has been in place, including times when any noteworthy adjustments were made to the measure;
- Any Harvest Control Rule or other pre-specified decision process that would trigger when and how the measure would be applied;
- Any documents describing monitoring systems in place to inform management on the effectiveness of measures with respect to biodiversity;
- Any follow-up studies after the measure(s) was first implemented, that evaluated performance of the measure relative to the target species, the biodiversity features(s) of interest, and the fisheries affected by the area-based measure(s).

Properties of the fisheries to which the area-based management applies, including:

- Vessel sizes and national or other affiliations of the fleets affected by the area-based measure;
- Gear(s) used by those fleets, and any changes to gears that are considered to be linked to the area-based measures;
- Area(s) and season(s) where the fleet operates, and how the measure might interact with the areas and seasons of operation;
- Typical target species and major bycatch species (if any) for the fisheries, and if either target species or bycatches differ between times or areas where the area-based measure is in force and when or where it is not in force;

- Any other aspect of the fisheries considered relevant to the workshop discussions.

Aspects of the governance processes of Management Authority:

- Any publically available record of the meeting(s) where the measure was presented, debated by participants in the formal consultation, and decision process and adoption;
- Any publically available records of any subsequent meetings where the performance of the measure was reviewed and discussed;
- Any publically available documents that are relevant to evaluating the prospect for the measure to remain in place for the longer-term, and/or factors that might lead to reconsidering maintaining the measure;

Other such information as the Management Jurisdiction thinks relevant to the workshop.

Annex 5: Mock OECM Pro Forma

MOCK Pro Forma Template for Scientific and Other Information to Evaluate Area-based fisheries management measures (ABFMs) as Potential Other Effective Area-based Conservation Measures (OECMs)

Title/Name of the area:

Prepared by (names, affiliations, title, contact details):

Institution(s) in charge of assessing OECMs (names, affiliations, title, contact details):

Abstract (In less than 200 words)

Location

(*Indicate the geographic location of the area, including co-ordinates if available. This should include a location map to be added to the 'Maps, Figures and Tables' section. It should state if the area is within or outside national jurisdiction, or straddling both.*)

Description of the proposed area

(*Identification of other effective area-based conservation measures should, to the extent possible, document the known biodiversity attributes (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), 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.*)

Identify pressures and threats on biodiversity

(*Inventory of known or reasonably foreseeable pressures and threats on biodiversity features, their nature, scale and source, and the range of societal and ecological values attached to the components.*)

Data and information available on the fisheries and the ecosystem

(*Describe the available data sources, e.g., distribution maps; 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 features of concern; ecosystem services (including food and livelihoods) and other relevant values affecting conservation; possible threats and pressures; existing MPAs (networks, seascapes) and other conservation measures. Provide details of the sources in the 'Relevant Databases' section.*)

Assessment of the area against CBD Criteria

(Discuss the area in relation to each of the CBD Criteria and relate the best available science. Please note where there are significant information gaps)

CBD Criteria **CBD/COP/DEC/14/8**	**Description** (Annex III.B to Decision 14/8)	**Ranking of criterion relevance** (Please mark one column with an X)		
		No information	**True**	**False**
Criterion A: Area is not currently recognized as a protected area				
A. Not a protected area	The area is not currently recognized or reported as a protected area [MPA] or part of a protected area [MPA]; it may have been established for another function.			
Explanation for ranking (Criterion (A) is absolute and, if not met, it is enough to disqualify the area.)				
Criterion B: Area is governed and managed				
B.1. Geographically defined space	Size and area are described, including in three dimensions where necessary.			
	Boundaries are geographically delineated.			
Provide details of the location				
B.2. Legitimate governance authorities	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.			

Explanation for rankings (Detail the Legitimate Authorities responsible for implementing the area-based management measure(s); Explain how the identified body has competence for management of threats to biodiversity within the area by detailing those threats)				
B.3. Managed	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.			
Explanation for rankings (Provide details for each element, citing relevant sources)				
Criterion C: Achieves sustained and effective contribution to *in situ* conservation of biodiversity *(Produces long-term* in situ *biodiversity conservation outcomes)*				
C.1. Effective	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.			
Explanation for rankings (Provide details for each element, citing relevant sources)				

C.2. Sustained over-long-term	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.			
Explanation for ranking (Detail the time frame(s) for the management measures)				
C.3. *In situ* conservation of biological diversity	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).			
Explanation for ranking				
C.4. Information and monitoring	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.			
	A monitoring system informs management on the effectiveness of measures with respect to biodiversity, including the health of ecosystems.			
	Processes should be in place to evaluate the effectiveness of governance and management, including with respect to equity.			
	General data of the area such as boundaries, aim and governance are available information.			

Explanation for rankings and details of monitoring systems (Identifying the methodologies that might be used for these assessments)				
Criterion D: Associated ecosystem functions and services and cultural, spiritual, socio-economic and other locally relevant values (*Maintains ecosystem functions and services, and upholds locally relevant values*)				
D.1. Ecosystem functions and services	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.			
	Management to enhance one particular ecosystem function or service does not impact negatively on the sites overall biological diversity information.			
Explanation for rankings				
D.2. Cultural, spiritual, socioeconomic and other locally relevant values	Governance and management measures identify, respect and uphold the cultural, spiritual, socioeconomic, and other locally relevant values of the area, where such values exist.			
	Governance and management measures respect and uphold the knowledge, practices and institutions that are fundamental for the *in situ* conservation of biodiversity.			
Explanation for rankings (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).				

Assessing additional OECM properties (Optional)

Other Criteria	**Description**	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Medium**	**High**
Add relevant criteria					
Explanation for ranking and details of the criteria					

References

(e.g., relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to relevant audio/visual material, video, models, etc.)

Relevant Databases

Maps, Figures and Tables

Rights and permissions

(Indicate if there are any known issues with giving permission to share or publish these data and what any conditions of publication might be; provide contact details for a contact person for this issue)

Annex 6: Evaluation Template

Template for Comments on the Performance of the Stepwise Approach of the Garcia *et al.* (2020) Document in helping the WKTOPS Break-out Group Discussions and Decisions

Case Study being evaluated: **Criteria and Step(s) being evaluated:**

Break-out Group Instructions: After reviewing the Mock Pro Forma Template and the Garcia *et al.* (2020) Guidance Document complete this document for each case study and considering all of the Criteria A, B, C, D and 'Other' by selecting the response that *best characterizes the group discussions* and providing a narrative explaining the choice and any suggestions for improvements to the guidance. Note that there are 4 questions for each Criterion and responses cross over the pages with a final open opportunity to provide feedback:

1. ***Were the proposed Steps explained clearly enough that they were understood by all participants?***

Response	**Tick One Box**
There was substantial confusion about the intent of the proposed Steps (why is this Step necessary to evaluate areas on the Criterion?).	
The intent of the Steps was clear only to those with substantial background in identification of OECMs and similar areas of priority for enhanced risk aversion in management of threats.	
The intent of the Steps was clear only to those with substantial background in the use for area-based fisheries management measures.	
The intent of the Steps was clear to all participants.	

Provide a narrative explaining your choice and suggesting improvements to the guidance.

2. ***Were the proposed Steps helpful in the application of the Criteria to the cases under study?***

Response	**Tick One Box**
The Steps actually impeded application of the Criteria, by leading the efforts into time-consuming actions or discussion that did not help with the evaluation.	
The Steps did guide the application of the Criteria along appropriate pathways, but required more time than would have been needed to complete the task to a comparable level of rigour following other approaches.	

The Steps did guide the application of the Criteria along appropriate pathways, but weren't necessary because the pathway was obvious even if the Steps had not been provided.	
The Steps did guide the application of the Criteria along appropriate pathways, and was of some help because even though the general pathway was apparent, the Steps prompted valuable discussion of the information available, so there is greater confidence in the conclusions drawn.	
The Steps did guide the application of the Criteria along appropriate pathways, and were of substantial value because they led efforts and discussion down an efficient pathway for application of the Criterion that otherwise was not readily apparent to all participants.	
The Steps guided the application of the Criteria along appropriate pathways, and were of great value because without their guidance no efficient pathway for application of the Criterion was readily apparent to any participant.	

Provide a narrative explaining your choice and suggesting improvements to the guidance.

3. ***Was application of the proposed Steps affected by the quantity and quality of information that was available for application of the criteria?***

Response	**Tick One Box**
The Steps were impossible to apply because even their minimal application demanded so much information that they could not be followed.	
The Steps were possible to apply, but they did not encourage use of at least some of the types of information that was available, so progress required deviation from the Steps to use all relevant information.	
The Steps were possible to apply, but their application was difficult because little information relevant to the Criteria was available.	
The Steps were possible to apply, but their application was difficult because the available information relevant to the Criteria was generally highly uncertain or otherwise of low quality.	
The Steps were possible to apply, but their application was difficult because there was substantial information available and following the stepwise approach fully meant efforts or discussion often bogged down in unnecessary detail.	
The Steps were possible to apply, and application used the available information effectively.	

Provide a narrative explaining your choice and suggesting improvements to the guidance.

4. ***Did application of the proposed Steps bias the effort and discussion of the available information relative to the Criteria?***

Response	**Tick One Box**
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information so strongly that the outcome of the discussion was considered predetermined by the proposed stepwise approach.	
Some participants in the subgroup felt that the Steps favoured certain kinds of information or uses of the information sufficiently strongly that the outcome of the discussion was largely predetermined by the Steps followed and not the information available.	
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. Participants agreed that had the Steps not been followed an outcome that made more balanced used of all the information would have resulted.	
Some participants of subgroup felt that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. However other participants agreed that following the Steps resulted in an outcome that made balanced used of all available the information.	
The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available. However the uses of the information was sufficiently obvious to all subgroup members that a similar outcome would probably have been reached without guidance on how to use the available information.	
The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available, and might have helped the discussion reach a more balanced outcome than would have been reached without guidance on how to use the available information.	

Provide a narrative explaining your choice and suggesting improvements to the guidance.

Any other comments not captured in the above

Annex 7: Mock Pro Forma North East UK Sandeel Closed Area

MOCK Pro Forma Template for Scientific and Other Information

to Evaluate Area-based fisheries management measures (ABFMs) as Potential Other Effective Area-based Conservation Measures (OECMs)

Title/Name of the area: North East UK Sandeel Closed Area

Prepared by (*names, affiliations, title, contact details)***:**

Peter Wright, Marine Scotland Science, Head of Ecology and Conservation Group, Peter.Wright@gov.scot, and sub-group 1

Institution(s) in charge of assessing OECMs (*names, affiliations, title, contact details)***:**

ICES, Copenhagen Denmark; Marine Scotland Science, Aberdeen, Scotland, UK; National Technical University, DTU-Aqua, Copenhagen, Denmark; Centre of Hydrology and Ecology, Edinburgh, Scotland, UK

Abstract (*In less than 200 words*)

Due to their importance in North Sea food webs, ICES has advised management to ensure that sandeel (primarily *Ammodytes marinus*) abundance be maintained high enough to provide food for predators. Following a UK call for a moratorium on sandeel fishing adjacent to seabird colonies along the north east UK, the EU, with advice from ICES (ICES, 1999), closed an area of ~20000 km^2. The European Council Regulation (Article 29a from Council Regulation No 850/98 Annex EC) was applied under technical measures for the protection of juveniles of marine organisms although the primary purpose of the closure was intended to benefit sandeel reliant predators by avoiding a localised depletion of this fish species. This precautionary closure began in 2000 and was formally reviewed in 2001, 2002 and 2007 (see STECF, 2007). In all these reviews and subsequent studies of the impact of the fishery on sensitive seabirds, notably kittiwakes (Daunt *et al.*, 2008), the original concern over a possible local impact of sandeel fishing expressed in 1999 did not fundamentally change. Following the exit of the UK from the European Union in 2021 the closure has been retained under UK legislation.

Location

*(Indicate the geographic location of the area, including co-ordinates if available. This should include a location map to be added to the '*Maps, Figures and Tables*' section. It should state if the area is within or outside national jurisdiction, or straddling both.)*

The geographical area bounded by the east coast of England and Scotland, and enclosed by sequentially joining with rhumb lines the following coordinates, which shall be measured according to the WGS84 system:

— the east coast of England at latitude 55°30′ N,
— latitude 55°30′ N, longitude 01°00′ W,
— latitude 58°00′ N, longitude 01°00′ W,
— latitude 58°00′ N, longitude 02°00′ W.

Fishing for sandeel using a towed gear with a mesh size of less than 32 mm within the geographical area referred to in the first subparagraph shall be prohibited. Fisheries for scientific investigation shall be allowed in order to monitor the sandeel stock in the area and the effects of the closure.

This area was within EU waters until 2021 when it is now solely within UK jurisdiction. When the closure was implemented it was in the North Sea stock area. Since 2011 it has been in Sandeel Area 4 following the ICES (2010) benchmark. The closure encompasses a number of sandeel banks, the major of these being Wee Bankie, Marr and Berwick Banks.

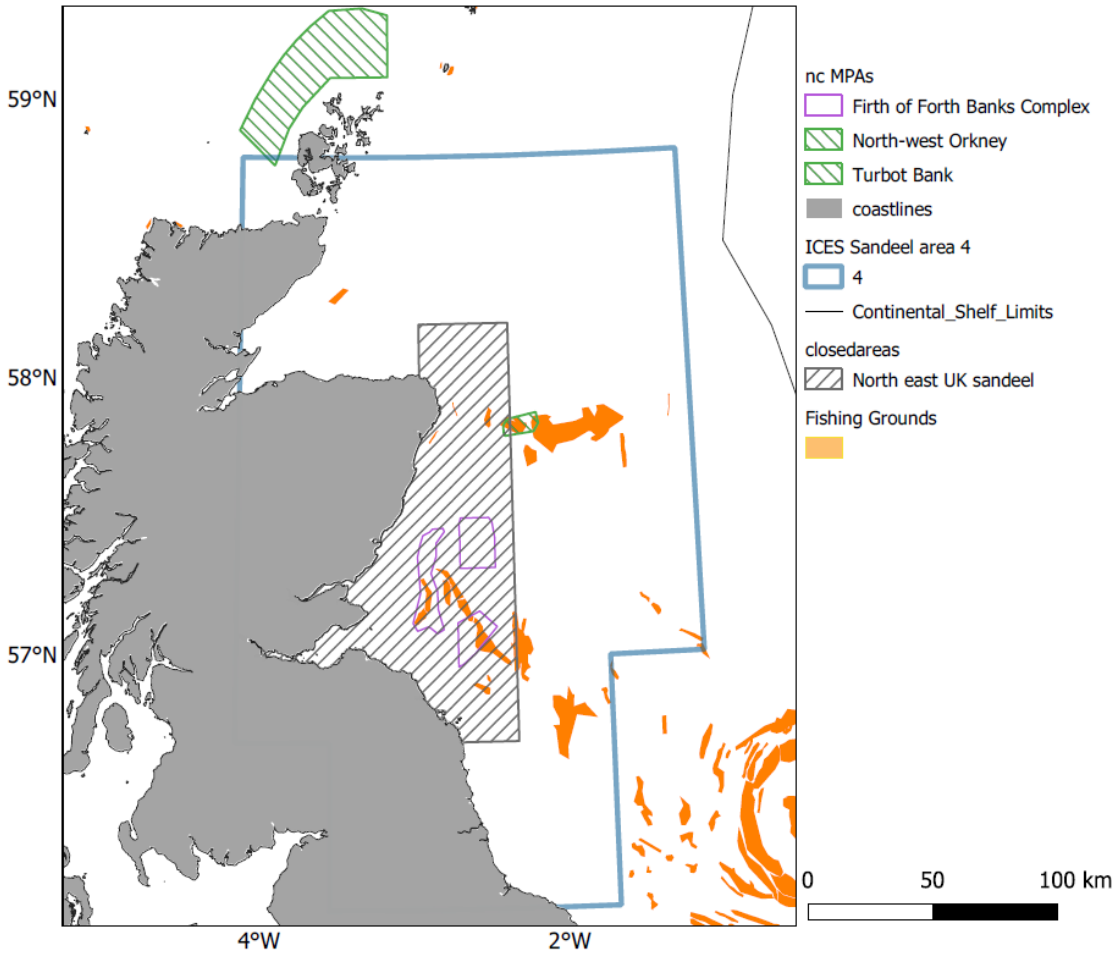

Figure 1. Chart showing the North east closed area within SA4. Nature conservation MPAs for sandeels also shown and fishing grounds from Jensen *et al.* (2011).

Description of the proposed area

(Identification of other effective area-based conservation measures should, to the extent possible, document the known biodiversity attributes (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), 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.)

While this is a fishery measure the intended purpose of the closed area was to benefit sandeel-reliant predators. Sandeels (primarily *Ammodytes marinus*) are the key forage fish for many seabirds (Wanless *et al.*, 2018), some of whom are reliant on this species to feed their chicks. Sandeels are also important prey for seals, porpoises, dolphins and demersal and pelagic fish species. The high sensitivity of kittiwake breeding success to the availability of high numbers of sandeels within their foraging range has been demonstrated here and elsewhere and a decline in breeding success of this species was associated with the development of a sandeel fishery off the north east UK coast in the 1990s (Rindorf *et al.*, 2000; Daunt *et al.*, 2008).

Identify pressures and threats on biodiversity

(Inventory of known or reasonably foreseeable pressures and threats on biodiversity features, their nature, scale and source, and the range of societal and ecological values attached to the components.)

Targeted fisheries are the main human pressure for sandeels. While the fishery has been displaced from the closed area it has operated close to the closure and so while localised fishery depletion in the vicinity of seabird colonies has stopped, fishing still effects the population dynamics of the population component. Since 2017, ICES fishery advice is intended to ensure that fishing mortality does not reduce the spawning stock biomass of SA4 to below Bpa (ICES, 2020). Scallop dredging can lead to mortality of sandeels but there is relatively little activity over most of the sand banks that sandeels inhabit. Potential threats to sandeels include the construction and local benthic changes arising from static marine wind turbines but no detected change was found at the Horns reef development off Jutland (van Deurs *et al.*, 2012). However, these structures are a concern for seabirds and potential impacts on kittiwakes is the topic for ongoing research. Recovery of fish predators, such as mackerel in the North Sea might also potentially effect the benefit of the closure. Due to the fact that sandeels don't migrate they are very sensitive to adverse environmental conditions and changes in the timing of sandeel larval prey and temperature dependent development rate has led to large inter-annual variation in recruitment.

Data and information available on the fisheries and the ecosystem

(Describe the available data sources, e.g., distribution maps; 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 features of concern; ecosystem services (including food and livelihoods) and other relevant values affecting conservation; possible threats and pressures; existing MPAs (networks, seascapes) and other conservation measures. Provide details of the sources in the 'Relevant Databases' section)

Figure 1 shows the distribution of fishing grounds, derived from a collaboration with the Danish sandeel fishery (Jensen *et al.*, 2011). Information on the fishery is available from ICES Herring Assessment working group (sandeel) reports (ICES, 2020).

Assessment of the area against CBD Criteria

(Discuss the area in relation to each of the CBD Criteria and relate the best available science. Please note where there are significant information gaps)

CBD Criteria **CBD/COP/DEC/14/8**	**Description** (Annex III.B to Decision 14/8)	**Ranking of criterion relevance** (please mark one column with an X)		
		No information	**True**	**False**
Criterion A: Area is not currently recognized as a protected area				
A. Not a protected area	The area is not currently recognized or reported as a protected area [MPA] or part of a protected area [MPA]; it may have been established for another function.		X	
Explanation for ranking (Criterion (A) is absolute and, if not met, it is enough to disqualify the area.) The closed area was established under fishery technical measures and the area is not reported on to WCMC protected planet database and is not included in reporting to Target 11. Part of the closed area overlaps with a ncMPA established in 2014 and so this area of overlap cannot be reported on for an OECM.				
Criterion B: Area is governed and managed				
B.1. Geographically defined space	Size and area are described, including in three dimensions where necessary.		X	
	Boundaries are geographically delineated.		X	
Provide details of the location Details of the boundaries are given above. Only sandeel fishing is limited, so only the bottom and associated depth fished by the high headline gear are included. See information in location section.				
B.2. Legitimate governance authorities	Governance has Legitimate Authority and is appropriate for achieving *in situ*conservation of biodiversity within the area.		X	
	Governance by indigenous peoples and local communities is self-identified in accordance with national legislation and applicable international obligations.		X	
	Governance reflects the equity considerations adopted in the Convention.		X	

	Governance may be by a single authority and/or organization or through collaboration among relevant authorities and provides the ability to address threats collectively.		X	
Explanation for rankings (Detail the Legitimate Authorities responsible for implementing the area-based management measure(s); Explain how the identified body has competence for management of threats to biodiversity within the area by detailing those threats) The closed area was implemented by the European Commission following advice sought from ICES and reviewed by STECF. The governance has now been transferred to the UK following BREXIT. Local communities and ENGOs in the UK were consulted and supported the closure. Industry officials from the affected fishery were involved in the process and have supported the monitoring fishery. Authorities in terms of the EC and now UK, have all the relevant information needed to consider the equity aspects of governance, including the relative costs and benefits.				
B.3. Managed	Managed in ways that achieve positive and sustained outcomes for the conservation of biological diversity.		X	
	Relevant authorities and stakeholders are identified and involved in management.		X	
	A management system is in place that contributes to sustaining the *in situ* conservation of biodiversity.		X	
	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.		[X]	
Explanation for rankings (Provide details for each element, citing relevant sources) The closure has been found to decrease the mortality of age 1+ sandeels, which are prey to adult kittiwakes and many others (STECF, 2007). The proposed kittiwake breeding success Criteria were more regularly achieved following the closure (Daunt *et al.*, 2008). ICES has been the main authority for advice on the closure which has been discussed with stakeholders as part of the sandeel fishery benchmark process. The closed area includes a significant potential source spawning aggregations for other parts of SA4 and a large fishery operated in 2003 at the southern boundary of the closure which might suggest a spillover effect. Together with other ncMPAs designated for sandeels, in both SA4 and further north there has been an attempt to promote network/system effects for this species. This was informed by an extensive biophysical modelling and otolith microchemistry analysis of connectivity among sand banks (Proctor *et al.*, 1998; Wright *et al.*, 2018; 2019). There was general agreement about the biodiversity importance of the area being protected by the ICES (1999) group set-up to consider the rationale for the closure. This emphasized the				

regions importance to breeding seabirds and particularly black legged kittiwakes. While other pressures such as existing dredging were considered by the group there is no evidence that the cessation of sandeel fishing has benefitted another type of fishery. Management is aware of possible threat of renewable developments on the prime species benefitting from the measure. Due to the functional importance of sandeels, they have been made a priority marine feature in Scottish waters and they are the key feature of a number of ncMPAs reported to OSPAR.

Criterion C: Achieves sustained and effective contribution to *in situ* conservation of biodiversity *(Produces long-term* in situ *biodiversity conservation outcomes)*

C.1. Effective	The area achieves, or is expected to achieve, positive and sustained outcomes for the *in situ* conservation of biodiversity.		[X]	
	Threats, existing or reasonably anticipated ones are addressed effectively by preventing, significantly reducing or eliminating them, and by restoring degraded ecosystems.		[X]	Not yet clear
	Mechanisms, such as policy frameworks and regulations, are in place to recognize and respond to new threats.		X	
	To the extent relevant and possible, management inside and outside the other effective area-based conservation measure is integrated.			?

Explanation for rankings (Provide details for each element, citing relevant sources)

C.1.a Monitoring demonstrated reduced sandeel mortality and higher breeding success in kittiwakes (Wright *et al.*, 2002; Daunt *et al.*, 2008; Greenstreet *et al.*, 2010).

C.1.2 The group discussed other activities allowed within the closed area such as scallop dredging that affect biodiversity. Removal of sandeel fishing is unlikely to benefit any other fishery, although further investigation would be warranted. There has been no other increase in human based mortality on sandeel grounds. Licensed marine renewable developments have little overlap with sandeel habitat and none of the fished grounds. However, renewable turbines are a recognized threat to the key predator species identified in the closure, highlighting the need for consideration as to whether this new threat will negate the benefits of the closure.

C.1.3 Licensing of activities do consider sandeel aggregations within this area.

C.1.4 ICES advice on TACs for SA4 currently does not account for closed area and so possibility of localised depletion of banks outside the area may need further exploration.

General note: The closure only affects one specific type of fishing and the benefit is just intended to support predators in the region, of which kittiwakes appear to be the most reliant and sensitive to sandeel abundance. Further work might be needed to review other effects on biodiversity value, although there are many sources of data available including the ICES NS-IBTS.

C.2. Sustained over-long-term	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.		X	
Explanation for ranking (Detail the time frame(s) for the management measures) Closed area came into force in 2000 under EU and now in UK legislation. Due to the nature of legislation it is possible that the closed area could be removed relatively quickly but UK (including Scottish Government) fisheries management advice in 2020 has highlighted the importance of maintaining the functional role of sandeels in ecosystems.				
C.3. *In situ* conservation of biological diversity	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).		X	
Explanation for ranking Closure is to reduce mortality of a critical forage fish – notably for central placed foragers. The fishery closure is not likely to have other significant impacts such as reducing benthic pressure as the bycatch is typically small.				
C.4. Information and monitoring	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.		X	
	A monitoring system informs management on the effectiveness of measures with respect to biodiversity, including the health of ecosystems.		X	
	Processes should be in place to evaluate the effectiveness of governance an management, including with respect to equity.		X	
	General data of the area such as boundaries, aim and governance are		X	

	available information.			
Explanation for rankings and details of monitoring systems (Identifying the methodologies that might be used for these assessments) The closed area focussed on sandeel reliant predators with a focus on seabirds and this was documented in the rationale document for the closure (ICES 1999). This closed area provides an example of good practice in the clarity of the rationale, goals and monitoring which is unusual for fishery closed areas (STECF, 2007) and some MPAs. Relevant research based information was collected in the few years prior to the closure and continued annually. The ICES (1999) group also highlighted the need to maintain a commercial CPUE time-series for vessels with a track record and this commercial monitoring continued to at least 2005 and was reported to STECF (2007). Reviews have been conducted for reporting to the European Commission and publication in the scientific literature. Information on the boundaries, aims and governance are given in the EC reviews of the closed area.				
Criterion D: Associated ecosystem functions and services and cultural, spiritual, socio-economic and other locally relevant values (*Maintains ecosystem functions and services, and upholds locally relevant values*)				
D.1. Ecosystem functions and services	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.		X	
	Management to enhance one particular ecosystem function or service does not impact negatively on the sites overall biological diversity information.		[X]	
Explanation for rankings 1.1 This criterion requires further information on the ecosystem service of the benefit of reducing pressure on sandeels. However, there is substantial evidence about wasp-waist food webs and the role sandeels play. There is also diet information that has been used to estimate predator consumption of sandeel in the northern North Sea from the ICES multi-species WG. There have been socio-economic studies into the benefit of wildlife tourism and seabirds in particular. The economic costs of the initial closure to sandeel fisheries could be estimated, although it should be noted that as the TAC was displaced rather than reduced it might have had a minor cost to the industry. Since 2017 ICES provides TAC advice for SA4 that includes the closed area. 1.2. Stopping sandeel fishing has not favoured the development of alternative human threats to the ecosystem function. However, further investigation of post-closure fishing and other human activities is warranted.				
D.2. Cultural,	Governance and management measures identify, respect and uphold		[X]	

spiritual, socioeconomic and other locally relevant values	the cultural, spiritual, socioeconomic, and other locally relevant values of the area, **where such values exist**.			
	Governance and management measures respect and uphold the knowledge, practices and institutions that are fundamental for the *in situ* conservation of biodiversity.		X	

Explanation for rankings (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).

2.1 The group discussed that this case study is not of the same significance as some examples involving indigenous peoples. However, there is recognition of the importance of seabirds in the UK economy and great public support (RSPB has 1 million members) and historical loss of seabirds from local colonies linked to fisheries have led to considerable public concern. As the fishery that established in the 1990s has been displaced rather than reduced due to the closed area it is difficult to assess the economic cost to the fishing industry.

2.2 Governance sought advice from recognized advice givers e.g., ICES.

Assessing additional OECM properties (Optional)

Other Criteria	**Description**	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Medium**	**High**
Add relevant criteria	Connectivity with other measures supporting a network/systems effect				X

Explanation for ranking and details of the criteria

International MPA guidance often highlights the need to promote networks of well-connected MPAs. When ncMPAs were designated for sandeels in Scottish waters, in both SA4 and further north there was an attempt to promote connectivity and support source/sink population dynamics that took account of this existing closed area. This was facilitated by an extensive biophysical modelling and otolith microchemistry analysis of connectivity among sand banks (Proctor *et al.*, 1998; Wright *et al.*, 2018; 2019).

References

(e.g., relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to relevant audio/visual material, video, models, etc.)

Daunt, F., Wanless, S., Greenstreet, S. P. R., Jensen, H., Hamer, K. C., and Harris, M. P. 2008. The impact of the sandeel fishery closure on seabird food consumption, distribution, and productivity in the northwestern North Sea. Canadian Journal of Fisheries and Aquatic Sciences, 65: 362–381. https://doi.org/10.1139/f07-164.

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van Deurs, M., Grome, T. M., Kaspersen, M., Jensen, H., Stengerg, C., Sørensen, T. K., *et al*. 2012. Short- and long-term effects of an offshore wind farm on three species of sandeel and their sand habitat. Marine Ecology Progress Series, 458 : 169-180. https://doi.org/10.3354/meps09736.

Wanless, S., Harris, M. P., Newell, M. A., Speakman J. R., and Daunt, F. 2018. Community-wide decline in the occurrence of lesser sandeels *Ammodytes marinus* in seabird chick diets at a North Sea colony. Marine Ecology Progress Series, 600: 193–206. https://doi.org/10.3354/meps12679.

Wright, P. J., Christensen, A., Régnier, T., Rindorf, A., and van Deurs, M. 2019. Integrating the scale of population processes into fisheries management, as illustrated in the sandeel, *Ammodytes marinus*. ICES Journal of Marine Science, 76(6): 1453–1463. https://doi.org/10.1093/icesjms/fsz013.

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Relevant Databases

Maps, Figures and Tables

See Wright (2019) Working Document to ICES/IUCN-CEM FEG Workshop on Testing OECM Practices and Strategies (WKTOPS)

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(Indicate if there are any known issues with giving permission to share or publish these data and what any conditions of publication might be; provide contact details for a contact person for this issue)

Annex 8: Mock Pro Forma Lophelia Coral Conservation Area

MOCK Pro Forma Template for Scientific and Other Information

to Evaluate Area-based fisheries management measures (ABFMs) as Potential Other Effective Area-based Conservation Measures (OECMs)

Title/Name of the area: Lophelia Coral Conservation Area

Prepared by (*names, affiliations, title, contact details)***:** Marty King, Conservation Planning Project Lead, Fisheries and Oceans Canada (Maritimes Region, Marine Planning and Conservation Division), Marty.King@dfo-mpo.gc.ca

Institution(s) in charge of assessing OECMs (*names, affiliations, title, contact details)***:** Fisheries and Oceans Canada

Abstract (*In less than 200 words*)

The Lophelia Coral Conservation Area (LCCA) was established in 2004 to protect Canada's only known living *Lophelia pertusa* reef complex. It is located on the edge of the Scotian Shelf roughly 280 km southeast of the Cape Breton, Nova Scotia (Figure 1). The reef has suffered significant damage from previous fishing activities (Buhl-Mortensen *et al.*, 2017). The primary conservation objective of the LCCA is protect the reef from further damage and allow for recovery. At 15 km^2, the LCCA is a very small conservation area compared to other coral and sponge closures in the region.

Location

*(Indicate the geographic location of the area, including co-ordinates if available. This should include a location map to be added to the '*Maps, Figures and Tables*' section. It should state if the area is within or outside national jurisdiction, or straddling both.)*

The LCCA is located within Canadian jurisdiction on the edge of the eastern Scotian Shelf approximately 280 km southeast of the Cape Breton, Nova Scotia. See below for the coordinates of the closure.

Description of the proposed area

(Identification of other effective area-based conservation measures should, to the extent possible, document the known biodiversity attributes (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), 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.)

The LCCA protects Canada's only known live *Lophelia pertusa* reef so it is considered a nationally unique feature (based on the current state of knowledge); (Beazley *et al.*, 2021). *L. pertusa* is a slow-growing and long-lived species so it is highly sensitive to any kind of physical disturbance. The reef provides habitat for many other organisms so it enhances the biodiversity of the area.

Identify pressures and threats on biodiversity

(Inventory of known or reasonably foreseeable pressures and threats on biodiversity features, their nature, scale and source, and the range of societal and ecological values attached to the components.)

Bottom-contact fisheries targeting redfish using otter trawl gear and Atlantic halibut using bottom longline gear represent the only immediate threat to the LCCA. The *L. pertusa* reef complex suffered extensive damage from these and other groundfish fisheries prior to being protected (Buhl-Mortensen *et al.*, 2017; Beazley *et al.*, 2021). Other potential future threats include oil and gas exploration and submarine cable installation. Climate change is another threat that needs to be considered in the management of this site.

Data and information available on the fisheries and the ecosystem

(Describe the available data sources, e.g., distribution maps; 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 features of concern; ecosystem services (including food and livelihoods) and other relevant values affecting conservation; possible threats and pressures; existing MPAs (networks, seascapes) and other conservation measures. Provide details of the sources in the 'Relevant Databases' section)

Biodiversity Information

Information on the *L. pertusa* reef and other biodiversity features of the LCCA is contained within studies by Buhl-Mortensen *et al.* (2017), Beazley *et al.* (2019) and Beazley *et al.* (2021).

Fisheries Information

The LCCA applies to all bottom-contacting fisheries, including groundfish (mobile- and fixed-gear), snow crab (pots), surf clam (hydraulic dredge), sea cucumber (dredge), hagfish (barrel) and whelk (pots). Groundfish fisheries targeting redfish (otter trawl) and Atlantic halibut (bottom longline) are the only active fisheries in the immediate vicinity of the LCCA. The Integrated Fisheries Management Plan (IFMP) for 4VWX5 Groundfish explains the governance, management measures and other properties of the groundfish fishery, including fleet size (DFO, 2018). The LCCA is listed as a closed area in the IFMP. Commercial fisheries landings based on logbook data have been mapped for all active fisheries in the area (Rozalska and Coffen-Smout, 2020). VMS tracks have also been mapped for redfish bottom trawl and halibut longline but this information has not been published.

Assessment of the area against CBD Criteria

(Discuss the area in relation to each of the CBD Criteria and relate the best available science. Please note where there are significant information gaps)

CBD Criteria **CBD/COP/DEC/14/8**	**Description** (Annex III.B to Decision 14/8)	**Ranking of criterion relevance** (please mark one column with an X)		
		No information	**True**	**False**
Criterion A: Area is not currently recognized as a protected area				
A. Not a protected area	The area is not currently recognized or reported as a protected area [MPA] or part of a protected area [MPA]; it		X	

	may have been established for another function.			
Explanation for ranking (Criteria (A) is absolute and, if not met, it is enough to disqualify the area.) The LCCA is not currently recognized as an MPA. It is recognized by Canada as an OECM.				
Criterion B: Area is governed and managed				
B.1. Geographically defined space	Size and area are described, including in three dimensions where necessary.		X	
The LCCA is 15 km^2. It was established to protect a sessile benthic feature so protection does not apply to the water column.				
	Boundaries are geographically delineated.		X	
Provide details of the location Point North latitude West longitude 1. 44º29'30''N 57º12'30''W 2. 44º29'30''N 57º10'00''W 3. 44º27'30''N 57º09'00''W 4. 44º27'30''N 57º12'30''W 5. 44º29'30''N 57º12'30''W				
B.2. Legitimate governance authorities	Governance has Legitimate Authority and is appropriate for achieving *in situ* conservation of biodiversity within the area.		X	
	Governance by indigenous peoples and local communities is self-identified in accordance with national legislation and applicable international obligations.		X*	
	Governance reflects the equity considerations adopted in the Convention.		X	
	Governance may be by a single authority and/or organization or through collaboration among relevant authorities and provides the ability to address threats collectively.		X	
Explanation for rankings (Detail the Legitimate Authorities responsible for implementing the area-based management measure(s); Explain how the identified body has competence for management of threats to biodiversity within the area by detailing those threats) B2.1: Under the *Fisheries Act*, the Minister of Fisheries and Oceans (DFO) has the mandate to manage fisheries and therefore close areas to fishing. B2.2: Management of Indigenous fisheries in the region is evolving. DFO has clear mandate for conservation. B2.3: All government agencies, stakeholders and ENGOs with an interest in the area at the time of establishment were consulted and continue to be engaged on management issues				

when necessary. B2.4: DFO works with other Federal and Provincial authorities to ensure threats from other activities do not compromise the conservation objectives of the LCCA.				
B.3. Managed	Managed in ways that achieve positive and sustained outcomes for the conservation of biological diversity.		X	
	Relevant authorities and stakeholders are identified and involved in management.		X	
	A management system is in place that contributes to sustaining the *in situ* conservation of biodiversity.		X	
	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.		X	
Explanation for rankings (Provide details for each element, citing relevant sources) B3.1: The LCCA is managed to achieve positive and sustained outcomes for the conservation of biodiversity. The site has a clear conservation objective and a high-level management plan that is being updated. B3.2: When necessary, fishing industry stakeholders are engaged through fisheries management mechanisms, such as commercial species advisory committees. Steps will be taken to make the management system more inclusive moving forward (e.g., establishment of a regional scale advisory committee). B3.3: The management system is currently effective but will be enhanced and formalized as part of the revised management plan. The management system will address how fishing and non-fishing activities will be managed to address all existing and potential threat to the *L. pertusa* reef and associated biodiversity. The management of non-fishing activities will require close collaboration with other federal, provincial and possibly Indigenous government agencies. B3.4: Adaptive management of the LCCA can occur through existing fisheries management mechanisms.				
Criterion C: Achieves sustained and effective contribution to *in situ* conservation of biodiversity *(Produces long-term* in situ *biodiversity conservation outcomes)*				
C.1. Effective	The area achieves, or is expected to achieve, positive and sustained outcomes for the *in situ* conservation of biodiversity.		X	
	Threats, existing or reasonably anticipated ones are addressed effectively by preventing, significantly reducing or eliminating them, and by restoring degraded ecosystems.		X	

	Mechanisms, such as policy frameworks and regulations, are in place to recognize and respond to new threats.		X	
	To the extent relevant and possible, management inside and outside the other effective area-based conservation measure is integrated.		X	

Explanation for rankings (Provide details for each element, citing relevant sources)

C1.1: A recent analysis based on three *in situ* optical surveys in 2003, 2009 and 2015 indicated that the density and abundance of epibenthic megafaunal species increased at a greater rate inside the LCCA compared to locations outside the closure over that time period (Beazley *et al.*, 2021). This suggest that the benthic communities within the LCCA are recovering. However, the same study found recruitment of *L. pertusa* to be low.

C1.2: All immediate threats to the reef (i.e., groundfish fisheries targeting redfish and Atlantic halibut) have been eliminated but accidental and deliberate incursions can occur due to drifting bottom longline gear. It is anticipated that the LCCA will be absorbed by a larger proposed conservation area called the Eastern Canyons (Beazley *et al.*, 2021), which may help address surveillance and enforcement challenges. The overall management system addresses reasonably anticipated threats (e.g., offshore petroleum exploration and development) through collaboration with other agencies.

C1.3: Policy frameworks and legislation are in place to address new threats. For example, the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) process for issuing Exploration Licenses, Significant Discovery Licenses, and Production Licenses (and associated activity authorizations) is in place to address threats from offshore petroleum exploration. Fisheries and Oceans Canada (and other federal departments) participate as a federal authority in Environmental Assessment process, led by Canadian Environmental Assessment Agency or the CNSOPB.

C1.4: Management of the LCCA is integrated with fisheries and broader oceans conservation and management activities outside the measure. For example, the LCCA is considered part of a broader regional-scale conservation network design.

C.2. Sustained over long-term	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.		X	

Explanation for ranking (Detail the time frame(s) for the management measures)

The LCCA has been in place for 17 years but it has been implemented through license conditions that are renewed each year and therefore can be easily removed. However, it is highly unlikely that the LCCA would ever be re-opened to fishing. Recent revisions to the *Fisheries Act* do allow for the creation of biodiversity protection regulations to protect sensitive habitats such as this but this level of formality is not necessary at this time. It should also be noted that the LCCA will likely be absorbed by a larger recently proposed conservation area called the Eastern Canyons (Beazley *et al.*, 2021).

C.3. *In situ* conservation of biological diversity	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).		X	
Explanation for ranking The LCCA has very high biodiversity conservation value. As the only known *L. pertusa* reef in Canada, it is currently considered nationally unique. Beazley *et al.* (2021) describe the area as a benthic biodiversity hotspot with 183 taxa.				
C.4. Information and monitoring	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.		X	
	A monitoring system informs management on the effectiveness of measures with respect to biodiversity, including the health of ecosystems.		X	
	Processes should be in place to evaluate the effectiveness of governance an management, including with respect to equity.		X	
	General data of the area such as boundaries, aim and governance are available information.		X	
Explanation for rankings and details of monitoring systems (Identifying the methodologies that might be used for these assessments) C4.1: The benthic biodiversity attributes of the area has been described by Beazley *et al.* (2021). Due to its remote location, there are no documented cultural or spiritual values associated with this site. C4.2: Biodiversity monitoring has occurred but has been opportunistic. Four *in situ* optical benthic surveys have occurred since the site was established. This site is one of the few conservation areas in the region where data were collected before establishment. These surveys require significant resources due to the remote location and the depth of the reef. Beazley *et al.* (2021) recommend surveys every 7 years. A more comprehensive monitoring program for all MPAs and OECMs in the bioregion will be developed in the coming years. Monitoring of				

fishing activity is occurring and is relatively effective using VMS, observers, aerial surveillance and other tools. Equity is not a significant factor here because all bottom fishing is prohibited. Stakeholders, other government agencies and ENGOs were consulted during the establishment of the LCCA and continue to be engaged on management issues when necessary.

C4.3: No formal processes for evaluating governance and management are in place but a more comprehensive management system is being developed for this area and the principle of adaptive management will be applied.

C4.4: General data and information on the area, such as boundaries, objectives and governance, is available through the management plan and the DFO website.

Criterion D: Associated ecosystem functions and services and cultural, spiritual, socioeconomic and other locally relevant values (*Maintains ecosystem functions and services, and upholds locally relevant values*)

D.1. Ecosystem functions and services	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.		X	
	Management to enhance one particular ecosystem function or service does not impact negatively on the sites overall biological diversity information.		X	

Explanation for rankings

D1.1: Ecosystem services are supported, such as the provision of habitat for many other taxa, including redfish, which is a commercially important species.

D1.2: Not applicable.

D.2. Cultural, spiritual, socioeconomic and other locally relevant values	Governance and management measures identify, respect and uphold the cultural, spiritual, socioeconomic, and other locally relevant values of the area, where such values exist.		X	
	Governance and management measures respect and uphold the knowledge, practices and institutions that are fundamental for the *in situ* conservation of biodiversity.		X	

Explanation for rankings (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).

D2.1: Remote location suggests that there may be limited cultural or spiritual values associated

with this area but it is considered a traditional commercial fishing ground with significant socioeconomic value. The fishing industry was carefully consulted during the establishment process (Breeze and Fenton 2007). D2.2: Governance and management measures respect and uphold the knowledge, practices and institutions needed for the *in situ* conservation of biodiversity.

Assessing additional OECM properties (Optional)

Other Criteria	**Description**	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Medium**	**High**
Add relevant criteria					
Explanation for ranking and details of the criteria					

References

(e.g., relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to relevant audio/visual material, video, models, etc.)

Beazley, L., Kenchington, E., Korabik, M., Fenton, D., and King, M. 2021. Other effective area-based conservation measure promotes recovery in a cold-water coral reef. Global Ecology and Conservation, 26: e01485. https://doi.org/10.1016/j.gecco.2021.e01485.

Beazley, L., Lirette, C. and Guijarro, J. 2019. Characterization of the corals and sponges of the Eastern Scotian Slope from a benthic imagery survey. Canadian Technical Report of Fisheries and Aquatic Sciences, 3302: 83 pp. https://waves-vagues.dfo-mpo.gc.ca/Library/4078132x.pdf (Access date 2-5-2021).

Breeze, H., and Fenton, D.G. 2007. Designing management measures to protect cold-water corals off Nova Scotia, Canada. Bulletin of Marine Science, 81(1): 123-133.

Buhl-Mortensen, P., Gordon, D. C., Buhl-Mortensen, L., and Kulka, D. W. 2017. First description of a *Lophelia pertusa* reef complex in Atlantic Canada. Deep Sea Research Part I: Oceanographic Research papers, 126: 21-30. https://doi.org/10.1016/j.dsr.2017.05.009.

DFO. 2017. Coral and Sponge Conservation Measures in the Maritimes. https://www.dfo-mpo.gc.ca/oceans/ceccsr-cerceef/measures-mesures-eng.html (Access date: 2-5-2021).

DFO. 2018. 4WX5Z Groundfish Integrated Management Plan. https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/groundfish-poisson-fond/groundfish-poisson-fond-4vwx5-eng.html (Access date: 2-5-2021).

Rozalska, K., and Coffen-Smout, S. 2020. Maritimes Region Fisheries Atlas: Catch Weight Landings Mapping (2014–2018) on a Hexagon Grid. Canadian Technical Report of Fisheries and Aquatic Sciences, 3373: 68 pp. http://publications.gc.ca/collections/collection_2020/mpo-dfo/Fs97-6-3373-eng.pdf (Access date 2-5-2021).

Relevant Databases

Maps, Figures and Tables

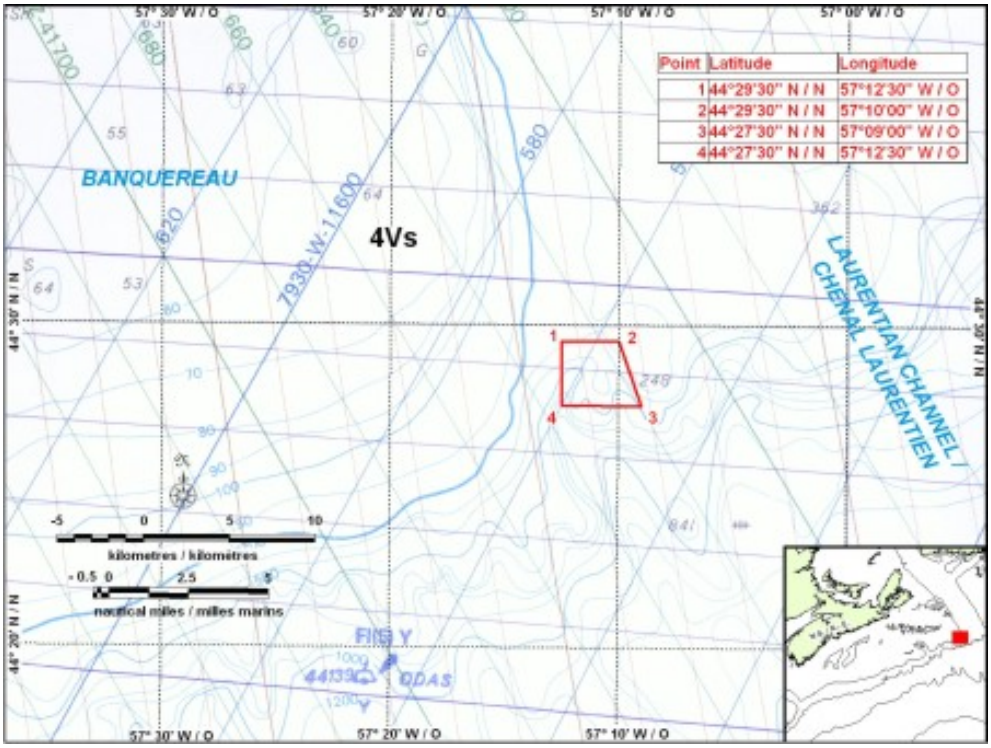

Figure 1. Map of the Lophelia Coral Conservation Area.

Rights and permissions

(Indicate if there are any known issues with giving permission to share or publish these data and what any conditions of publication might be; provide contact details for a contact person for this issue)

Annex 9: Mock Pro Forma NAFO Sponge Closures

MOCK Pro Forma Template for Scientific and Other Information

to Evaluate Area-based fisheries management measures (ABFMs) as Potential Other Effective Area-based Conservation Measures (OECMs)

Title/Name of the area: NAFO Flemish Cap and Slopes of the Grand Bank Sponge VME

Prepared by (*names, affiliations, title, contact details)***:**

Andrew Kenny (UK) CEFAS, andrew.kenny@cefas.co.uk

Institution(s) in charge of assessing OECMs (*names, affiliations, title, contact details)***:**

This would ideally be done by NAFO, the proposer or the body with Legitimate Authority for the OECM.

Abstract (*In less than 200 words*)

Deep-sea sponge grounds are important components of deep-water ecosystems. They increase habitat complexity (Tissot *et al.*, 2006; Buhl-Mortensen *et al.*, 2010), enhancing biodiversity (Buhl-Mortensen and Mortensen, 2005; Beazley *et al.*, 2013), providing important habitat for fish feeding and spawning (Amsler *et al.*, 2009; Kenchington, 2013) in addition to improving water quality and benthic productivity functions (Pham *et al.*, 2019). The structural characteristics, their slow growth rates and high longevity (Klitgaard and Tendal, 2004) tend to make them sensitive and vulnerable to perturbations, particularly to the mechanical impacts of bottom fishing activities (Wassenberg *et al.*, 2002; Heifetz *et al.*, 2009), and they can take decades or longer to recover (if they recover at all) if they are removed or damaged. Deep sea sponge grounds qualify as Vulnerable Marine Ecosystems in relation to high seas fisheries, according to Criteria developed by FAO (FAO, 2009).

The slopes of the Flemish Cap and Grand Banks of Newfoundland contain most of the aggregations of large sponges (sponge fields) which constitute VMEs in international waters of the Northwest Atlantic Fisheries Organization (NAFO) Regulatory Area. This area also includes all the current NAFO fishery closures which currently protect > 60% of the known biomass of the large sponges in the fishing footprint of the NAFO Regulatory Area.

Location

*(Indicate the geographic location of the area, including co-ordinates if available. This should include a location map to be added to the '*Maps, Figures and Tables*' section. It should state if the area is within or outside national jurisdiction, or straddling both.)*

The NAFO VME sponge closures are located entirely within the NAFO Regulatory Area (NRA), they comprise VME closure Areas 1, 2, 3, 4, 5 and 6 (NAFO, 2021) as shown in Figures 1a and 1b below with coordinates given in Table 1.

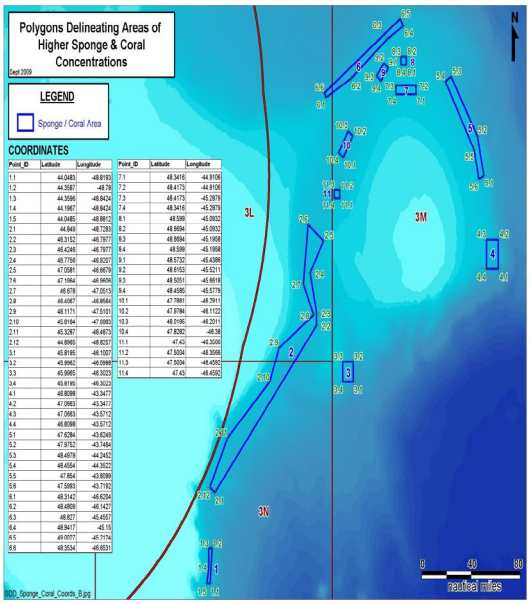

Figure 1a. NAFO Sponge and coral closures as defined in 2009.

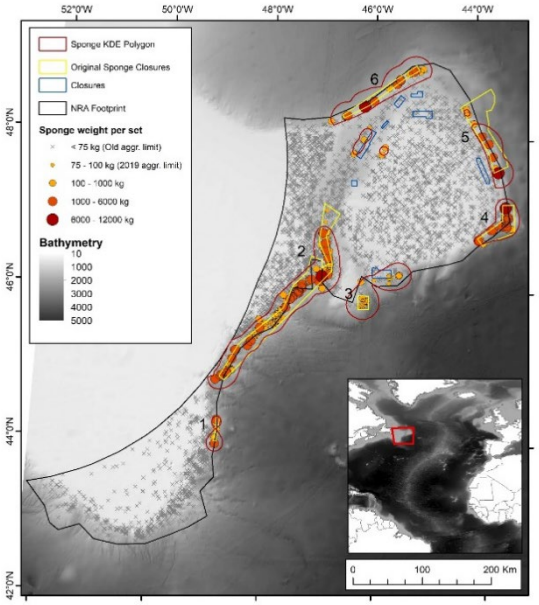

Figure 1b. NAFO Sponge and coral closures as defined in 2020 (NAFO, 2020), the sponge closures highlighted in yellow and are numbered 1, 2, 3, 4, 5, and 6.

Table 1. Coordinates for the 6 NAFO sponge closures as of 2020 (NAFO, 2020).

Latitude	Longitude	Closure	Latitude	Longitude	Closure	Latitude	Longitude	Closure
44.849	-48.7292778	2	45.8195	-46.1007	3	47.79611	-43.485278	5
44.8965	-48.8256944	2	45.8195	-46.3023	3	47.68178	-43.451861	5
45.32869	-48.4872778	2	45.9965	-46.3023	3	47.59928	-43.7192	5
45.8184	-47.6882778	2	45.9965	-46.1007	3	47.854	-43.809889	5
46.1171	-47.5100833	2	45.8195	-46.1007	3	48.45539	-44.3522	5
46.28703	-47.2629444	2	46.743	-44.054	4	48.69369	-43.752222	5
46.50617	-47.1841472	2	46.972	-43.5712	4	48.62028	-43.69	5
46.44222	-46.9813889	2	47.175	-43.5712	4	48.50417	-43.692222	5
46.35133	-46.9813889	2	47.175	-43.3477	4	48.41889	-43.755556	5
46.40669	-46.8563889	2	46.8098	-43.3477	4	48.40806	-43.847222	5
46.678	-47.0513	2	46.66	-43.969	4	48.23889	-43.805278	5
47.19639	-46.9605833	2	46.743	-44.054	4	48.16472	-43.823333	5
47.05808	-46.6679	2	44.048278	-48.8193	1	47.79611	-43.485278	5
46.77558	-46.9206944	2	44.0485	-48.881194	1	48.31419	-46.620389	6
46.42458	-46.7976944	2	44.196694	-48.842389	1	48.35339	-46.653083	6
46.31519	-46.7976944	2	44.359583	-48.842389	1	49.0027	-45.212389	6
44.849	-48.7292778	2	44.358694	-48.78	1	48.94169	-45.149972	6
			44.048278	-48.8193	1	48.827	-45.455694	6
						48.48089	-46.142694	6
						48.31419	-46.620389	6

Description of the proposed area

(Identification of other effective area-based conservation measures should, to the extent possible, document the known biodiversity attributes (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), 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.)

The Flemish Cap is a plateau with a radius of approximately 200 km at the 500 m isobath, with a depth of less than 150 m at its centre. It is situated east of the Grand Banks of Newfoundland and separated from it by the approximately 1200-m-deep Flemish Pass. Bottom trawling in NAFO is restricted to the fishing footprint which also includes areas on the Grand Bank outside the Canadian EEZ known as the Nose and Tail of the Grand Bank (Figure 2).

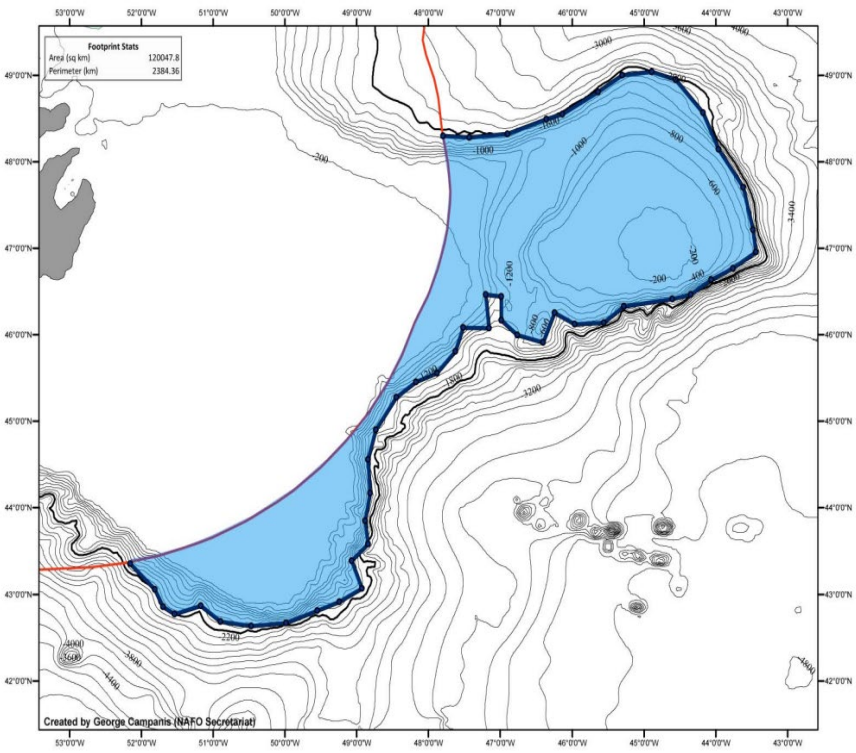

Figure 2. NAFO fishing footprint showing the boundary of the Canadian EEZ (red line) and the 2000m isobath in bold (NAFO, 2009a).

The water mass around this area comprises mainly two sources: the Labrador Current Slope water, with temperatures between 3 and 4ºC and salinities between 34 and 35‰, flowing from the north and the North Atlantic Current water, with temperatures >4ºC and salinities >34.8‰, flowing from the south (Colbourne and Foote, 2000). At the Flemish Pass, the Labrador Current bifurcates with the major branch flowing southward to the south-eastern slope of the Grand Banks; meanwhile, the side branch circulates clockwise around Flemish Cap. Around the Tail of the Banks the Labrador Current and the Gulf Stream meet, giving rise to the North Atlantic Current (NAC) and the NAC front. The 3000 m isobath is often considered the offshore limit of the deep Labrador Current (Cuny *et al.*, 2005).

The Northwest Atlantic Fisheries Organization (NAFO) is in charge of the management and conservation of most of the fishery resources on waters outside the EEZs (Regulatory Area) in the North-West Atlantic Ocean. The area described corresponds to the 3LMNO divisions of the NAFO Regulatory Area (NRA) between 600 m and 2500 m depth. This area includes the main Greenland halibut (*Reinhardtius hippoglossoides*) fishing grounds in international waters, with the highest concentration of fishing effort seen along the continental slope on the north-east side of the Flemish Cap and a smaller concentration along the southern end of the Flemish Pass and around the Tail of the Banks (NAFO, 2015a).

Spanish/EU and Canadian research vessel (RV) bottom-trawl surveys sample most of this area annually, but only down to 1500 m (Healey *et al.*, 2012; Nogueira *et al.*, 2017). The main objective of these surveys is to produce abundance and biomass indices for the main demersal species, and to determine the demographic structure of their populations, although other scientific goals, such as the collection of information on the spatial and bathymetric distribution of megabenthic invertebrate species (such as large sponges), are also addressed.

Geodia sp. dominated sponge grounds form a linear band following depth contours on the continental slopes in the NRA. Six areas with significant sponge concentrations have been identified

based on RV surveys (NAFO, 2009b; Kenchington *et al.*, 2011): a narrow band between 700 m and 1470 m depth on the north-east slope of the Grand Banks, between the Nose and the Tail of the Banks; the south-eastern corner of the Beothuk Knoll between 1000 and 1400 m depth; the south-eastern corner of the slope of Flemish Cap between 950 and 1330 m depth; the eastern slope of the Flemish Cap in a band from north to southeast between 1050 and 1350 m depth; and lastly, the north slope of the Flemish Cap and Flemish Pass in one area known as Sackville Spur, between 1250 m and 1450 m depth.

Species distribution models for sponge grounds have been developed for the area described (Kenchington *et al.*, 2015). The models have a spatial extent of the NRA (Divs. 3LMNO) to 2500 m depth and show prediction surfaces with clearly defined areas of high occurrence probability of sponge which predominantly coincide with the Sponge VME fishery closures.

An increased level of biodiversity has been shown to occur in sponge grounds (Beazley *et al.*, 2013), which provide significant functions important in delivering ecosystem heath and services, such as water quality and secondary production functions, both of which are important in maintaining healthy and resilient fish stocks (Pham *et al.*, 2019; Maldonado *et al.*, 2016; Kenchington *et al.*, 2013; Meyer *et al.*, 2019). For example, it has been estimated that sponge grounds (VMEs) in this region have the capacity to filter approximately 56,143 ± 15,047 million litres of seawater daily from the bottom waters encompassing an area of 135,056.82 km^2 of seafloor (Pham *et al.*, 2019). This huge exchange of water is likely to make a significant contribution to the re-cycling of carbon (chemical energy) and nutrients, giving rise to elevated levels of secondary benthic production (Maldonado *et al.*, 2016) including the potential associated benefits (via the provision of food, refugia and/or nursery grounds) for commercially targeted fish species in the region (Kenchington *et al.*, 2013; Meyer *et al.*, 2019).

Identify pressures and threats on biodiversity

(Inventory of known or reasonably foreseeable pressures and threats on biodiversity features, their nature, scale and source, and the range of societal and ecological values attached to the components.)

The primary threat is from bottom trawling activities associated with the Greenland halibut Fishery (NAFO, 2015a), but oil and gas activities in the Flemish Pass, as well as those on the wider Grand Banks, can pose additional threats to the species found in the described area (C-NLOPB, 2014; NAFO, 2015a). Oil and gas activities could include disturbance and injury of mammals and seabirds by anthropogenic noise, oil spills and associated increase in vessel traffic. Exploration and development activities can also impact VME indicator taxa when they overlap in the slope areas such as the Flemish Pass.

Data and information available on the fisheries and the ecosystem

(Describe the available data sources, e.g., distribution maps; 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 features of concern; ecosystem services (including food and livelihoods) and other relevant values affecting conservation; possible threats and pressures; existing MPAs (networks, seascapes) and other conservation measures. Provide details of the sources in the 'Relevant Databases' section)

The primary data sources are from reports of various NAFO working groups, in particular Scientific Council Working Group on Ecosystem Science for Assessments (NAFO, 2015a), the joint Scientific Council and Commission working group on Ecosystem Approach Framework for Fisheries Management (NAFO, 2009b) and the NAFO Conservation and Enforcement Measures (NAFO, 2021) – all of the reports related to these groups can be found on the NAFO website https://www.nafo.int/Library/. For example, all of the maps of the managed fisheries and how they overlap with sponge VME and sponge fishery closures are given in NAFO (2015a).

Assessment of the area against CBD Criteria

(Discuss the area in relation to each of the CBD Criteria and relate the best available science. Please note where there are significant information gaps)

CBD Criteria **CBD/COP/DEC/14/8**	**Description** (Annex III.B to Decision 14/8)	**Ranking of criterion relevance** (please mark one column with an X)		
		No information	**True**	**False**
Criterion A: Area is not currently recognized as a protected area				
A. Not a protected area	The area is not currently recognized or reported as a protected area [MPA] or part of a protected area [MPA]; it may have been established for another function.		X	
Explanation for ranking (Criteria (A) is absolute and, if not met, it is enough to disqualify the area. NAFO VME sponge closures (Areas 1, 2, 3, 4, 5, and 6) are not reported as MPAs in the context of meeting the CBD biodiversity protected area targets.				
Criterion B: Area is governed and managed				
B.1. Geographically defined space	Size and area are described, including in three dimensions where necessary.		X	
	Boundaries are geographically delineated.		X	
Provide details of the location The NAFO sponge VME closures consist of 6 separate fishery closures which are ecologically connected (Kenchington, *et al.*, 2019; Wang *et al.*, 2020) and therefore should be considered collectively as a single OECM. The sponge closures have well defined spatial boundaries (NAFO, 2021) whose location and coordinates are described in the descriptive preamble of this pro forma.				
B.2. Legitimate governance authorities	Governance has Legitimate Authority and is appropriate for achieving *in situ* conservation of biodiversity within the area.		X	
	Governance by indigenous peoples and local communities is self-identified in accordance with national legislation and applicable international obligations.		X	
	Governance reflects the equity considerations adopted in the CBD Convention.		X	

	Governance may be by a single authority and/or organization or through collaboration among relevant authorities and provides the ability to address threats collectively.		X	
Explanation for rankings (Detail the Legitimate Authorities responsible for implementing the area-based management measure(s); Explain how the identified body has competence for management of threats to biodiversity within the area by detailing those threats) The NAFO Convention (NAFO, 2020) and the NAFO Conservation and Enforcement Measures (NAFO, 2021) constitute the Legitimate Authority for managing demersal fisheries and the VME sponge closures within the NAFO Regulatory Area (NRA). There is no shared jurisdiction in managing the VME sponge closures as they are all located within the NRA which is outside any national jurisdiction. However, there are additional threats to the sponge grounds arising from threats not under the jurisdiction of NAFO such as oil and gas activities, but these are considered to be relatively low compared to the potential direct threat arising from bottom trawling activities. Indigenous people's interests have also been considered by NAFO and assessed not to be significant in this offshore region.				
B.3. Managed	Managed in ways that achieves or expects to achieve positive and sustained outcomes for the conservation of biological diversity.		X	
	Relevant authorities and stakeholders are identified and involved in management.		X	
	A management system is in place that contributes to sustaining the *in situ* conservation of biodiversity.		X	
	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.		X	
Explanation for rankings (Provide details for each element, citing relevant sources) Bottom trawl and long-line fishery closures to protect sponge VME were first established in NAFO in 2009 (NAFO, 2009b). Since then, all NAFO VMEs have been subject to periodic review following annual monitoring and assessment to ensure they remain effective (NAFO, 2013 and 2019). Accordingly, in 2012, 2014 and 2015, revisions to the sponge VME closure boundaries were introduced increasing the overall area and biomass of sponge protected in the NRA (NAFO, 2012, 2014, 2015b). Further extensions to the existing closed areas are under consideration in 2021. The sponge VME closures already account for more than 60% of the total large-sponge biomass in the NRA and are amongst the most well protected VMEs in the NRA.				

Scientists, managers and industry from NAFO Contracting Parties (CPs), along with national and global NGOs, are regularly consulted according to the procedures and processes outlined as part of the NAFO governance structures which oversee the management of the VME sponge closures (Koen-Alonso, *et al.*, 2018). Typically, this happens at three levels **i**, at the scientific working group level where experts representing different organizations (e.g., academic, government, industry, NGOs) are invited to attend WG discussions at the discretion of the WG Chairs, **ii**. at joint meetings between NAFO CPs, managers and scientists, and other stakeholders in the capacity as observers, and **iii**. at the NAFO annual meeting, again between CPs, managers and scientists, and other stakeholders (e.g., national, and international NGOs, industry and academics in the capacity as observers).

The primary and most significant threat to sponge VME is from bottom trawling activities and the management of that threat is entirely within the jurisdiction and authority of NAFO. However, there are other threats operating in the region and in close proximity to the sponge VME which are not managed by (or under the jurisdiction of) NAFO, most notably oil and gas exploration and production activities (C-NLOPB, 2014; NAFO, 2015a).

Criterion C: Achieves sustained and effective contribution to *in situ* conservation of biodiversity *(Produces long-term* in situ *biodiversity conservation outcomes)*

C.1. Effective	The area achieves, or is expected to achieve, positive and sustained outcomes for the *in situ* conservation of biodiversity.		X	
	Threats, existing or reasonably anticipated ones are addressed effectively by preventing, significantly reducing or eliminating them, and by restoring degraded ecosystems.		X	
	Mechanisms, such as policy frameworks and regulations, are in place to recognize and respond to new threats.		X	
	To the extent relevant and possible, management inside and outside the other effective area-based conservation measure is integrated.		X	

Explanation for rankings (Provide details for each element, citing relevant sources)

Full reviews of the status of VME closures and VMEs in the NRA are conducted every 5 years. Since 2009 two reviews have been conducted, e.g., in 2014 and 2019 (NAFO, 2013; 2019). Following the first review, recommendations detailing management options were identified and actions taken following scientific advice to revise the boundaries of sponge VME area closures (Areas, 2, 4 and 5) (NAFO, 2012, 2014, 2015b). A similar review process was intended to be conducted in 2020 following completion of the second review of VMEs undertaken in 2019. As a result of the latest review (NAFO, 2019) further revisions to the sponge VME boundaries are expected, but precise nature of boundary adjustments has not been confirmed or approved at the time of competing this pro forma.

If new threats associated with bottom fishing activities emerge, then mechanisms are in place to respond to these appropriately (see Koen-Alonso *et al.*, 2018). However, there are no formal mechanisms or arrangements to address or assess non-fisheries related threats to the NAFO

VME protection measures (e.g., VME fishery closures), specifically those designed to protect sponge VME from the effects of bottom fishing activities. In this respect management inside and outside the area-based measure is not fully integrated with other sectors, but this is primarily a consequence of there not being an overarching governance framework cross sectoral governance in the high seas.				
C.2. Sustained over long-term	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.		X	
Explanation for ranking (Detail the time frame(s) for the management measures) NAFO sponge VME fishery closures have been in place for over 10 years. In that time, their effectiveness has been reviewed (NAFO, 2013; 2019) and additional measures taken to increase the protection of sponge VME. NAFO has also made a commitment to implement and ecosystem approach to fisheries management, and to protect biodiversity (NAFO, 2017). The effectiveness of NAFO in achieving these objectives is set out in the NAFO Convention, and its organizational performance is subject to periodic independent review by a panel of experts (NAFO, 2011; 2018).				
C.3. *In situ* conservation of biological diversity	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).		X	
Explanation for ranking Recent research has improved the understanding of the ecological functions performed by VMEs and specifically Sponge VME in the NRA, including their value to humans (Thurber *et al.*, 2014; Maldonado *et al.*, 2016; Pham *et al.*, 2019; Murillo *et al.*, 2020). It has also been shown that an increased level of biodiversity occurs in sponge grounds (Beazley, *et al.*, 2015). The increased levels of biodiversity and specific functions associated with large sponge grounds gives rise enhanced secondary production, and enhanced benthic-pelagic coupling of nutrients, including particulate and dissolved organic matter (Baldrighi *et al.*, 2017). For example, it has been estimated that sponge grounds (VMEs) located in the Flemish Cap area of the northwest Atlantic, have the capacity to filter approximately 56,143 ± 15,047 million litres of seawater daily from the bottom waters encompassing an area of 135,056.82 km^2 of seafloor (Pham *et al.*, 2019). This huge exchange of water is likely to make a significant contribution to the cycling of carbon (chemical energy) and nutrients, giving rise to elevated levels of secondary benthic production (Maldonado *et al.*, 2016) including the potential associated benefits (via				

the provision of food, refugia and/or nursery grounds) for commercially targeted fish species in the region (Kenchington *et al.*, 2013 and Meyer *et al.*, 2019). The NAFO sponge VME closures consist of 6 separate fishery closures, which are in relatively close in spatial proximity to one another, are likely to be ecologically connected (Kenchington *et al.*, 2019). The separate closures should therefore be considered as a single interconnected system which collectively serve to sustain significant regional populations of sponge at levels which maintain their essential functional processes of value to the wide ecosystem (Baco *et al.* 2016).				
C.4. Information and monitoring	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 effective-ness.		X	
	A monitoring system informs management on the effectiveness of measures with respect to biodiversity, including the health of ecosystems.		X	
	Processes should be in place to evaluate the effectiveness of governance an management, including with respect to equity.		X	
	General data of the area such as boundaries, aim and governance are available information.		X	
Explanation for rankings and details of monitoring systems (Identifying the methodologies that might be used for these assessments) All licensed fishing vessels operating in the NRA are equipped with VMS which comply with minimum data logging and transmission standards, e.g., 1 hr. ping intervals. In addition, haul-by-haul total catch data is documented which is integrated with the VMS data to provide precise locational catch information. Compliance of fishing vessel activities with respect to VME fishery closures and catches is monitored and assessed each year. Furthermore, every 5 years a full assessment of bottom fisheries is conducted to assess the likelihood of SAI occurring (or having occurred) on VMEs. The most recent bottom fisheries and SAI assessment was conducted in 2016 (NAFO, 2015a). A full review of VME fishery closures and VMEs is conducted every 5 years to assess the effectiveness of the management measures, the last VME review was conducted in 2019 (NAFO, 2019).				
Criterion D: Associated ecosystem functions and services and cultural, spiritual, socio-economic and other locally relevant values (*Maintains ecosystem functions and services, and upholds locally relevant values*)				
D.1. Ecosystem	Ecosystem functions and services are supported, including those of importance to indigenous peoples and		X	

functions and services	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.			
	Management to enhance one particular ecosystem function or service does not impact negatively on the sites overall biological diversity information.		X	

Explanation for rankings

As described under C3 (above), sponge VME supports several important ecosystem functions especially those associated with nutrient recycling, and habitat provision which are essential in maintaining the high biodiversity associated with the sponge grounds. The provision of these functions is likely to have a positive benefit for the health, resilience and overall productivity of ecosystem (including fish), although the precise mechanisms by which this occurs is unclear and not certain.

The assessment of trade-offs in NAFO is essentially focused on balancing the need to protect biodiversity with the need to protect fishing opportunities. Whilst it is recognized these two objectives are not necessarily mutually exclusive, the areas of high sponge biomass (and biodiversity) tend to be found in areas which are not fished because they are in too deep water or because the nature of the seabed is not conducive to fishing in some way. Therefore, identifying existing and new areas of sponge VME tends to be in areas which represent little direct conflict to the present-day fisheries. Furthermore, as the quantity and quality of monitoring data and assessment methods improve (year on year) there is greater confidence in identifying new areas of significant VME indicator species (sponge) biomass whilst also having greater confidence that the area identified is likely to not represent an important fishing area through an analysis of VMS and catch data.

D.2. Cultural, spiritual, socioeconomic and other locally relevant values	Governance and management measures identify, respect and uphold the cultural, spiritual, socioeconomic, and other locally relevant values of the area, where such values exist.			
	Governance and management measures respect and uphold the knowledge, practices and institutions that are fundamental for the *in situ* conservation of biodiversity.			

Explanation for rankings (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).

The fishery has important socio-economic value, and this is taken into account, especially during the annual fishery quota negotiations at the NAFO Annual Meetings, but less is known

about the precise spiritual and cultural values associated with such fisheries. Nevertheless, it is known that long-term cultural traditions are associated with the fisheries operating in this region are especially important for the families and communities that depend on them. The scientific community has gained much by investigating the nature of the unique habitats and species found in the NRA, resulting in a plethora scientific papers, which has contributed greatly to the understanding of deep sea conservation biology and the development of management measures to ensure the sustainability of both biodiversity and the fisheries in the region.

Assessing additional OECM properties (Optional)

Other Criteria	**Description**	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Medium**	**High**
Add relevant criteria	Are there any potential overlapping fisheries management measures which would infer additional protection or governance for the features under consideration, e.g., a fishing footprint.			X	

Explanation for ranking and details of the Criteria

Areas outside the fishing footprint are also protected, in that no directed fishing activity is permitted outside the fishing footprint without *a priori* an appropriate assessment which is part of a 'exploratory fishing protocol' being undertaken (endorsed by the Scientific Council) and permission granted. All the sponge closures extend, in part, into areas beyond the fishing footprint. Therefore, the sponge located in such areas are not only protected (in the first instance) by the fishery closure, but they are also protected by the fishing footprint. In one case (Area 3), the entire sponge closure is located outside the fishing footprint. They are therefore protected, not only by the notably Areas.

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(e.g., relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to relevant audio/visual material, video, models, etc.)

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Maps, Figures and Tables

As included in the main body of the text.

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The author(s) are not aware of any issues.

Annex 10: Mock Pro Forma NEAFC Rockall Haddock Box

MOCK Pro Forma Template for Scientific and Other Information

to Evaluate Area-based fisheries management measures (ABFMs) as Potential Other Effective Area-based Conservation Measures (OECMs)

Title/Name of the area: NEAFC Rockall Haddock Box

Prepared by (*names, affiliations, title, contact details)*:

(this Mock Pro Forma by ICES through WKTOPS)
David. C.M. Miller, ICES Secretariat, david.miller@ices.dk; Members of WKTOPS Break-out Group 2.

Institution(s) in charge of assessing OECMs (*names, affiliations, title, contact details)***:**
This would ideally be done by NEAFC for the portion beyond national jurisdiction (ABNJ), but would that be done by NEAFC or the Contracting Parties to NEAFC? There is a need to consider UK and EU/Ireland if the full closure area is to be put forward as a single OECM as it extends into national waters too.

Abstract (*In less than 200 words*)

The NEAFC fisheries management measure in this case study is a restriction on the gear being allowed within an area known as 'the Rockall Haddock Box' in the Rockall Bank in the northeast Atlantic. The original management aim was for the protection of juvenile haddock to safe-guard stock recruitment. This measure has been in place in NEAFC since January 2002 with a ban on all fishing gear except longlines. Other bottom fisheries closed areas in the Rockall Hatton region are focused on protection of Vulnerable Marine Ecosystems (VME) and fall under a different Recommendation and different measures. The western half of the Rockall Haddock Box itself is set within one of NEAFC's 'existing bottom fishing areas'. The eastern half of the Box is in UK and EU national waters, but the same protections are afforded as the closure is a measure agreed to by the relevant NEAFC Contracting Parties. Both pelagic and bottom fishing occurs adjacent to the box in both the ABNJ and the EEZ areas.

Multiple VME indicator species have been identified within the Rockall Haddock Box, but there are no bonafide (validated) records of VME habitats, e.g., *Lophelia pertusa* reef. Sea pens are the most significant VME related feature of the box, notably in the east. There are no fish species unique to the area, but the critically endangered Blue Skate is recorded regularly from inside the Rockall Haddock Box.

Location

*(Indicate the geographic location of the area, including co-ordinates if available. This should include a location map to be added to the '*Maps, Figures and Tables*' section. It should state if the area is within or outside national jurisdiction, or straddling both.)*

The Rockall Haddock Box is bounded by the following coordinates, which shall be measured according to the WGS84 system:

- 57° 00' N, 15° 00' W

- 57° 00' N, 14° 00' W

- 56° 30' N, 14° 00' W

- 56° 30' N, 15° 00' W

This area straddles international, UK and EU (Ireland) national waters (see Figure 1).

Description of the proposed area

(Identification of other effective area-based conservation measures should, to the extent possible, document the known biodiversity attributes (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), 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.)

The Rockall Haddock Box is sited on the top of Rockall Bank mainly between depths of 150 and 250 m. In the SE corner, the box extends over the break of Rockall Bank where it deepens rapidly to around 800 m. The substrate consists of sedimentary mud and coarse sand, punctuated by exposed bedrock, boulders and cobbles, all of which is host to a diverse burrowing and encrusting faunal assemblage that includes long-lived and fragile deep-sea corals and sponges (Roberts *et al.*, 2008).

There is some evidence for presence of the reef-forming stony coral, *Lophelia pertusa*, in the Box - both records from the fishing industry and single specimen (bycatch) observations from fisheries survey data (Figure 1: source ICES WGDEC VME database). These records are mainly in the NW corner of the box. Most coral recorded was dead and it is likely this area was historically more important for VME, than it is now. One visual (towed camera) survey has been undertaken in the NW corner that showed no evidence of extensive coral reefs. There is a single by-catch record of black coral and multiple records of small individual sponges (not aggregations) from fisheries surveys. There are multiple records of sea pen bycatch from fisheries surveys further east where the seabed is softer (ICES WGDEC). One of these sea pen species has only recently been described and is not known from elsewhere (García-Cárdenas *et al.*, 2019). Sea pens are recorded from this deeper eastern corner of the Box, but there is no indication of coral reefs or sponge aggregations (ICES WGDEC). Sea pens, therefore, are the most significant VME related feature of the Box. Overall, the ICES VME database shows multiple records of indicator species, but no bonafide (validated) VMEs in the Box.

There are numerous (50+) species of demersal fish known to be in the area but no fish species are likely to be unique to the area (Neat and Campbell, 2011). Fish species of conservation concern and biodiversity interest are mainly elasmobranchs. There are multiple records of the critically endangered blue skate (*Dipturus batis/flossada*) from inside the Haddock Box (Frost *et al.*, 2020) as well as outside the Box. Deepwater elasmobranchs (Neat *et al.*, 2015), such as the endangered leafscale gulper shark, are likely to be found in the far SE corner of the Box, where depths exceed 500 m.

There are no known indigenous interests in the area.

Identify pressures and threats on biodiversity

(Inventory of known or reasonably foreseeable pressures and threats on biodiversity features, their nature, scale and source, and the range of societal and ecological values attached to the components.)

The Hatton-Rockall plateau in the northeast Atlantic Ocean has long been the subject of interest for fishers, prospectors, conservationists, managers, planners, and politicians (Johnson *et al.*, 2019). The primarily pressure and threat to biodiversity in the area is fishing e.g., haddock fisheries. To date, there is no exploitation of oil and gas. The pelagic environment is influenced by the strength of subpolar gyre and other meso- and macro-scale oceanographic circulation patterns which may be impacted on by climate change in future.

Data and information available on the fisheries and the ecosystem

(Describe the available data sources, e.g., distribution maps; 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 features of concern; ecosystem services (including food and livelihoods) and other relevant values affecting conservation; possible threats and pressures; existing MPAs (networks, seascapes) and other conservation measures. Provide details of the sources in the 'Relevant Databases' section)

Marine Scotland conducts surveys in the area and has information (which is available to ICES) from inside and outside the closed area (trawl surveys, bycatch of benthos, sediment samples, and TV surveys). Some scientific papers on different components of the ecosystem have been published; sea pens (García-Cárdenas *et al.*, 2019), deep sea elasmobranchs (Neat *et al.*, 2015) and fish species (Neat and Campbell, 2011). Various ICES working groups collate and provide data in reports and databases (e.g., WGDEC, WGCSE, WGSFD) with survey values, VME indicators and fishing activity information. ICES conducts VME assessments of the area on an annual basis and provides fisheries advice for various stocks caught in the area (including the Rockall haddock stock). While NEAFC will monitor activity in international waters, within national waters the relevant national authority carries out monitoring control and surveillance (VMS, catch reports etc.).

Assessment of the area against CBD Criteria

(Discuss the area in relation to each of the CBD Criteria and relate the best available science. Please note where there are significant information gaps)

CBD Criteria **CBD/COP/DEC/14/8**	**Description** (Annex III.B to Decision 14/8)	**Ranking of criterion relevance** (please mark one column with an X)		
		No information	**True**	**False**
Criterion A: Area is not currently recognized as a protected area				
A. Not a protected area	The area is not currently recognized or reported as a protected area [MPA] or part of a protected area [MPA]; it may have been established for another function.		X	
Explanation for ranking (Criteria (A) is absolute and, if not met, it is enough to disqualify the area.) The Rockall Haddock Box is an annually renewed agreement to prohibit bottom contacting				

fisheries in a clearly defined geographic area. It has not been formally reported to WCMC protected planet database and is not included in reporting to Target 11.				
Criterion B: Area is governed and managed				
B.1. Geographically defined space	Size and area are described, including in three dimensions where necessary.		X	
	Boundaries are geographically delineated.		X	
Provide details of the location Boundaries defined in NEAFC recommendation, with co-ordinates (see above). The NEAFC Convention sets out that it can make regulations for national waters subject to the request and affirmation of that party. Since its implementation, all parties have agreed to maintain the Haddock Box. The NEAFC recommendation is up for annual renewal, with currently no indication of immediate change in this situation likely. Size: Half a degree square (precise area could be calculated). Vertical dimension not specified. Applies to all fisheries in the water column except long lines.				
B.2. Legitimate governance authorities	Governance has Legitimate Authority and is appropriate for achieving *in situ* conservation of biodiversity within the area.		X	
	Governance by indigenous peoples and local communities is self-identified in accordance with national legislation and applicable international obligations.		[X]	
	Governance reflects the equity considerations adopted in the CBD Convention.		X	
	Governance may be by a single authority and/or organization or through collaboration among relevant authorities and provides the ability to address threats collectively.		X	
Explanation for rankings (Detail the Legitimate Authorities responsible for implementing the area-based management measure(s); Explain how the identified body has competence for management of threats to biodiversity within the area by detailing those threats) NEAFC provides legitimate governance (including binding regulation for EU and UK subject to their agreement the part of box in their waters). Ireland and UK monitor and enforce within their own waters. Science advice is unified – ICES provides independent advice to all. The requirement to use ICES as a sole scientific advisor means that if wider biodiversity aspects were to be brought in via OSPAR etc., these would need to go through ICES processes first – this is what happened				

in the case of the NEAFC-OSPAR collaboration on EBSA proposals in 2013. There are no local or indigenous communities associated with the area.				
B.3. Managed	Managed in ways that achieve**s or is expected to achieve** positive and sustained outcomes for the conservation of biological diversity.		X	
	Relevant authorities and stakeholders are identified and involved in management.		X	
	A management system is in place that contributes to sustaining the *in situ* conservation of biodiversity.		X	
	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.		[X]	
Explanation for rankings (Provide details for each element, citing relevant sources) The Rockall Haddock Box is managed by NEAFC, and the EU and UK. ICES provides independent advice to management for the area. ICES is required by NEAFC to take into account the ecosystem approach in its advice so the advice on the box would reflect this. Managers, independent scientists (ICES) and stakeholders are involved through NEAFC (and in UK and EU): Permanent Committee on Management and Science (PECMAS) and annual general meetings. Fishing is currently considered the primary threat to biodiversity in the area. Prohibition of bottom trawling may protect VME indicator species. There could be impact from bottom-contact long-lining, which raises some concerns over the effectiveness of the measure which would have to be checked. No other fishing such is allowed providing some protection to the area. The Rockall Haddock Box was not specifically designed for biodiversity conservation outcomes. The Box is to protect juvenile haddock. While the regulation itself makes no mention of biodiversity, ICES advice takes into account wider ecosystem considerations, and NEAFC would expect ICES to advise if there is a significant concern to the ecosystem. The Rockall Haddock Box is regularly negotiated and is adopted on an annual basis. There is therefore a risk that if this benefit was found to be limited then the box may not be continued. VME indicator species observed in the haddock box are regularly updated by ICES to consider if VMEs areas would need to be defined should the haddock closure no longer be maintained. Further research is needed to firmly establish the presence of VMEs.				
Criterion C: Achieves sustained and effective contribution to *in situ* conservation of biodiversity *(Produces long-term* in situ *biodiversity conservation outcomes)*				
C.1. Effective	The area achieves, or is expected to achieve, positive and sustained outcomes for the *in situ* conservation of biodiversity.		X	

	Threats, existing or reasonably anticipated ones are addressed effectively by preventing, significantly reducing or eliminating them, and by restoring degraded ecosystems.		X	
	Mechanisms, such as policy frameworks and regulations, are in place to recognize and respond to new threats.		[X]	
	To the extent relevant and possible, management inside and outside the other effective area-based conservation measure is integrated.		X	

Explanation for rankings (Provide details for each element, citing relevant sources)

The NEAFC recommendation is renewed annually. The measure is in place as long as there is the need to protect juvenile haddock. This is a long-term objective, and the Box has been in place for 20 years.

There are no specific biodiversity outcomes contained in the objectives of the Haddock Box. There are known VME indicator species within the Box (particularly sea pens). NEAFC has asked for advice from ICES about whether the area in the Haddock Box should be closed under NEAFC's VME recommendation should the benefit to juvenile haddock no longer be needed.

NEAFC expects ICES to advise on new threats (e.g., oil and gas etc.) as well as monitoring developments in other sectors. Mechanisms to resolve these are 'soft' even within national administrations, given socioeconomic and political pressures which will apply in each case. OSPAR can handle some aspects of such threats but not all of them.

IUU fishing – NEAFC can take action against illegal fisheries. Given there is no known fishing activity by non-contracting parties, the main focus is to ensure compliance by contracting party vessels. Presently compliance is assessed to be good with respect to avoiding closed areas. Technological advances (e.g., e-reporting, improved VMS compliance analyses etc.) are improving the ability to monitor and enforce closure.

C.2. Sustained over long-term	The other effective area-based conservation measures are in place for the long-term or are likely to be.			[X]

Explanation for ranking (Detail the time frame(s) for the management measures)

NEAFC will provide sustained governance of the region. The measure is in place as long as there is a perceived benefit to protect juvenile haddock. This is a long-term objective, and the Box has been in place for 20 years. Annual revisions allow adaptability, though they do not necessarily reflect the 'long-term' planning regarding the measures. There is intent for this measure to remain in place. The likely duration of a measure to achieve its agreed aim should be assessed independently of administrative review and renewal cycles.

Ongoing review of the achievement of the objectives of this measure could indicate limited benefits, this poses a risk to the long-term nature of the measure. Although evidence for bonafide VMEs is lacking, ICES advised NEAFC that the area should remain to ensure VME protection (ICES, 2020).

C.3. *In situ* conservation	Recognition of other effective area-		X	

of biological diversity	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).			
Explanation for ranking There is a range of biodiversity attributes for which the site is considered important. Data is available from surveys and other sources about fish, VME indicators, etc. within the area. The Haddock Box is within a wider area is being considered as an EBSA, with no CBD Decision yet. If it is part of an EBSA this should be sufficient. The proposed EBSA considers a much broader range though, so while there is connectivity to the region there is no direct correspondence between the broader EBSA region and the haddock box. Some endangered species (e.g., leafscale gulper sharks, blue skate), following the IUCN red list, are found in the area. Rockall Bank, as one of the few 'shallow' and isolated banks/plateaus in the NEA, could be considered a 'unique' marine ecosystem. The fish community differs from the west coast of Scotland on the continental shelf for example. A species of sea pen found there has to date only been recorded from this locality. The Rockall Haddock Box protects soft sediment seabed habitats important to fish and sea pens.				
C.4. Information and monitoring	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 effective-ness.		X	
	A monitoring system informs management on the effectiveness of measures with respect to biodiversity, including the health of ecosystems.		X	
	Processes should be in place to evaluate the effectiveness of governance an management, including with respect to equity.		X	
	General data of the area such as boundaries, aim and governance are available information.		X	
Explanation for rankings and details of monitoring systems (Identifying the methodologies that might be used for these assessments)				

Marine Scotland has information (which is available to ICES) from inside and outside the closed area (trawl surveys, bycatch of benthos, sediment samples, and TV surveys). ICES reports (e.g., WGDEC, WGCSE, WGSFD) with survey values, VME indicators, fishing activity. ICES conduct VME assessments of the area on an annual basis. ICES provide fisheries advice for various stocks caught in the area (including the Rockall haddock stock). NEAFC and national administrations monitor fishery compliance (VMS, catch reports). Information on boundaries, aim and governance is available through NEAFC (published recommendations, meeting minutes etc.).				
Criterion D: Associated ecosystem functions and services and cultural, spiritual, socio-economic and other locally relevant values (*Maintains ecosystem functions and services, and upholds locally relevant values*)				
D.1. Ecosystem functions and services	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.		X	
	Management to enhance one particular ecosystem function or service does not impact negatively on the sites overall biological diversity information.		X	
Explanation for rankings The long-line fisheries permitted inside the area provide socioeconomic benefits. There is insufficient information to assess if the area provides particular ecosystem functions and services, e.g., carbon sequestration.				
D.2. Cultural, spiritual, socioeconomic and other locally relevant values	Governance and management measures identify, respect and uphold the cultural, spiritual, socioeconomic, and other locally relevant values of the area, where such values exist.		X	
	Governance and management measures respect and uphold the knowledge, practices and institutions that are fundamental for the *in situ* conservation of biodiversity.		X	
Explanation for rankings (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). Fishermen have fished at Rockall for centuries and have long held traditions and knowledge of the region. Fisherman provided information when the area to close was being considered.				

Long line fishing is still allowed in the area and provides socioeconomic benefits. Stakeholder socioeconomic concerns are taken into consideration through governance framework. No known local cultural or spiritual significance.

Assessing additional OECM properties (Optional)

Not Completed for this case study

Other Criteria	**Description**	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Medium**	**High**
Add relevant criteria					
Explanation for ranking and details of the criteria					

References

(e.g., relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to relevant audio/visual material, video, models, etc.)

Frost, M. Neat, F. C., Stirling, D., Bendall, V., Noble, L. R., and Jones, C. S. 2020. Distribution and thermal niche of the common skate species complex in the North-East Atlantic. Marine Ecology Progress Series, 656: 65-74. https://doi.org/10.3354/meps13545.

García-Cárdenas, F. J., Drewery, J., and López González, P. J. 2019. Resurrection of the sea pen genus *Ptilella* Gray, 1870 and description of *Ptilella grayi* n. sp. from the NE Atlantic (Octocorallia: Pennatulacea). Scientia Marina, 83 (3), 261-276. https://doi.org/10.3989/scimar.04845.26A.

ICES. 2020. Vulnerable marine ecosystems in the NEAFC Regulatory Area closed to fishing for purposes other than VME protection. *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, vme.neafc.2. https://doi.org/10.17895/ices.advice.7427.

Johnson, D., Froján, C. B., Neat, F., van Oevelen, D., Stirling, D., Gubbins, M. J., *et al*. 2019. Rockall and Hatton: resolving a super wicked marine governance problem in the high seas of the Northeast Atlantic Ocean. Frontiers in Marine Science, 6: 69. https://doi.org/10.3389/fmars.2019.00069

Neat, F., and Campbell, N. 2011. Demersal fish diversity of the isolated Rockall plateau compared with the adjacent west coast shelf of Scotland. Biological Journal of the Linnean Society of London, 104(1): 138-147. https://doi.org/10.1111/j.1095-8312.2011.01699.x.

Neat, F., Burns, F., Jones, E., and Blasdale, T. 2015. The diversity, distribution and status of deep-water elasmobranchs in the Rockall Trough, NE Atlantic. Journal of Fish Biology, 87(6): 1469-1488. https://doi.org/10.1111/jfb.12822.

Roberts, J. M., Henry, L. A., Long, D., and Hartley, J. P. 2008. Cold-water coral reef frameworks, megafaunal communities and evidence for coral carbonate mounds on the Hatton Bank, north east Atlantic. Facies, 54: 297-316. https://doi.org/10.1007/s10347-008-0140-x

Relevant Databases

ICES Stock Assessment database for assessments of fisheries resources.

ICES database of VME indicator species.

Maps, Figures and Tables

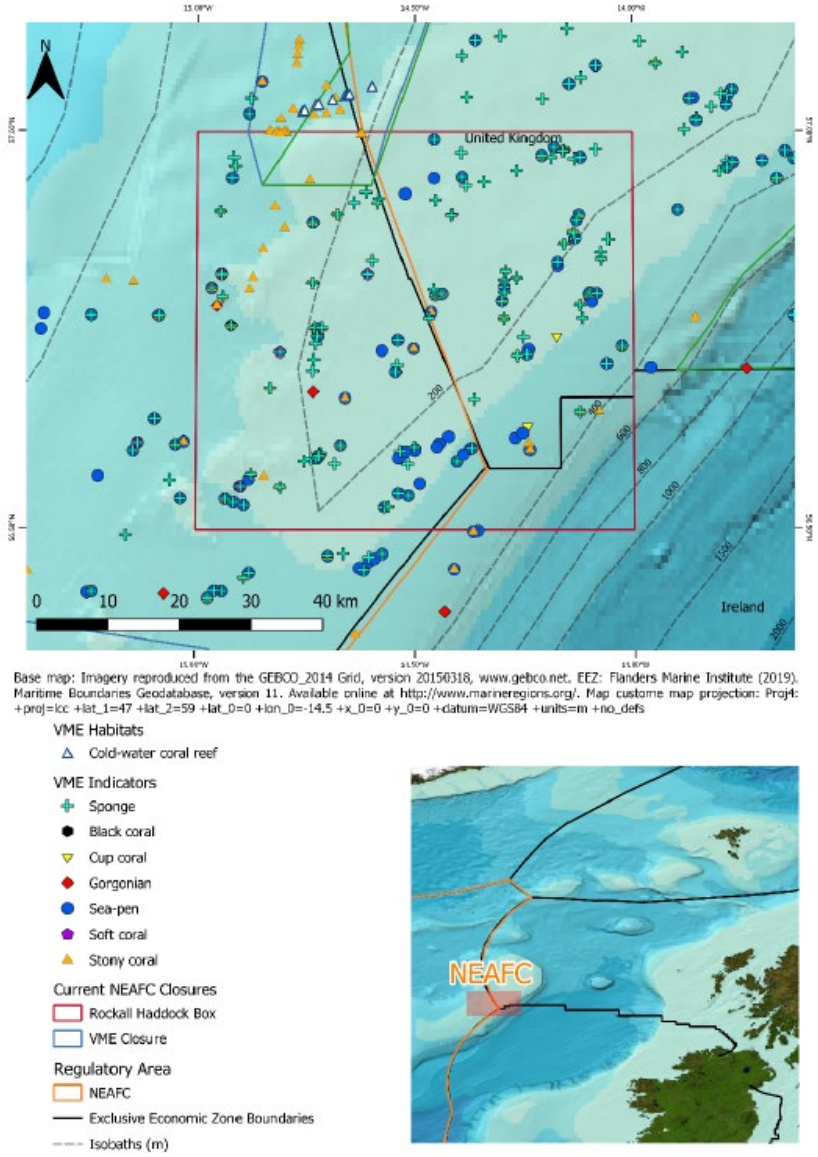

Figure 1. The location of the Rockall Haddock Box closure, including VME habitats and indicator records submitted to the ICES VME database 2016-2019 (ICES, 2020).

Rights and permissions

(Indicate if there are any known issues with giving permission to share or publish these data and what any conditions of publication might be; provide contact details for a contact person for this issue)

All publically available.

Annex 11: Mock Pro Forma NAFO Seamount (Corner Rise) Closure

MOCK Pro Forma Template for Scientific and Other Information

to Evaluate Area-based fisheries management measures (ABFMs) as Potential Other Effective Area-based Conservation Measures (OECMs)

Title/Name of the area: Corner Rise Seamounts

Prepared by (*names, affiliations, title, contact details)*: *Daniela Diz, Associate Professor, Heriot-Watt University, d.diz@hw.ac.uk and WKTOPS Group 3 participants* But in reality, this would be completed by the competent authority

Institution(s) in charge of assessing OECMs (*names, affiliations, title, contact details)*: *WKTOPS workshop*

Abstract (*In less than 200 words*)

The Corner Rise Seamounts are located in the northwest Atlantic in areas beyond national jurisdiction, and under the Northwest Atlantic Fisheries Organization (NAFO) regulatory area. These seamounts chain has been described as an ecologically or biologically significant marine area under two decisions of the Convention on Biological Diversity (CBD, 2012a; 2014a), and have been identified by NAFO contracting parties as a vulnerable marine ecosystem (VME) (NAFO, 2021). Different fisheries measures have been put in place to protect these seamounts and associated species since 2006. In 2016, bottom trawling has been unauthorized to proceed (NAFO, 2021), and requirements for mid-water trawl gear modification were introduced to avoid bottom contact. The mid-water trawl fishery targets splendid alfonsino (*Beryx splendens*). Greenland shark is caught as bycatch. Uncertainties concerning the alfonsino stock status has prevented the NAFO Scientific Council to conduct stock assessments for this stock (NAFO division 6G).[8] The second (and latest) NAFO performance review (NAFO, 2018) has recommended that NAFO '*establishes conservation and management measures for Splendid Alfonsino in Subarea 6, at the earliest opportunity*' (NAFO, 2018). In 2019, the NAFO Scientific Council concluded the stock is depleted and recommended imposing a moratorium. At the subsequent NAFO Annual Meeting, Parties agreed with a moratorium, and the 2020 meeting agreed to maintain the moratorium until 2021, when the stock status will be re-assessed. In 2021, the VME measures will also be reviewed, and scientific proposals to expand the VME closure (see Figure 1 below) will also be considered.

Location

*(Indicate the geographic location of the area, including co-ordinates if available. This should include a location map to be added to the '*Maps, Figures and Tables*' section. It should state if the area is within or outside national jurisdiction, or straddling both.)*

The Corner Rise Seamounts chain is located in the northwest Atlantic Ocean in areas beyond national jurisdiction, and within the Northwest Atlantic Fisheries Organization (NAFO) regulatory area (Figures 1, 2).

[8] Due to lack of abundance or exploitation data, no reliable stock assessment could be conducted.

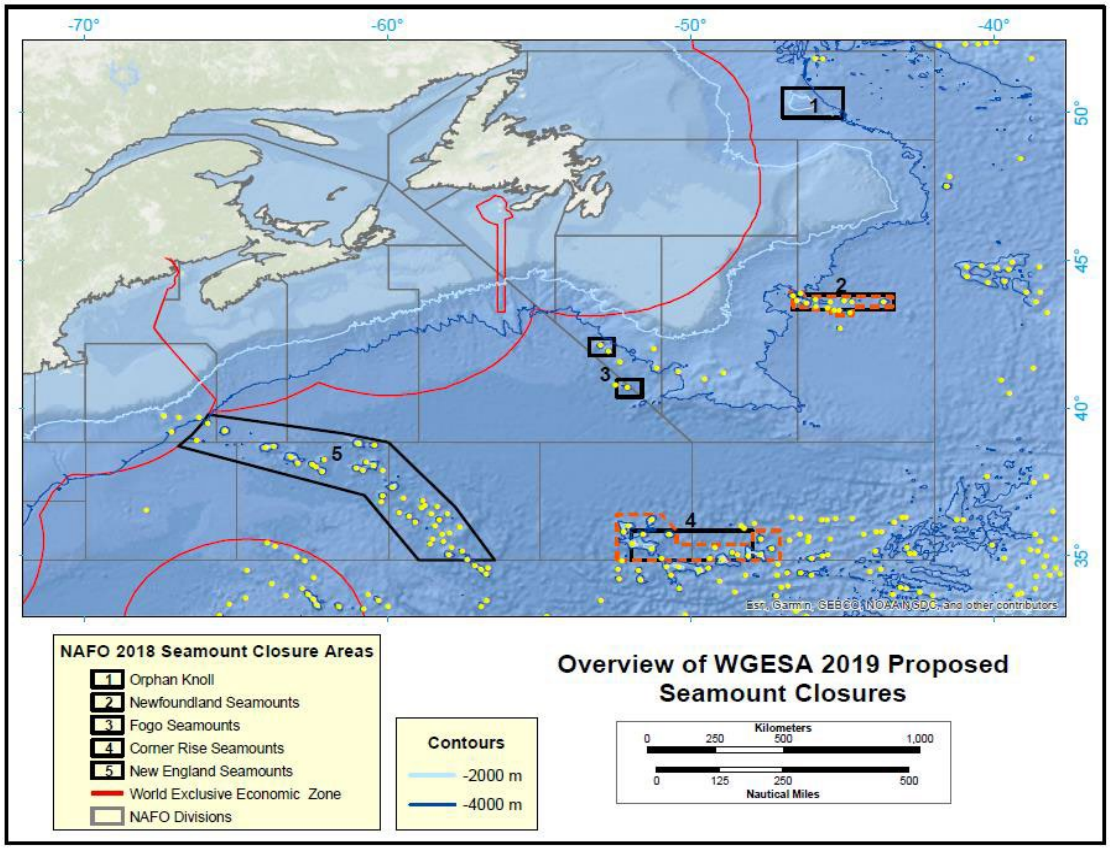

Figure 1. Map showing the location of the current area closed by NAFO to protect Corner Rise Seamounts (Area 4, black outline). The dashed line indicates a proposal tabled in 2020 to expand the current closure and this has been further extended to include all seamounts with peaks < 4000 m in 2021. Yellow circles indicate seamount peak locations. (Figure from NAFO, 2019).

Corner Rise Seamounts	1	35°00'00"N	48°00'00"W
	2	36°00'00"N	48°00'00"W
	3	36°00'00"N	52°00'00"W
	4	35°00'00"N	52°00'00"W

Figure 2. VME bottom fishing closure coordinates.

Description of the proposed area

(Identification of other effective area-based conservation measures should, to the extent possible, document the known biodiversity attributes (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), 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.)

The Corner Rise Seamounts host complex coral and sponge communities, including numerous endemic species. Benthic diversity is very high relative to the surrounding abyssal areas. Seamount slopes and deeper summit environments (greater than 2000 m from the surface) currently remain free of any direct impacts of human activities, although some of the shallower seamounts have been commercially fished (CBD, 2014b).

Waller *et al.* (2007) explored five of the Corner Rise Seamounts using an ROV and documented pristine coral areas as well as 'dramatic evidence of largescale trawling damage' on the summits of Kukenthal peak and Yukutat Seamount (CBD, 2014b) (see also Figure 3 below).

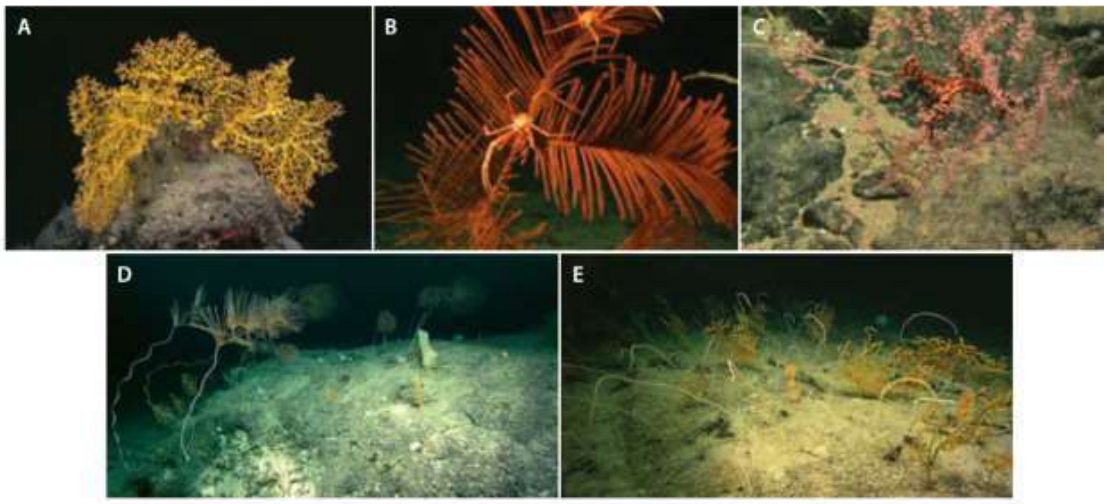

Figure 3. Characteristic features of the New England and Corner Rise seamounts. Habitat-forming coral ecosystems support diverse invertebrate associations on the New England and Corner Rise seamounts, including (a) ophiuroids, shrimp, hydroids, and galatheid crabs associated with the scleractinian *Enallopsammia* on Lyman Seamount (1450 m), (b) chyrostylid crabs on the antipatharian *Plumapathes* on Kükenthal Seamount (915 m), (c) *Ophinocreas oedipus* ophiuroid wrapped around the coral *Metallogorgia melanotrichos*, (d) spiraling *Iridogorgia* corals along with *Metalogorgia* corals and sponges living on an outcrop on the Corner Rise Seamounts, and (e) a soft coral community of *Paramuricea* sp., *Calyptrophora* sp., and *Chrysogorgia* sp. from Corner Seamount (1220 m); (from Shank, 2010).

Lapointe *et al.* (2020) note that 'only one location, Kükenthal Peak on Corner Seamount, was sampled at depths shallower than 1000 m, and this was an area that had been previously trawled by commercial fisheries (Vinnichenko, 1997; Waller *et al.*, 2007; Watling *et al.*, 2007). The basal structures of a variety of corals and sponges were found but most were dead, although there were several small, presumably young, colonies of *Parantipathes larix* and a few colonies of the plexaurid gorgonian coral, *Placogorgia* sp., were observed (Figure S13). The latter species was not found at depths >1200 m on the New England or Corner Rise Seamounts.'[9]

Identify pressures and threats on biodiversity

(Inventory of known or reasonably foreseeable pressures and threats on biodiversity features, their nature, scale and source, and the range of societal and ecological values attached to the components.)

- Mid-water trawl for alfonsino could potentially pose a threat to biodiversity in cases such as: moratorium is lifted in absence of a robust stock assessment that informs the TAC, and effective bycatch measures to prevent the bycatch of Greenland sharks are not in place;
- Deep seabed mining could pose a threat;
- Climate change and ocean acidification could pose a threat.

[9] Ibid.

Data and information available on the fisheries and the ecosystem

(Describe the available data sources, e.g., distribution maps; 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 features of concern; ecosystem services (including food and livelihoods) and other relevant values affecting conservation; possible threats and pressures; existing MPAs (networks, seascapes) and other conservation measures. Provide details of the sources in the 'Relevant Databases' section)

Corner Rise Seamounts VME:

The Corner Rise Seamounts chain has been described as an area that meets the ecologically or biologically significant marine area Criteria under two decisions of the Convention on Biological Diversity Conference of the Parties (CBD, 2012a; 2014a). This seamounts chain has been identified by NAFO contracting parties as a vulnerable marine ecosystem (VME); (NAFO, 2021). Different fisheries measures have been put in place to protect these seamounts and associated species since 2006. In 2016, bottom trawling was unauthorized to proceed (NAFO, 2021), and requirements for mid-water trawl gear modification were introduced to avoid bottom contact. The mid-water trawl fishery targets splendid alfonsino (*Beryx splendens*) species. Greenland shark species is caught as bycatch. Uncertainties concerning the alfonsino stock status has prevented the NAFO Scientific Council to conduct stock assessments for this stock (NAFO division 6G).[10] The second (and latest) NAFO performance review (NAFO, 2018) has recommended that NAFO '*establishes conservation and management measures for Splendid Alfonsino in Subarea 6, at the earliest opportunity'* (NAFO, 2018). In 2019, the NAFO Scientific Council concluded the stock is depleted and recommended imposing a moratorium. At the subsequent NAFO Annual Meeting, Parties agreed with a moratorium, and the 2020 meeting agreed to maintain the moratorium until 2021, when the stock status will be re-assessed. In 2021, the VME measures will also be reviewed, and scientific proposals to expand the VME closure (see Figure 1) will also be considered.

Latest records of the catch in this area date back to 2019. NAFO Scientific Council stated that:

'One Spanish trawler operated during 2019 in Div. 6G NAFO Regulatory Area using a midwater trawl gear. The fishing effort of this trawler was 8 days (33 hours). The most important species in catches was the *Beryx splendens* and Greenland shark *(Somniosus microcephalus)*' (NAFO, 2020b).

The NAFO Commission stated that 'One vessel (class size 5) spent 10 fishing days, as part of its fishing trip, in Division 6G catching alfonsinos.' (NAFO, 2020b).

The latest NAFO Scientific Council assessment of the splendid alfonsino in subarea 6 states that 'Alfonsino is distributed over a wide area which may be composed of several populations. Stock structure is unknown. Until more complete data on stock structure is obtained it is considered that separate populations live on each seamount. Alfonsino is an oceanic demersal species which form distinct aggregations, at 300–950 m depth, on top of seamounts in the North Atlantic'.

Most published growth studies suggest a maximum life span between 10 and 20 years. The observed variability in the maximum age / length depends on the geographic region. Sexual maturation was found to begin at age 2 and at a mean length of 18 cm. By age 5–6 years, all individuals were mature at 25–30 cm fork length. On the Corner Rise Seamounts, alfonsino were observed to spawn from May–June to August–September.

[10] Due to lack of abundance or exploitation data, no reliable stock assessment could be conducted.

As a consequence of the species association with seamounts, their life-history, and their aggregation behaviour, this species is easily overexploited and can only sustain low rates of exploitation' (NAFO, 2020b).

Spatial distribution of the fishery:

With respect to the spatial distribution of the fishery (Figures 4, 5), the NAFO Scientific Council noted that:

'Kükenthal peak in NAFO Div. 6G is the western summit of the Corner Rise seamount. SC plotted the location of the peak as defined by its 1800 m contour according to bathymetric charts produced by GEBCO (www.gebco.net) and the Canadian hydrographic service. The correspondence between the two data sources was reasonably good (Figure xii.1), however it should be noted that confidence in available bathymetry mapping is uncertain.' (NAFO, 2020b).

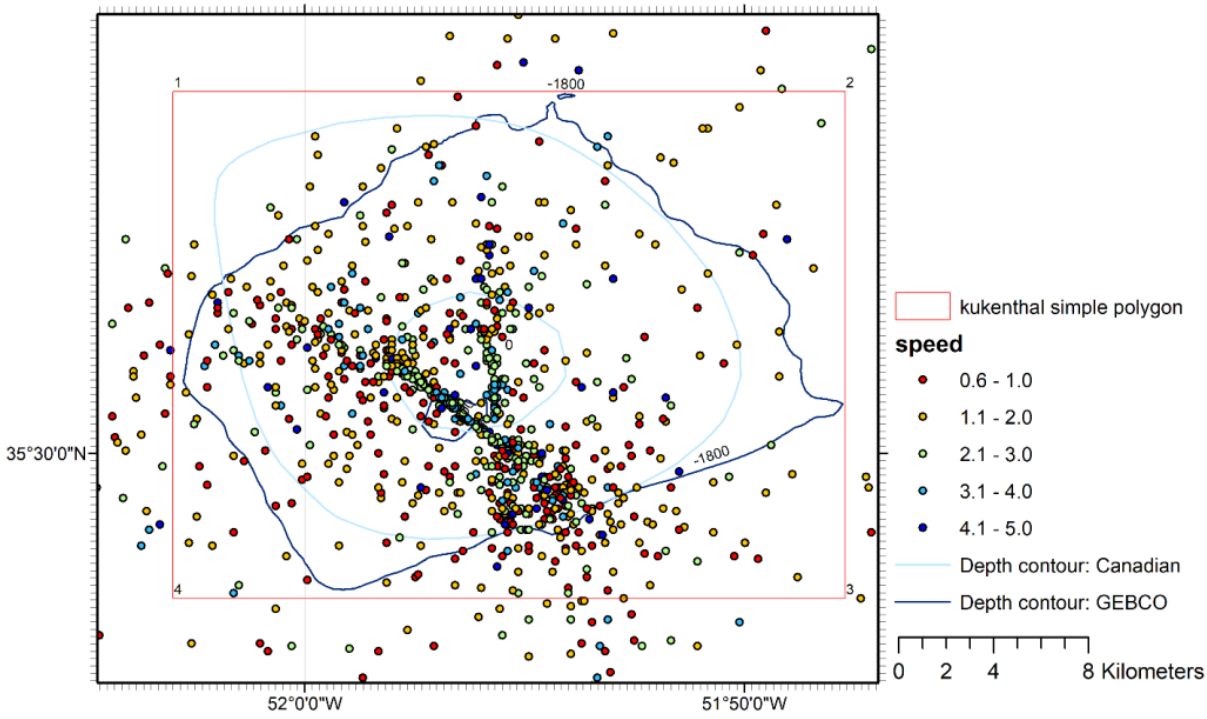

Figure 4. VMS positions in the vicinity of the Kukenthal Peak filtered for speeds between 0.5 and 5 knots, with a polygon (red line) proposed to delineate the Kukenthal peak (as per figure xii.2 of NAFO, 2020b).

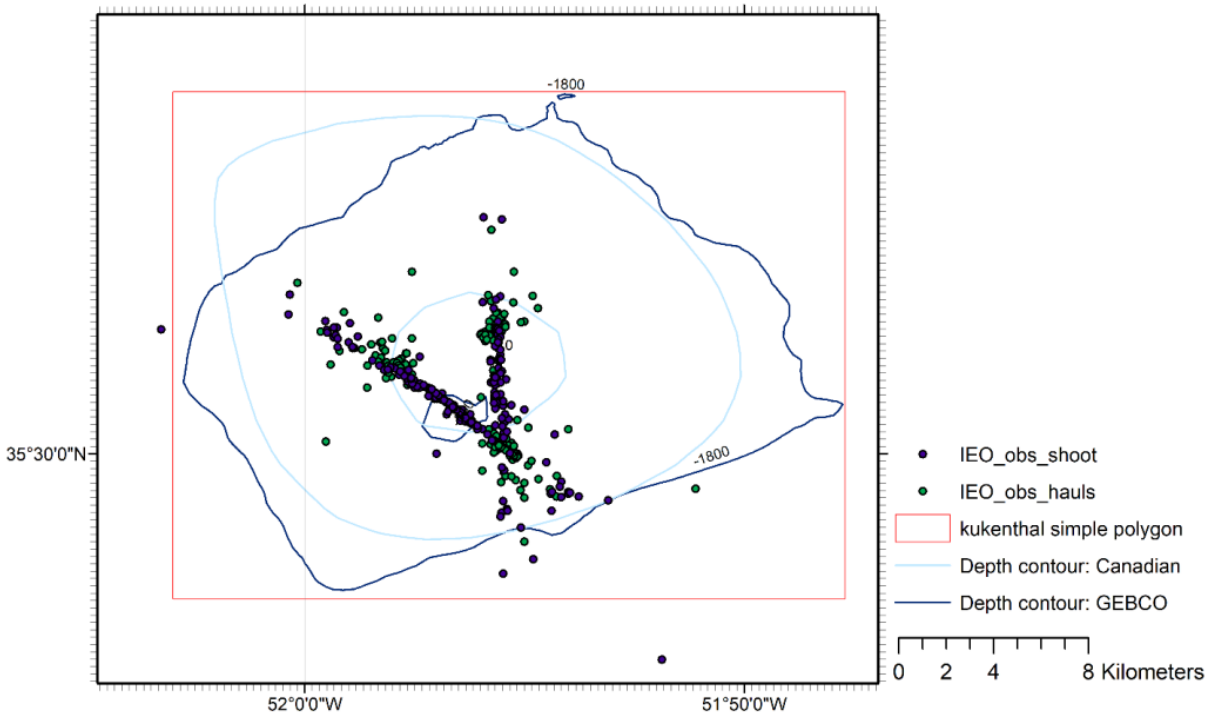

Figure 5. Start and end positions of fishing operations observed by Spanish scientific observers from 2009, 2012 and 2016-2018, with a polygon (red line) proposed to delineate the Kukenthal peak (as per figure xii.3 of NAFO, 2020b).

Greenland Shark bycatch:

Greenland sharks are caught as bycatch in this fishery. The Scientific Council has indicated that sources of uncertainties exist concerning reporting rates and inconsistencies in reporting requirements because catch weight is visually estimated, and catch numbers have typically not been reported. (NAFO, 2020b) The NAFO CEM requires that reporting information on Greenland sharks bycatch include catch numbers, length, sex and condition (NAFO, 2021).

While there was an agenda item dedicated to the Bycatch and discards of Greenland sharks (for the entire NAFO regulatory area) at the 2020 NAFO Commission meeting, this item was deferred to 2021. The Commission requested that the Scientific Council Work with WG-BDS (Bycatch and Discards WG) to identify areas and times where bycatch and discards of Greenland sharks have a higher rate of occurrence in time for consideration by the Commission in 2021 to inform the development of measures to reduce bycatch in the NAFO Regulatory Area. (NAFO, 2020b).

Assessment of the area against CBD Criteria

(Discuss the area in relation to each of the CBD Criteria and relate the best available science. Please note where there are significant information gaps)

CBD Criteria **CBD/COP/DEC/14/8**	**Description** (Annex III.B to Decision 14/8)	**Ranking of criterion relevance** (please mark one column with an X)		
		No information	**True**	**False**
Criterion A: Area is not currently recognized as a protected area				
Not a protected area	The area is not currently recognized or reported as a protected area [MPA] or part of a protected area [MPA]; it may have been established for another function.		X	

Explanation for ranking (Criteria (A) is absolute and, if not met, it is enough to disqualify the area.)

This area is not a protected area (not included in the WCMC WDPA database).

Criterion B: Area is governed and managed

B.1. Geographically defined space	Size and area are described, including in three dimensions where necessary.		X	
	Boundaries are geographically delineated.		X	

Provide details of the location

Corner Rise Seamounts	1	35°00'00"N	48°00'00"W
	2	36°00'00"N	48°00'00"W
	3	36°00'00"N	52°00'00"W
	4	35°00'00"N	52°00'00"W

Source: NAFO (2021). See also maps in the first section of this pro forma.

B.2. Legitimate governance authorities	Governance has Legitimate Authority and is appropriate for achieving *in situ* conservation of biodiversity within the area.		X	

Explanation for ranking

Yes, NAFO is the Legitimate Authority for fisheries in the area (but please note that NAFO does not manage species managed by other fishery bodies, i.e. salmon (NASCO), tunas/marlins (ICCAT), and whales (NAMMCO). The legal basis are the NAFO Convention (2020a) and the NAFO Conservation and Enforcement Measures (NAFO, 2021). Other activities such as shipping and deed seabed mining are regulated by the International Maritime Organization (IMO) and the International Seabed Authority (ISA), respectively.

	Governance by indigenous peoples and local communities is self-identified in accordance with national legislation and applicable international obligations.			X

Explanation for ranking

Not applicable/ no IPLCs interests have been identified for this area

	Governance reflects the equity considerations adopted in the Convention.		X	

Explanation for ranking

Yes, While decisions are taken by Contracting Parties, NAFO has observer procedures and a transparent decision-making process that allow for stakeholders to be involved (incl. NGOs, industry).

	Governance may be by a single authority		X*	

	and/or organization or through collaboration among relevant authorities and provides the ability to address threats collectively.			
Explanation for rankings (Detail the Legitimate Authorities responsible for implementing the area-based management measure(s); Explain how the identified body has competence for management of threats to biodiversity within the area by detailing those threats) NAFO has the mandate to adopt conservation and management fishing measures concerning the Corner Rise Seamounts VME and the alfonsino fishery (NAFO, 2020a; 2021). Other sectors are not regulated by NAFO, but while there is room for improvement, efforts are being made to increase coordination or at least information sharing with other competent authorities in the NAFO regulatory area (e.g., with ISA). There is an MOU in place with the Sargasso Sea Commission. For other parts of the regulatory area that overlap with Canadian extended continental shelf (which is not relevant for these seamounts area), there has been increasing efforts to improve cooperation with the Canada-Newfoundland Offshore Petroleum Board. Importantly, the NAFO Scientific Council is requested to provide updates on relevant research related to the potential impact of activities other than fishing in the Convention Area from time to time. * This is one of the instances where the ranking would benefit from another column indicating 'yes, but there is room for improvement' or something in this sense.				
B.3. Managed	Managed in ways that achieve positive and sustained outcomes for the conservation of biological diversity.		X*	
Explanation for rankings The Seamounts are currently protected from significant adverse impacts from bottom fishing under NAFO's VME measures (NAFO, 2021). The current measures (bottom trawl ban and mid-water trawl modified gear permission will be reviewed later in 2021. The associated fishery for alfonsino is currently under moratorium as the stock appears to be depleted (NAFO, 2020b). Stock assessment uncertainties exist (NAFO, 2020b). Bycatch for Greenland sharks in this fishery has yet to be addressed before the fishery re-opens. * This is another case that uncertainties on the whether these measures suffice for the achievement of positive and sustained outcomes have been highlighted – perhaps the ranking here could also be 'yes, but with improvements'.				
	Relevant authorities and stakeholders are identified and involved in management.		X	
Explanation for rankings Yes – it is a smaller group of stakeholders engaged in the decision-making process since it is a sectoral organisation with competence in areas beyond national jurisdiction. Decisions are taken by States. Industry is part of delegations, and observers (NGOs, academia) can attend meetings and some delegations allow NGOs in their team, NGOs can make statements and provide expertise.				
	A management system is in place that contributes to sustaining the *in situ* conservation of biodiversity.		X	

Explanation for rankings Yes as it is an in-situ conservation measure as per CBD Art 2 definition that NAFO has competence to adopt under its 2017 Convention, and in light of UNGA Resolution 61/105 (2006) and subsequent resolutions on vulnerable marine ecosystems.				
	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.		X*	
Explanation for rankings (Provide details for each element, citing relevant sources) VME closures are usually reviewed every 5 years (NAFO, 2021). The next round of review will take place in 2021. There are processes in place to identify and manage new fisheries threats (VME scientific reviews, and stock assessments, ecosystem approach roadmap, etc.), and efforts to enhance cooperation with other competent bodies in the area has been made – but it is still too soon to tell if these cooperative efforts would be sufficient to prevent new threats from these other sectors. *In principle there are processes and procedures in place for NAFO decisions to be taken based on scientific advice, but it not clear if the 5 year closure review could be sufficient for achieving long-term outcomes. However, these closures are usually renewed.				
Criterion C: Achieves sustained and effective contribution to *in situ* conservation of biodiversity *(Produces long-term* in situ *biodiversity conservation outcomes)*				
C.1. Effective	The area achieves, or is expected to achieve, positive and sustained outcomes for the *in situ* conservation of biodiversity.		X	
	Threats, existing or reasonably anticipated ones are addressed effectively by preventing, significantly reducing or eliminating them, and by restoring degraded ecosystems.		X	
	Mechanisms, such as policy frameworks and regulations, are in place to recognize and respond to new threats.		X*	
	To the extent relevant and possible, management inside and outside the other effective area-based conservation measure is integrated.		X	
Explanation for rankings (Provide details for each element, citing relevant sources) • Sustained outcomes are expected (on the benthic ecosystem), but further understanding between the benthic-pelagic coupling would be beneficial to further assess the effectiveness of the measures in place, and bycatch measures could be improved. • There are frameworks in place from other sectors (whether they will be effective or not is a different question); e.g., there is uncertainty around new mining regulations being negotiated at the ISA – whether or not those will be able to prevent any threats to these seamounts.				

<table>
<tr><td colspan="5">

- Integration: there has been efforts by NAFO to understand pressures from other sectors in the NAFO regulatory area, there has been efforts to sign MoUs, and increased cooperation with other competent authorities.

*Qualified 'yes' in light of the above.
</td></tr>
<tr><td>C.2. Sustained over long-term</td><td>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.</td><td></td><td>X*</td><td></td></tr>
<tr><td colspan="5">Explanation for ranking (detail the time frame(s) for the management measures

VME measures are reviewed every 5 years (NAFO, 2021; Art. 23 (2) (a)), but the provisions of this chapter of the NCEM shall be reviewed no later than 2022 (NAFO, 2021; Art. 24). The conservation and management measures for this VME will be reviewed by the NAFO Commission in its Annual Meeting in 2021. Current restrictions for bottom fishing activities on seamounts are in place until 31 December 2021. Under these restrictions, 'no vessel shall engage in bottom fishing activities in any of the' identified polygons (see figure 1 in the introductory section of this pro forma for the map of this seamount chain polygon measure) (NAFO, 2021; Art. 17.1) While bottom trawl is not allowed as per Art 17(1), gear requirements for mid-water trawl are the following:

'when fishing in the seamount closures defined in Article 17(1), only gear that is designed to fish for pelagic species, no portion of which is designed to be or is operated in contact with the bottom at any time, is allowed. The gear shall not include discs, bobbins or rollers on its footrope or any other attachments designed to make contact with the bottom. The trawl may have chafing gear attached' (NAFO, 2021; Art. 13(8))

On bycatch of Greenland sharks: The Scientific Council has indicated that sources of uncertainties exist concerning reporting rates and inconsistencies in reporting requirements because catch weight is visually estimated, and catch numbers have typically not been reported. (NAFO, 2020b) The NAFO CEM requires that reporting information on Greenland sharks bycatch include catch numbers, length, sex and condition (NAFO, 2021; Art 30.14 (j)). While there was an agenda item dedicated to the Bycatch and discards of Greenland sharks (for the entire NAFO regulatory area) at the 2020 NAFO Commission meeting, this item was deferred to 2021. The Commission requested that the Scientific Council Work with WG- BDS (Bycatch and Discards WG) to identify areas and times where bycatch and discards of Greenland sharks have a higher rate of occurrence in time for consideration by the Commission in 2021 to inform the development of measures to reduce bycatch in the NAFO Regulatory Area. (NAFO, 2020b).

*Qualified 'yes' in light of the above.</td></tr>
<tr><td>C.3. In situ conservation of biological diversity</td><td>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).</td><td></td><td>X</td><td></td></tr>
</table>

Explanation for ranking The VME measure is based on scientific assessments that the area meets the VME Criteria (as well as the EBSA criteria) and the description of the biodiversity range is contained in multiple Scientific Council and its Working Group on Ecosystem Science and Assessment (WGESA) reports that informed the conservation and management measures in place under NCEM. Some of these reports include: • Report of the 6th Meeting of the NAFO Scientific Council Working Group on Ecosystem Science and Assessment (WGESA). First review of VME closures in 2013 (NAFO, 2013); • Report of the 12th Meeting of the NAFO Scientific Council Working Group on Ecosystem Science and Assessment (WG-ESA). 2nd review of VME closures in 2019 (NAFO, 2019); • Information contained in Lapointe *et al*. (2020) on the characterisation of megabenthic assemblages in the lower bathyal zone of the Corner Rise Seamounts is informing the ongoing NAFO scientific VME re-assessment.				
C.4. Information and monitoring	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.		X	
	A monitoring system informs management on the effectiveness of measures with respect to biodiversity, including the health of ecosystems.	X		
	Processes should be in place to evaluate the effectiveness of governance and management, including with respect to equity.		X	
	General data of the area such as boundaries, aim and governance are available information.		X	

Explanation for rankings and details of monitoring systems (Identifying the methodologies that might be used for these assessments)

The management measures adopted for the Corner Rise Seamounts were based on scientific description of the area by the NAFO Scientific Council and its WGESA, as well as EBSA descriptions (2012 and 2014). For example, The Sargasso Sea EBSA description (2012) notes that:

'These seamounts support complex coral and sponge communities, including numerous endemics, which provide habitat for diverse invertebrate communities that include some highly dependent commensal species (Watling, 2007; Watling *et al*., 2007; Cho, 2008; Simpson and Watling, 2011; Pante and Watling, 2011; ICES, 2011; Shank, 2010). These seamounts also host abundant populations of deep-water fish, which have been heavily exploited commercially since 1976 (Vinnichenko, 1997), but despite this they remain important as aggregating and spawning areas for the alfonsino (*Beryx splendens*). Deep-sea and seamount fish stocks are particularly vulnerable to exploitation because the fish are very long-lived, take many years to reach sexual maturity, and have very low fecundities (Norse *et al*., 2012).' (see Area description of the EBSA pro forma online: https://chm.cbd.int/database/record?documentID=200098)

- No cultural/spiritual values have been identified to date. Monitoring system that informs management is not as robust as the system for within the fishing footprint where other VMEs are more regularly monitored. Outside the fishing footprint, the exploratory fisheries protocol applies. Fisheries survey methods are still to be adopted (expected to be adopted later in 2021) (see Carrera and Gonzales-Costas, 2020).
- Scientific cruises/research by independent scientists has been regularly conducted from at least from 2003 to 2014 (see Lapointe *et al*., 2020), and these findings are incorporated in WGESA/Scientific Council assessments. However, no NAFO VME monitoring programme currently exist for the area.
- Effective governance/management is usually addressed by the scientific review of the closures. Peer-review literature and ongoing research in the area informs the reviews.
- Independent RFMO performance reviews also serve this purpose in a more general way. For example, in the 2018 NAFO performance review, the panel recommended adopting management measures for the alfonsino fishery in the area.

Criterion D: Associated ecosystem functions and services and cultural, spiritual, socio-economic and other locally relevant values (*Maintains ecosystem functions and services, and upholds locally relevant values*)				
D.1. Ecosystem functions and services	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.	X		
	Management to enhance one particular ecosystem function or service does not impact negatively on the sites overall biological diversity information.	X		

Explanation for rankings There has been increased efforts by NAFO scientists in assessing the ecosystem function and services of VMEs within and in the adjacent areas of the NAFO fishing footprint. The Corner Rise Seamounts are located outside the fishing footprint and not regularly monitored so far under NAFO, although these seamounts have been researched and scientifically assessed in peer-review literature (see Watling *et al.*, 2007; Cho, 2008; Shank, 2010; Simpson and Watling, 2011; Pante and Watling, 2012; Lapointe *et al.*, 2020). The functions and services may be inferred by comparison with other regions, or from literature more broadly. The EBSA description that notes the role of those seamounts collectively in providing a series of spatially structured features that form a broad corridor that may facilitate gene flow among deep sea populations and pelagic fauna, nursery, or feeding opportunities for migratory species (CBD, 2014b).				
D.2. Cultural, spiritual, socioeconomic and other locally relevant values	Governance and management measures identify, respect and uphold the cultural, spiritual, socioeconomic, and other locally relevant values of the area, where such values exist.		X	
	Governance and management measures respect and uphold the knowledge, practices and institutions that are fundamental for the *in situ* conservation of biodiversity.		X	
Explanation for rankings (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). • Ecological values have been described above and under NAFO scientific assessments, EBSA descriptions, and peer-review literature mentioned above. • This area is located in areas beyond national jurisdiction and far away from the coast. Although there may be cultural, spiritual, socio-economic values associated with them, it is not known.				

Assessing additional OECM properties (Optional)

Other Criteria	**Description**	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Medium**	**High**
Add relevant criteria					
Explanation for ranking and details of the criteria					

References

(e.g., relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to relevant audio/visual material, video, models, etc.)

Carrera, P., and Gonzales-Costas, F. 2020. Sampling Plan for an Acoustic Survey of Kükenthal Peak (NAFO Division 6G) to Quantify Alfonsino (*Beryx splendens*) Biomass, Abundance and Size Composition. NAFO Scientific Council Meeting, June 2020. NAFO SCR Doc. 20/036, Serial No. N7084: 24pp. https://www.nafo.int/Portals/0/PDFs/sc/2020/scr20-036.pdf (Access date 2-5-2021).

CBD. 2012a. Decision XI/17 Marine and coastal biodiversity: ecologically or biologically significant marine areas. 11th Meeting of the Conference of the Parties to the Convention on Biological Conservation, 8-19 October, Hyderabad, India. UNEP/CBD/COP/DEC/XI/17: 32pp. https://www.cbd.int/doc/decisions/cop-11/cop-11-dec-17-en.pdf (Access date 2-5-2021).

CBD. 2012b. Report of the Wider Caribbean and Western Mid-Atlantic Regional Workshop to Facilitate the Description of Ecologically or Biologically Significant Marine Areas. 16th Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice, 30 April – 5 May, Montreal, Canada. UNEP/CBD/SBSTTA/16/INF/7: 241pp. https://www.cbd.int/doc/meetings/mar/rwebsa-wcar-01/official/rwebsa-wcar-01-sbstta-16-inf-07-en.pdf (Access date 2-5-2021).

CBD. 2014a. Decision XII/22 Marine and coastal biodiversity: ecologically or biologically significant marine areas (EBSAs). 12th Meeting of the Conference of the Parties to the Convention on Biological Conservation, 6-17 October, Pyeongchang, Republic of Korea. UNEP/CBD/COP/DEC/XII/22: 59pp. https://www.cbd.int/doc/decisions/cop-12/cop-12-dec-22-en.pdf (Access date 2-5-2021).

CBD. 2014b. Report of the Northwest Atlantic Regional Workshop to Facilitate the Description of Ecologically or Biologically Significant Marine Areas, 24-28 March, Montreal, Canada. UNEP/CBD/EBSA/WS/2014/2/4: 122pp. https://www.cbd.int/doc/meetings/mar/ebsaws-2014-02/official/ebsaws-2014-02-04-en.pdf (Access date 2-5-2021).

Cho, W. 2008. Faunal biogeography, community structure, and genetic connectivity of North Atlantic seamounts. PhD Dissertation, Massachusetts Institute of Technology and Woods Hole Oceanographic Institution. 177pp.

Lapointe, A. E., Watling, L., France, S. C., and Auster, P. J. 2020. Megabenthic assemblages in the lower bathyal (700-3000m) on the New England and Corner Rise Seamounts Northwest Atlantic. Deep-Sea Research Part I: Oceanographic Research Papers, 165: 103366. https://doi.org/10.1016/j.dsr.2020.103366.

NAFO. 2013. Report of the 6th Meeting of the NAFO Scientific Council Working Group on Ecosystem Science and Assessment (WGESA). NAFO SCS Doc. 13/024, Serial No. N6277: 207pp. https://www.nafo.int/Portals/0/PDFs/sc/2013/scs13-24.pdf (Access date 2-5-2021).

NAFO. 2018. NAFO performance review panel report 2018. NAFO, Nova Scotia, Canada. 72pp.

https://www.nafo.int/Portals/0/PDFs/Performance/NAFOPerformanceReviewPanelRpt2018.pdf (Access date 2-5-2021).

NAFO. 2019. Report of the 12th meeting of the NAFO Meeting of the NAFO Scientific Council (SC) Working Group on Ecosystem Science and Assessment (WGESA), NAFO Headquarters, Dartmouth, NS, Canada, 19- 28 November 2019. NAFO SCS Doc. 19/25, Serial No. N7027: 135pp. https://www.nafo.int/Portals/0/PDFs/sc/2019/scs19-25.pdf (Access date 2-5-2021).

NAFO. 2020a. Convention on the cooperation in the Northwest Atlantic Fisheries. NAFO, Nova Scotia, Canada. 38pp. https://www.nafo.int/Portals/0/PDFs/key-publications/NAFOConvention.pdf (Access date 2-5-2021).

NAFO. 2020b. Report of the NAFO Scientific Council Annual Meeting, 21 - 25 September. NAFO SCS Doc. 20/19, Serial No. N7123: 85pp. https://www.nafo.int/Portals/0/PDFs/sc/2020/scs20-19.pdf (Access date 2-5-2021).

NAFO. 2021. Northwest Atlantic Fisheries Organization Conservation and Enforcement Measures 2021. NAFO/COM Doc. 21/01: 194pp. https://www.nafo.int/Portals/0/PDFs/COM/2021/comdoc21-01.pdf (Access date 2-5-2021).

Norse, E. A., Brooke, S., Cheung, W. W. L., Clark, M. R., Ekeland, I., Froese, R., *et al*. 2012. Sustainability of deep-sea fisheries. Marine Policy, 36(2): 307-320. https://doi.org/10.1016/j.marpol.2011.06.008.

Pante, E., and Watling, L. 2012. *Chrysogorgia* from the New England and Corner Seamounts: Atlantic-Pacific connections. Journal of the Marine Biological Association of the United Kingdom, 92(5): 911-927. https://doi.org/10.1017/S0025315411001354

Shank, T. M. 2010. Spotlight 4: New England and Corner Rise Seamounts. Oceanography, 23:104-105.

Simpson, A., and Watling, L. 2011. Precious corals (Octocorallia: Coralliidae) from the Northwestern Atlantic. Journal of the Marine Biological Association of the United Kingdom, 91(2): 369-382. https://doi.org/10.1017/S002531541000086X

Vinnichenko, V. I. 1997. Russian Investigations and Deep Water Fishery on the Corner Rising Seamount in Subarea 6. NAFO Scientific Council Studies 30: 41-49. https://archive.nafo.int/open/studies/s30/Vinnichenko.pdf (Access date 2-5-2021).

Watling, L., Waller, R., and Auster, P. J. 2007. Corner Rise Seamounts: the impact of deep-sea fisheries. ICES Insight, 44: 10-14.

Relevant Databases

The Seamount Catalog is a digital archive for bathymetric seamount maps that can be viewed and downloaded in various formats. This catalogue contains morphological data, sample information, related grid and multibeam data files, as well as user-contributed files that all can be downloaded. Currently this catalog contains more than 1800 seamounts from all the oceans.

http://earthref.org/SC/

CBD EBSA repository:

Sargasso Sea EBSA: https://chm.cbd.int/database/record?documentID=200098

New England and Corner Rise Seamounts EBSAs: https://chm.cbd.int/database/record?documentID=200098

EBSA information sharing mechanism**:** https://www.cbd.int/ebsa/

Maps, Figures and Tables

See Figures 1-3 from the first section of the pro forma.

Rights and permissions

(Indicate if there are any known issues with giving permission to share or publish these data and what any conditions of publication might be; provide contact details for a contact person for this issue)

No known issues.

Annex 12: Mock Pro Forma Lyme Bay Mussel Farm

MOCK Pro Forma Template for Scientific and Other Information to Evaluate Area-based fisheries management measures (ABFMs) as Potential Other Effective Area-based Conservation Measures (OECMs)

Title/Name of the area: Lyme Bay Mussel Farm

Prepared by (*names, affiliations, title, contact details)***:**

Dr Emma Sheehan
Associate Professor of Marine Ecology
School of Biological and Marine Sciences
University of Plymouth
UK
Email: emma.sheehan@plymouth.ac.uk

Llucia Mascorda Cabre
PhD Candidate
School of Biological and Marine Sciences
University of Plymouth
UK
Email: llucia.mascordacabre@plymouth.ac.uk

and WKTOPS Group 3 participants

Institution(s) in charge of assessing OECMs (*names, affiliations, title, contact details)***:**

ICES IUCN-CEM-FEG WKTOPS workshop

Abstract (*In less than 200 words*)

Mussel aquaculture installations have been shown to have a wide range of impacts on the surrounding environment and generate space user conflicts. However, there is some evidence that moving these installations offshore could mitigate these impacts, while providing important ecosystem services.

The Lyme Bay mussel farm is an offshore long-line mussel aquaculture development in Lyme Bay, southwest UK. The farm is located in an area of historic heavy fishing activity which has had to cease due to the introduced structure of ropes, lines, buoys and anchors into the benthic and pelagic ecosystem. A BACI methodology (eight years) has been used to monitor the ecosystem pre- and post-development through the use of a wide range of survey techniques such as underwater video towed array, ROV, baited seabed underwater video, midwater video, plankton net trawls, benthic grabs, CTD maestro, bird and mammal surveys, ADCP and acoustic telemetry. This has been coupled with a socio-economic study.

Results to date show a creation of biogenic mussel reef habitat below the farm, large aggregations of pelagic fishes around the mussel farm headlines acting as a FAD, nursery, food source and as

habitat for epibiota (Mascorda Cabre *et al.*, 2021; Sheehan *et al.*, 2019, 2020). Important commercial species have been recorded showing a trend of greater abundance of epibenthic species. The benthic ecosystem, infaunal community or the zooplankton communities were not negatively affected by the mussel farm. Perceptions from local fishers were mixed as some had been displaced by the development while others have noticed an increase in their catch around the farm and recognised the potential for the farm to have a positive effect on fisheries. There was no evidence that the farm had increased landings in the area.

Location

*(Indicate the geographic location of the area, including co-ordinates if available. This should include a location map to be added to the '*Maps, Figures and Tables*' section. It should state if the area is within or outside national jurisdiction, or straddling both.)*

The offshore mussel farm in situated in Lyme Bay, the South West of England (*Figure 3*), in the English Channel. Lyme Bay is a large, open embayment with a moderate slope from the intertidal zone to up to 50m depth in the central outer reaches. Most of the Bay is backed by cliffs (CEFAS, 2015).

The mussel farm is a suspended rope type of mussel aquaculture located in an exposed area between about 3 and 10 km offshore of Sidmouth and Seaton in depths of between 20 and 30 m relative to chart datum in Lyme Bay (*Figure 3*). The farm leased 15 km2 of seabed from The Crown Estate (*Figure 2*) to deploy a specially designed technology of suspended longline ropes to cultivate the native blue mussel *Mytilus edulis*. When fully operational, these three sites will cover a total area of 15.4 km² and produce up to 10,000 tonnes of mussels per year. The mussel farmers have mussel lines in Sites 1 and 2 only since November 2013. The total area developed to date is about 12 km² (each site has an area of 3x2km). Most of the development is now focused in Site 2 at about half of its capacity. The farm was built around a 15° angle south to the prevailing flow direction with a prevailing flow direction eastwards and more or less parallel to the isobar.

The competent authority considered the farm to be 'offshore' as the central point of all three sites lie at least 5 km from the shore. The Good Practice Guide (EU Working Group on the Microbiological Monitoring of Bivalve Mollusc Harvesting Areas, 2014) outlines that the term 'offshore' is equivalent to the term 'remote area' upon which no sources of contamination impact.

Coordinates (The Crown Estate, 2010):

Site 1	Site 2
50° 35.556' N 3° 15.086' W	50° 39.010' N 3° 11.700' W
50° 35.927' N 3° 13.488' W	50° 39.200' N 3° 10.028' W
50° 34.397' N 3° 12.632' W	50° 37.600' N 3° 09.600' W
50° 34.025' N 3° 14.205' W	50° 37.405' N 3° 11.281' W

Description of the proposed area

(Identification of other effective area-based conservation measures should, to the extent possible, document the known biodiversity attributes (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), 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.)

Lyme Bay has been identified as a 'marine biodiversity hotspot', holding particularly high species richness and making it one of England's most important areas for marine biodiversity

(Fleming and Jones, 2012; JNCC, 2010; Singer and Jones, 2018). The Bay contains a mosaic of substrates including sand, mud, gravel, rock and mixed ground (Rees *et al.*, 2016). The area protects UK Biodiversity Action Plan (BAP) species and habitats such as the pink sea fan (*Eunicella verrucosa*), seagrass beds (Eelgrass) and honeycomb worm (*Sabellaria alveolata*) reefs (NE, 2010). These are important in terms of ecology, conservation and socio-economics (Sheehan *et al.*, 2016) as they interact to support the delivery of several ecosystem processes (i.e. primary and secondary production) and ecosystem services (i.e. fish for food) (Rees *et al.*, 2016). The site is home to several areas of national and international conservation importance, holding different marine protected areas (MPA) designated with various levels of spatial management (Figure 1).

Lyme Bay is home to important fishing grounds where different fishing methods are used contributing 12% of the SW England Gross Value Added (GVA) in 2016 (Sheehan *et al.*, 2016; Singer and Jones, 2018). A large number of recreational users, including sea anglers and dive charters operate around the reefs and wrecks of Lyme Bay, significantly contributing to the local community (Rees *et al.*, 2016; Sheehan *et al.*, 2016; Singer and Jones, 2018).

The mussel farm is located in a heavily impacted area as a result of historical heavy fishing activity. In 2013, when the 'before impact' survey was undertaken, the results from sediment grab samples and underwater videos performed prior to any development showed that the area under study was mainly composed of sand and mud with species characteristic of such habitats under disturbed circumstances. The area in which the mussel farm development was planned was indicative of a disturbed habitat, homogenous with no hard structure, a result from being heavily fished by bottom towed gear. The effects to date are (Bridger, 2021 unpublished):

Epibenthic community

Four years after the first farm structures were installed and mussels were grown and harvested, a significant change to the epibenthic habitat was observed. The amount of mussels covering the seabed significantly increased within the mussel farm compared to control areas, increasing the amount of hard structure to previous soft-sediment habitat. A further increase in mussel fall-off cover has been seen during 2018 and 2019 analysis. Mussels, when aggregated in beds, are ecosystem engineers, creating habitat, which increases environmental heterogeneity and habitat diversity (Jones *et al.*, 1997). This effect has the potential to increase species richness through the provision of substrata for colonisation (Borthagaray and Carranza, 2007) and provide refuges from predation, nursery areas and food.

During the first four years of development, abundance of sessile and sedentary epifauna in the farm remained higher or similar to control areas. A significantly greater species richness of sessile and sedentary epifauna was found in the farm, although mobile epifauna were not as obviously affected by the installation of the mussel farm, both abundance and species richness remained similar between treatments throughout the survey. In Year 4, the abundance of mobile epifauna was significantly greater in the farm compared to control areas due to large schools of Atlantic horse mackerel *Trachurus trachurus* and poor cod *Trisopterus minutus* within the mussel farm, presumably as a result of the increase in food availability, because of the farm structures on the benthos (e.g., anchor blocks) were acting as fish aggregation devices or both. In general, all of the key taxa showed a positive response to the development (Atlantic horse mackerel *Trachurus trachurus* and whiting *Merlangius merlangus,* common whelk *Buccinum undatum,* brown crab *Cancer pagurus* and European lobster *Homarus gammarus*) (Figure 5).

Preliminary analysis of survey data from 2018 and 2019 show that the farm is altering the mobile epibenthic and demersal community with higher within the farm abundances of the scavengers (*Asterias rubens, Pagurus spp.*) and filter feeders (*Ophiura ophiura*), planktivore and small shrimp/fish predators (*Trisopterus luscus, Scyliorhinus canicula*). The range of phyla and trophic levels represented by this group of species suggest that the whole ecosystem is being benefited

by the mussel farm, rather than one particular group becoming dominant. This contrasts with previous results where only benthic predators increased within a coastal mussel farm (D'Amours *et al.*, 2008). Although *Merlangius merlangus* was more abundant at the far control sites, this could be due to the 'spillover' effect from either the MPA or the farm (unpublished data). In many cases, there was a clear gradient between far control and mussel farm sites. If there were no spillover effect from the farm, the far control and close control locations would be expected to be homogenous, with no significant difference in community. The fact that this was not the case strongly supports the hypothesis that there is some spillover occurring. Given the previous homogeneity of the habitat following destructive fishing techniques (Bridger, 2021 unpublished), this is evidence that the mussel farm is starting to alter the fauna, not just within its boundaries, but also on a wider scale (unpublished data).

During the analysis of 2018 and 2019 levels of mussel fall off, the role of mussels as an ecosystem engineer became clear. Most noticeable were the high abundances of schooling fish at sites with >10% mussel fall off. *Trisopterus luscus*, *Trachurus trachurus* and *Merlangius merlangus* were all major contributors to the difference in faunal community between 0% and >10% mussel fall off, as were *Asterias rubens* and *Pagurus* spp., both of which also had high abundances within the farm. There was no evidence of an alteration of the benthic habitat type at the control sites; no mussel fall off was observed outside the boundaries of the farm.

Furthermore, results from Project ROPE have detected five individual lobsters in the region of the mussel farm (Site 2) two to three weeks after tag and release while two of them where re-taught during subsequent potting campaigns for the same project. In addition, movement of European seabass have confirmed ecological connectivity between South Devon's estuaries and the offshore mussel farm in Lyme Bay (Pittman *et al.*, 2020).

Overall, all of the key taxa show a positive response to the development of the Lyme Bay offshore mussel farm, these findings suggest that development is beginning to increase the integrity of the epibenthic ecosystem, particularly through the provision of feeding areas and refuges from predation. If the increasing abundance of commercial species continues, it could increase the catch per unit effort in fishing ground around the mussel farm, known as 'spillover' (Rowley, 1994), enhancing wild fisheries.

Infaunal community and sediment

Overall, the farm has not significantly changed the sediment underneath the headlines within the first four years of headline deployment. There was no evidence of the farm having a negative impact on the organic matter or mean particle size of sediment. Preliminary studies of data from 2018 to 2020 further support this, showing that there has been no statistical changes to the sediment within the farm and on the control sites since the development of the farm.

There has been no observed overall effect of the mussel farm on the infaunal community. The first four years of study showed that the four main feeding groups within the infaunal community were deposit feeders (e.g., polychaete families Ampharetidae, Magelonidae and Hesionidae), predators (e.g., polychaete families Nephtyidae and Goniadidae, and anemone family Edwardsiidae), suspension feeders (e.g., amphipod family Ampeliscidae, sea squirt *Ciona intestinalis* and polychaete family Oweniidae) and filter feeders (e.g., blue mussel *Mytilus edulis* and polychaete families Sabellidae and Serpulidae). The two main groups dominating the assemblage were polychaetes and amphipods, and so these groups were picked as key taxa. Neither group showed a significant response to the installation of the mussel farm. The highest correlation between infaunal community and a single habitat variable was with redox potential, which suggested that the infaunal community responded negatively when the redox potential was particularly low. However, mean redox potential fell below 0 mV both underneath the farm and in

control areas, indicating that this was not a direct impact of the farm, but a response of infaunal communities to the conditions in the area in general.

It is evident that the mussel farm is located in a heavily impacted area, most likely a result of historical heavy fishing activity. This can be appreciated from the 2013 surveys showing trawled marks on the seabed. The negative impact of bottom towed fishing gear on infaunal communities is well-documented (Cook *et al.*, 2013; Kaiser *et al.*, 2000; Kaiser and Spencer, 1996) as it is a major cause of physical disturbance. There is no evidence that the installation of the mussel farm is further significantly affecting the benthic habitat and infaunal communities. This contrasts with much of the literature assessing the effects of inshore mussel farms (Callier *et al.*, 2007; Chamberlain *et al.*, 2001; Stenton-Dozey *et al.*, 1999, 2001; Wilding, 2012).

Pelagic community

Mussel farms add a great deal of hard structure (e.g., headlines and rope droppers) into the pelagic environment, where structure would largely be absent. Floating hard structures in the offshore are known to attract fish in the same way as fish aggregation devices (FADs) (Callier *et al.*, 2017; Mascorda Cabre *et al.*, 2021; Sheehan *et al.*, 2019). Results show that pelagic fishes are attracted to the mussel farm, with large number of Atlantic horse mackerel *Trachurus trachurus* and grey thick-lipped mullet *Chelon labrosus* recorded exclusively within the farm and non on the control areas. These fish were also more abundant around ropes with older mussels on them, which supported a greater species richness of epibiota. There was also evidence that commercial brown crab *Cancer pagurus* is using the mussel ropes as a nursery area while *C. labrosus* were recorded eating directly off the mussel ropes.

Mussel aquaculture developments are known to deplete zooplankton groups, filtering large volumes of water each day. Results from the first four years of development show that zooplankton have not been depleted within the farm compared to outside. This is also supported by preliminary analysis of zooplankton data from the farm's Site 2 in 2019.

These findings suggest that the addition of structure into the pelagic environment is not negatively affecting this ecosystem but on the contrary, enhancing pelagic biodiversity in the area. Mussel headlines are attracting fishes and providing a surface area for the settlement and colonisation of epibiota which could contribute to the overall production of the area (Mascorda Cabre *et al.*, 2021; Sheehan *et al.*, 2019). Pelagic fishes are more heavily aggregated around headlines with older mussels growing on them, perhaps due to them hosting a greater species richness of epibiota and therefore a greater variety and biomass of food sources.

Marine mammals and birds

Observations of birds and mammals interacting with suspended mussel farm structures show a positive or neutral effect on such species (Clement, 2013; Keeley *et al.*, 2009; Roycroft *et al.*, 2007). Although studies on the interactions of seabirds and marine mammals with inshore mussel longlines found no significant difference in overall species richness and diversity between mussel farm and control sites, significantly higher numbers of seabirds heavily used mussel buoys as perching platforms for preening (Clement, 2013; Roycroft *et al.*, 2007). Some authors have stressed the potential for issues suggesting that interactions with marine mammals should not be overlooked as there is considerable uncertainty in the long-term and ecosystem-wide consequences, especially with the expansion of the industry in terms of scale and into the offshore environment. However, interactions are thought to be low risk as threats mainly arise from loose ropes or the site overlapping with migratory routes which can be easily echo-located (Gentry *et al.*, 2016; Keeley *et al.*, 2009; Le Gouvello *et al.*, 2017; Matarazzo Suplicy, 2018).

Data on marine mammals and birds is collected once a year during a boat survey and the mussel farmers collect sightings *ad hoc* and are recorded in a logbook. This data is yet to be analysed however, there is no record to date of any entanglement instead, the farmers report to have pods

of dolphins following them into the farm and feeding there, especially of one particular individual.

Identify pressures and threats on biodiversity

(Inventory of known or reasonably foreseeable pressures and threats on biodiversity features, their nature, scale and source, and the range of societal and ecological values attached to the components.)

After eight years of BACI surveys, to date there is no evidence that the installation of the mussel farm is negatively affecting the benthic or pelagic ecosystem nor having the expected impacts of a coastal/inshore farm.

There was no evidence of the farm having a negative impact on the organic matter or mean particle size of sediment. Redox potential did show some significant differences between the farm and control areas, however by the fourth year of data analysis, redox potential showed no statistically significant differences. There was no evidence of the mussel farm changing the redox discontinuity layer: the depth in the sediment at which there is a transition from oxygenated to reduced conditions. There was no evidence of the farm depleting the area of zooplankton, increasing algal blooms or altering the water quality of the area.

There was no observed overall effect of the mussel farm on the infaunal community. The four main feeding groups within the infaunal community were deposit feeders (e.g., polychaete families Ampharetidae, Magelonidae and Hesionidae), predators (e.g., polychaete families Nephtyidae and Goniadidae, and anemone family Edwardsiidae), suspension feeders (e.g., amphipod family Ampeliscidae, sea squirt *Ciona intestinalis* and polychaete family Oweniidae) and filter feeders (e.g., blue mussel *Mytilus edulis* and polychaete families Sabellidae and Serpulidae). If the mussel farm was negatively affecting the benthic habitat, we would expect a greater abundance of Capitellidae under the farm compared to control areas (Tomassetti and Porrello, 2005).

Previous studies reported a shift in community structure from suspension feeders to deposit feeders under an inshore mussel aquaculture. This shift is not apparent in this offshore mussel farm, where some suspension feeders were more abundant under the mussel farm than in control areas. This is most likely due to the high hydrodynamic energy at the farm.

The mussel farm could be contributing to the production of the pelagic and benthic ecosystem, not just attracting species from the wider area which could produce a spillover effect into adjacent fisheries and MPAs.

A preliminary oceanographic study shows that the hydrodynamic regime of the area might be altered by the farm structure. An acoustic dropper current profiler (ADCP) survey shows that there's changes in speed and direction of water flowing through the farm (at both ebb and flood tides) as well as identifying greater variability in speed with depth (a normal behaviour following hydrodynamic laws – Ekman transport). Overall, a decrease in current speed can be seen with increasing depth. However, further analysis must be performed such as calculating current shear to understand the variability in speed with height and comparing results with the position of the longlines, ropes and their development stages to understand the extent and magnitude of such changes and how these interact with the ecosystem of the area (especially in terms of sediment transport).

Impacts on marine mammals and birds have been reported in inshore farms although there is no evidence of offshore farms negatively interacting with large marine vertebrates. However, this is recognised to be a possible pressure and will be treated as such.

It is evident that both sessile and sedentary, and mobile epifauna are beginning to respond to the change in epibenthic habitat. The epibenthic habitat within the offshore mussel farm is shifting as a direct effect of the aquaculture installation with an increase of mussels covering the seafloor. However, so far there has been no evidence of any alteration of the benthic habitat type at the

control sites; no mussel fall off has been observed outside the boundaries of the farm. Despite the opportunity for the mussels to provide habitat and a food source in the epibenthic ecosystem, large amounts of mussels falling to the seabed could have a detrimental effect and so should be controlled and avoided.

Data and information available on the fisheries and the ecosystem

(Describe the available data sources, e.g., distribution maps; 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 features of concern; ecosystem services (including food and livelihoods) and other relevant values affecting conservation; possible threats and pressures; existing MPAs (networks, seascapes) and other conservation measures. Provide details of the sources in the 'Relevant Databases' section)

The site is home to several areas of national and international conservation importance, holding different marine protected areas (MPAs) designated with various levels of spatial management (Figure 1): four areas closed to towed demersal fishing gear under voluntary agreements in 2001 and expanded in 2006; the voluntary areas developed into The Lyme Bay Designated Area (Fishing Restrictions) Order, a Statutory Instrument (SI) excluding bottom-towed fishing gear from a 206 km2 area (Defra, 2008); new byelaws implemented by the Southern Inshore Fisheries and Conservation Authority (IFCA) and Devon and Severn IFCA protected 236km² of Habitats Directive 92/43/EEC Annex I reef features within a 312km Site of Community Interest (SCI) to conserve the reef and associated reef species; the SCI developed into the Lyme Bay and Torbay Special Area of Conservation (Defra, 2011; NE, 2010); Torbay Marine Conservation Zone (MCZ), Chesil Beach and Stennis Ledges MCZ, East of Start Point MCZ, South of Portland MCZ and Skerries Bank and Surround MCZ (Ares *et al.*, 2010; Rees *et al.*, 2016).

The 2008 Lyme Bay MPA excluded 206 km² from bottom towed fishing (e.g., demersal trawlers, scallop dredgers) following concerns about damage to the ecosystem which contains a highly diverse community of highly sensitive gorgonian corals, bryozoans and erect sponges (Mangi *et al.*, 2011). Static gear fishers (e.g., potters) are still allowed within the MPA. A socio-economic impact assessment found that mobile gear fishers were impacted through displacement effects, having to find new fishing ground. Furthermore, there was increased conflict between static and mobile fishers (Mangi *et al.*, 2011). The implementation of the MPA has allowed recovery of the highly sensitive species, and overall species richness and abundance has increased (Sheehan, Cousens, *et al.*, 2013; Sheehan, Stevens, *et al.*, 2013).

In 2013, the area leased to the mussel farm was designated. The farm was designed to allow static fishing methods to carry on within the farm, but is unsuitable for bottom towed fishing practices. Currently, the farm covers an area of 12 km², adding to the total area of fishing ground that has been closed to mobile bottom towed gear in Lyme Bay. The exclusion of this further area to bottom towed fishing means the mussel farm has the potential to act as a *de facto* MPA, restoring the benthic habitat and ecosystems. The farm is currently being used by anglers that are benefiting of the FAD effect and the increased fisheries available in the area. This is shown by the mussel farmers finding hooks and lines stuck on the mussel ropes. There has also been episodes where trawlers have deliberately gone through the farm damaging the ropes.

The predicted annual production at full development would be between 5000 and 10 000 tonnes, which would represent an approximate 20% – 40% increase in total farmed mussel production in the UK. In the short to medium term, production would be targeted for export to the Dutch wholesale market, where there is a chronic and continuing shortage of mussels. The medium to long-term aim would be to develop new markets within the UK, which currently has a low per capita consumption of mussels. Of particular importance is that production would help to meet

the aims of the UK Government's food security policy, which stresses greater domestic production of healthy, affordable and sustainable food. The development would bring significant employment and other economic benefits to the region, and an economic benefit to the national economy through exports or the reduction of imports (Offshore Shellfish Summary).

Prior to development, Offshore Shellfish Ltd exposed the plans to develop the mussel farm to the Lyme Bay Consultative Committee (previously Lyme Bay Working Group), a collaboration initiative between fishermen, conservationists, scientists and regulators in Lyme Bay. The farmers have attended these meetings since with the aim to keep interested parties engaged and informed in the development process. However, there are many fishers that do not partake on such meetings that would lack information on the development. A questionnaire was developed to collect data on the perceptions of one of the main stakeholder groups in Lyme Bay: commercial fishers. Questionnaires were conducted as face-to-face interviews from 2017–2018 and were designed to separate the opinions of mobile gear fishers (e.g., trawlers and dredgers) and static gear fishers (e.g., potters and netters).

The development of the offshore mussel farm has affected the fishing activity of commercial fishers in Lyme Bay and elicited both positive and negative perceptions from fishers. Three mobile gear fishers, who use otter trawls, were directly displaced from an area of their usual fishing ground because of the installation of the mussel farm. However, all three fishers recognised some potential for the farm to have a positive ecological effect on fish stocks in the area, or have a positive economic effect through the creation of jobs and increase in income for the area, one fisher now fishes around the perimeter of the farm, close to the buoys that mark the farm boundary. The six static gear fishers, using pots and nets, were also concerned about the mussel farm taking up fishing ground, even if they were not directly affected by the farm themselves. One fisher was concerned that trawlers being displaced could migrate into potting areas leading to concentrated fishing. Three fishers recognised the potential for the farm to increase fish stocks, acting as a safe place with a rich food source. As well as the mussel farm taking over fishing ground, the other main issue that the commercial fishers brought up was the lack of information provided by the mussel farm. Two thirds of the fishers either received no information prior to the development of the farm, or felt that the information provided was insufficient.

An approximate number of mobile and static gear fishers that were active around the farm area before it was developed were extracted from FisherMap (Borja *et al.*, 2000; des Clers *et al.*, 2008). FisherMap was developed by the Finding Sanctuary project to map the nature and extent of fishing activity around the coasts and seas of Devon and Dorset, with the aim of developing a network of MPAs (des Clers *et al.*, 2008). The data describes the activity of 594 commercial fishers who gave their permission for data to be shared (out of 984 interviewed), over the period of 2005-2010. In the 3 km area around the farm (Figure 5–7), a maximum of 22 mobile and 8 static fishers were sighted. However, in the area within and around the close perimeter of the farm area, 17 mobile and 3 static gear fishers were sighted, with the tracks of 2 mobile and 3 static gear fishers actually intersecting the farm area. Although many boats use both mobile and static gear methods and switch between the two methods over years and seasons, this is the most accurate data readily available on fishing activity by gear type.

Landings data by ICES rectangle was used to assess how catches have changed from the beginning of the development of the mussel farm (2013) to five years on (2017). Ports within ICES rectangles 30E6 and 30E7 were included, and catch data were split into mobile and static fishing gear types. Specific landings data were extracted for brown crabs *Cancer pagurus*, common whelk *Buccinum undatum* and schooling fish (Atlantic horse mackerel *Trachurus trachurus* and whiting *Merlangius merlangus*).

Landings data show that the landed weight of *C. pagurus* has increased from 2016 to 2017, and landings have significantly increased for static gear fishers operating both inside and outside of

the MPA (Rees *et al.*, 2016). This may be a result of MPA management, enabling spatial separation of gear (Rees *et al.*, 2016), recovery of the reef habitat (Sheehan, Stevens, *et al.*, 2013) and wider fisheries management to support the *C. pagurus* fishery (Rees *et al.*, 2021). *C. pagurus* makes use of space under boulders and within crevices in reefs (Hayward and Ryland, 1995), it is possible that the mussel farm may also support the crab fishery as mussels build up on the seabed forming reefs which may also provide attractive living spaces for brown crabs, and with the mussels themselves also providing a food source. However, this effect was not experienced by the two fishers who pot for crabs in and around the perimeter of the mussel farm.

Landings from static gear fishers operating outside of the Lyme Bay MPA are dominated by whelk, though catch is declining over time (Rees *et al.*, 2016). A decrease in whelk landings was seen from 2016 to 2017. There is evidence that the overall decline in landings could be due to unregulated landing sizes, with immature whelks being landed. Devon and Severn Inshore Fisheries and Conservation Authority (DandS IFCA) reviewed the minimum landings size of *B. undatum* concluding that it was too low, and have since raised the minimum landing size from 4.5 cm to 5.5 cm, and have since raised the minimum landing size from 4.5 cm to 5.5 cm.

Abundance of *B undatum* increased in the mussel farm between 2016 and 2017. This could be a result of reduced fishing effort within the mussel farm as fishers found it more difficult to deploy pots around the mussel headlines, despite the farm being designed to allow this. Furthermore, *B. undatum* are scavengers (Nielsen, 1974), so could be benefitting from the increase in mussels as food on the seabed. Therefore, the mussel farm could be allowing the abundance of *B. undatum* to increase within the farm area. However, fishers did not notice an increase in *B. undatum* in their catch in and around the perimeter of the mussel farm, and the fisher who solely targets *B. undatum* noticed a decrease in their catch, blaming an increase in starfish predation. There is ecological evidence for this observation with an increase in the abundance of common starfish *Asterias rubens* in the mussel farm from 2013 to 2017.

Despite landings of schooling fish decreasing from 2016 to 2017, one trawler said that they had noticed a slight increase in overall catch around the edge of the mussel farm, choosing to fish there over other fishing sites. There is some evidence that the abundances of some commercial species are increasing within the mussel farm. However, there is not sufficient agreement between this evidence and the fishers' landings. It may be that spillover into fishing areas has not yet occurred. Spillover effects may take years to be noticed by fishers, with benefits often not seen for 5–20 years depending on the initial population size and life span of the species, and overall health of the ecosystem.

Despite changes in spatial management measures linked to the Lyme Bay MPA and the mussel farm, total landings and income increased overall from 2013 to 2017 for both mobile and static gear fishers in Lyme Bay. For those species targeted by fishers close to the mussel farm (*C. pagurus*, *B. undatum* and schooling fish), Lyme Bay landings data indicates that there has been variation in landings of *C. pagurus* and *B. undatum*, but with an overall increase over time, and a decline in landings of schooling fish *T. trachurus* and *M. merlangus*. Ecological evidence from the mussel farm indicates an increase in the abundance of *C. pagurus* and *B. undatum*. How this translates to landings data for fishers operating in the vicinity of the farm is tenuous, as it is known that fishers switch their gear type throughout the year in response to available species, to take advantage of market prices, or in response to management events and other factors (Rees *et al.*, 2016).

Effective management of the growing aquaculture sector requires input from stakeholders to understand how the industry affects local communities. Greater communication with the fishers could also have reduced the negative perceptions associated with mussel farms as it allows managers to respond to stakeholder concerns with scientific evidence (Salgado *et al.*, 2015). Despite being offshore where competition with other activities is reduced, there is still conflict between

the Lyme Bay mussel farm and local commercial fishers, mainly due to the farm taking up fishing ground and the lack of obvious short-term benefits to landings and the delay in spillover effect. Even if the development of the farm was discussed within the Lyme Bay Consultative Committee, this might still not reach all the stakeholders involved hence raising communication issues among certain areas of the fishing community. However, there is some agreement among the commercial fishers of Lyme Bay that the offshore mussel farm has the potential to provide a provisioning ecosystem service of enhancing wild fisheries due to its supporting ecosystem service as an artificial reef habitat.

Assessment of the area against CBD Criteria

(Discuss the area in relation to each of the CBD Criteria and relate the best available science. Please note where there are significant information gaps)

CBD Criteria **CBD/COP/DEC/14/8**	**Description** (Annex III.B to Decision 14/8)	**Ranking of criterion relevance** (please mark one column with an X)		
		No information	**True**	**False**
Criterion A: Area is not currently recognized as a protected area				
A. Not a protected area	The area is not currently recognized or reported as a protected area [MPA] or part of a protected area [MPA]; it may have been established for another function.		X	
Explanation for ranking (Criteria (A) is absolute and, if not met, it is enough to disqualify the area.) Not a protected area, the area was open to fishing prior to consent for aquaculture. The current developed sites do not overlap with an MPA although the 3rd licensed site is very close to an MPA (license has conditions to make sure there's no impact on the MPA) Not an MPA (Area open/dredged/trawled prior to consent)				
Both Site 1 and 2 of the mussel farm are outside the nearest Lyme Bay MPA				
Criterion B: Area is governed and managed				
B.1. Geographically defined space	Size and area are described, including in three dimensions where necessary.		X	
	Boundaries are geographically delineated.		X	

Provide details of the location

See maps at the end of the document. Coordinates are given by The Crown Estate, 2010:

Site 1	Site 2
50° 35.556' N 3° 15.086' W	50° 39.010' N 3° 11.700' W
50° 35.927' N 3° 13.488' W	50° 39.200' N 3° 10.028' W
50° 34.397' N 3° 12.632' W	50° 37.600' N 3° 09.600' W
50° 34.025' N 3° 14.205' W	50° 37.405' N 3° 11.281' W

B.2. Legitimate governance authorities	Governance has Legitimate Authority and is appropriate for achieving *in situ* conservation of biodiversity within the area.		X	
	Governance by indigenous peoples and local communities is self-identified in accordance with national legislation and applicable international obligations.			X
	Governance reflects the equity considerations adopted in the Convention.		X	
	Governance may be by a single authority and/or organization or through collaboration among relevant authorities and provides the ability to address threats collectively.		X	

Explanation for rankings (Detail the Legitimate Authorities responsible for implementing the area-based management measure(s); Explain how the identified body has competence for management of threats to biodiversity within the area by detailing those threats)

There's a license to use the seabed that is exclusive (MMO and The Crown Estate). Although there is no direct management measures to exclude other activities such as towed fishing from the area, the physical structures of the mussel farm are excluding such fishing activities from taking place. This is consistent with a fishing ban due to in-built enforcement. However, if current measures are not considered sufficient, the Devon and Severn IFCAs can implement byelaws/severance order to further protect the farm from trawling which would add strength to the case. The angling community fishing for bait often uses the farm.

The farm's development went through a consultation process including ongoing meetings with the Lyme Bay Consultative Committee which are still attended by the mussel farmers and where most of the stakeholders of Lyme Bay take part.

B.3. Managed	Managed in ways that achieve positive and sustained outcomes for the conservation of		X	

	biological diversity.			
	Relevant authorities and stakeholders are identified and involved in management.		X	
	A management system is in place that contributes to sustaining the *in situ* conservation of biodiversity.	Further clarity on 'system' and on 'in-situ' is needed.		
	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.		X	

Explanation for rankings (Provide details for each element, citing relevant sources)

Although the main aim/intend of the farm is to grow mussels for exploitation, there are positive and sustained outcomes from this type of development that contribute to restoration and conservation of biological diversity.

The area has been monitored following a BACI survey programme therefore, there is evidence on the state of the environment in and around the development prior to designation. Pre-development results showed the area to be typical of a disturbed habitat by historical bottom trawled fishing activities. Since first deployment in 2013, the area has shown to be contributing to enhancing biological diversity and restoring the area towards heterogeneous habitat.

There are clear relevant authorities and stakeholders involved in the farm such as Devon and Severn IFCA, MMO, The Crown Estate, Natural England (NE), Devon Wildlife Trust, CEFAS, Environment Agency and Defra. NE is in charge of reviewing the license. If there are any environmental effects or changes in water quality, the authorities can intervene. In particular, constant monitoring of the farm's water quality is reported to CEFAS and EA.

Excludability of other activities due to the farm's structures is seen as management. The farm's 20-year license is consider to be long-term. There has been biodiversity enhancement both throughout the water column and the seabed. One of the most important threats are invasive species, in this farm, there is no input of feed or any substance a part from ropes therefore the thread of invasive is minimal. However, this is being monitored.

Criterion C: Achieves sustained and effective contribution to *in situ* conservation of biodiversity (*Produces long-term* in situ *biodiversity conservation outcomes)*

C.1. Effective	The area achieves, or is expected to achieve, positive and sustained outcomes		X	

	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.		X	
	Mechanisms, such as policy frameworks and regulations, are in place to recognize and respond to new threats.	X		
	To the extent relevant and possible, management inside and outside the other effective area-based conservation measure is integrated.		X (to a certain extent)	
Explanation for rankings (Provide details for each element, citing relevant sources) The farm's physical structures exclude destructive activities and create habitat allowing recovery and restoration achieving sustained and effective contribution to in situ conservation of biodiversity. There has been biodiversity enhancement both throughout the water column and the seabed. One of the most important threats are invasive species, in this farm, there is no input of feed or any substance a part from ropes therefore the thread of invasive is minimal. However, this is being monitored. Although mussel farms can be threatened by pesticides, agriculture run off or anything that affects water quality, the nature of this farm placed in the offshore environment away from point source pollution, its high hydrodynamic regime and the fact that there is no input of any substance to stimulate growth minimise any threat to prevent the restoration of the area. The area is often used by recreational fishermen and tourist on marine mammal sighting trips. The current farm is divided in 2 sites that are at a distance of about 3 km away from each other.				
C.2. Sustained over long-term	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.		X	
Explanation for ranking (Detail the time frame(s) for the management measures) The farm's 20-year license is consider to be long-term. The amount of research, funding and time required to obtain a license for aquaculture indicates that when granted, the development will be in place for long-term and that licenses will be granted for long periods of times in order to be viable as a business.				

C.3. *In situ* conservation of biological diversity	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).		X	
Explanation for ranking The BACI methodology used during the development of this farm includes a thorough monitoring campaign, which extends since 2013 before any structures or development was in place until now (2020). Eight years of survey campaigns including a wide range of survey techniques have been used to identify the range of biodiversity attributes of the area and monitor changes. The entire time series has yet to be analysed completely.				
C.4. Information and monitoring	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.		X	
	A monitoring system informs management on the effectiveness of measures with respect to biodiversity, including the health of ecosystems.		X	
	Processes should be in place to evaluate the effectiveness of governance and management, including with respect to equity.		X	
	General data of the area such as boundaries, aim and governance are available information.		X	
Explanation for rankings and details of monitoring systems (Identifying the methodologies that might be used for these assessments) The farm and its surrounding environment is being monitored on a yearly basis (2013-2020). A socio-economic study was performed and there will be another one done soon. As part of the license, the relevant authority (NE) is informed of any relevant interactions of the farm with the environment that could affect the nearby MPA and water quality is constantly monitored for human health issues.				

Criterion D: Associated ecosystem functions and services and cultural, spiritual, socio-economic and other locally relevant values (*Maintains ecosystem functions and services, and upholds locally relevant values*)				
D.1. Ecosystem functions and services	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.		X	
	Management to enhance one particular ecosystem function or service does not impact negatively on the sites overall biological diversity information.		X	
Explanation for rankings Mussels are ecosystem engineers providing a well-known range of ecosystem services from improving water quality helping tackle eutrophication issues to uptaking CO_2. The various studies underway are not only monitoring the interactions of the farm with the environment but also looking at the ecosystem services such as the increased complexity of the seabed, an increase in commercial species and spillover effect, the use of the farm by migratory species, FAD effect or as a nursery. The spillover effect and how the farm is enhancing commercially valuable species as well as it's used by such species with high ecosystem service values is under study. The area is also promoting tourisms as marine mammal sighting tours and recreational fishers use it. The farm is creating jobs in the area. Although the main aim of the farm is to grow mussels, this is having a positive effect not only on the ecological biodiversity of the area but also on its ecosystem services.				
D.2. Cultural, spiritual, socioeconomic and other locally relevant values	Governance and management measures identify, respect and uphold the cultural, spiritual, socioeconomic, and other locally relevant values of the area, where such values exist.		X	
	Governance and management measures respect and uphold the knowledge, practices and institutions that are fundamental for the *in situ* conservation of biodiversity.		X	

Explanation for rankings (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).

The farm's development went through a consultation process including ongoing meetings with the Lyme Bay Consultative Committee which are still attended by the mussel farmers and where most of the stakeholders of Lyme Bay take part.

There's a license to use the seabed that is exclusive (MMO and The Crown Estate). Although there is no direct management measures to exclude other activities such as towed fishing from the area, the physical structures of the mussel farm are excluding such fishing activities from taking place. This is consistent with a fishing ban due to in-built enforcement. However, if current measures are not considered sufficient, the Devon and Severn IFCAs can implement byelaws/severance order to further protect the farm from trawling which would add strength to the case. The angling community fishing for bait often uses the farm.

There are clear relevant authorities and stakeholders involved in the farm such as IFCA, MMO, The Crown Estate, Natural England, Devon Wildlife Trust, CEFAS, Environment Agency and Defra. NE is in charge of reviewing the license. If there are any environmental effects or changes in water quality, the authorities can intervene. In particular, constant monitoring of the farm's water quality is reported to CEFAS and EA.

The farm's physical structures exclude destructive activities and create habitat allowing recovery and restoration achieving sustained and effective contribution to in situ conservation of biodiversity. There has been biodiversity enhancement both throughout the water column and the seabed. The farm and its surrounding environment is being monitored on a yearly basis (2013-2020).

Assessing additional OECM properties (Optional)

Other Criteria	**Description**	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Medium**	**High**
Connectivity	Connectivity is referred to in Annexes I, II and III (Criteria C). It has been defined as a measure of the extent to which plants and animals can move between habitat patches. Connectivity may be structural (related to physical connections, e.g., continuity in the habitat) or functional (related to movements between patches. It determines the level of exchange between distribution patches and affects gene flow, local adaptation, extinction risk, colonization probability, and the potential for organisms to move as they			X	

	cope with climate change. In fisheries, structural connectivity is particularly important for bottom habitats and resident species. Functional connectivity is particularly important for pelagic habitats and species and for highly migratory species with life histories extended across very different and distant habitats.				

Explanation for ranking and details of the criteria

The area is based in a biodiversity 'hotspot' and near an MPA. Although still under study, it is thought that the farm could be enhancing biodiversity and supporting species movement with the MPA.

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(e.g., relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to relevant audio/visual material, video, models, etc.)

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Relevant Databases

N/A

Maps, Figures and Tables

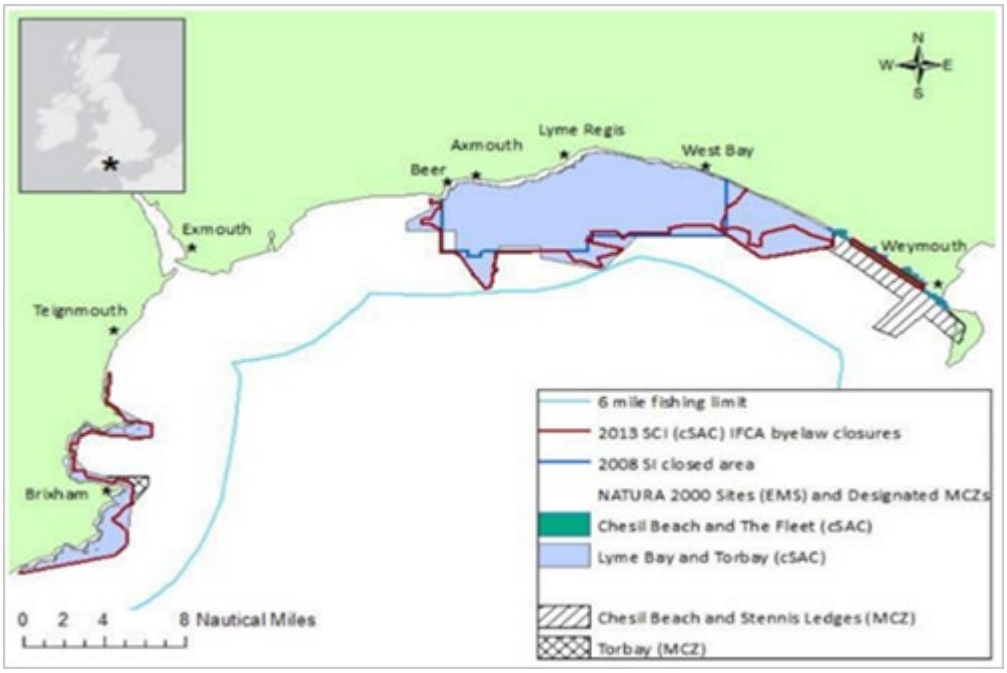

Figure 1. Lyme Bay MPA designations.

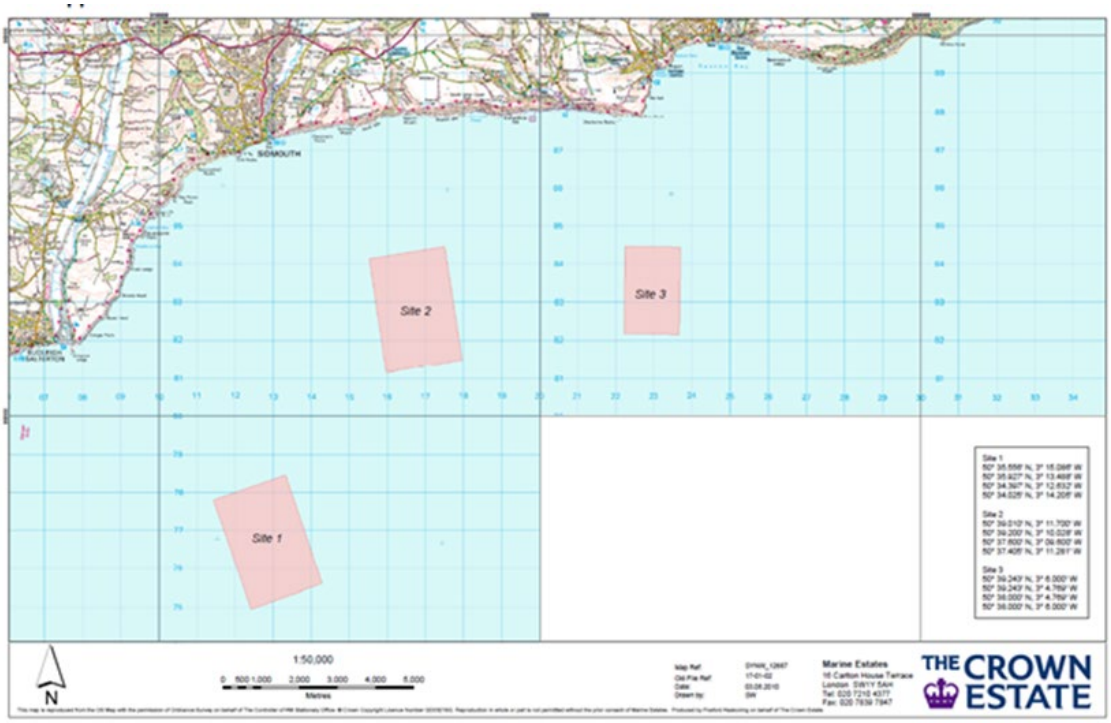

Figure 2. The Crown Estate approved plan.

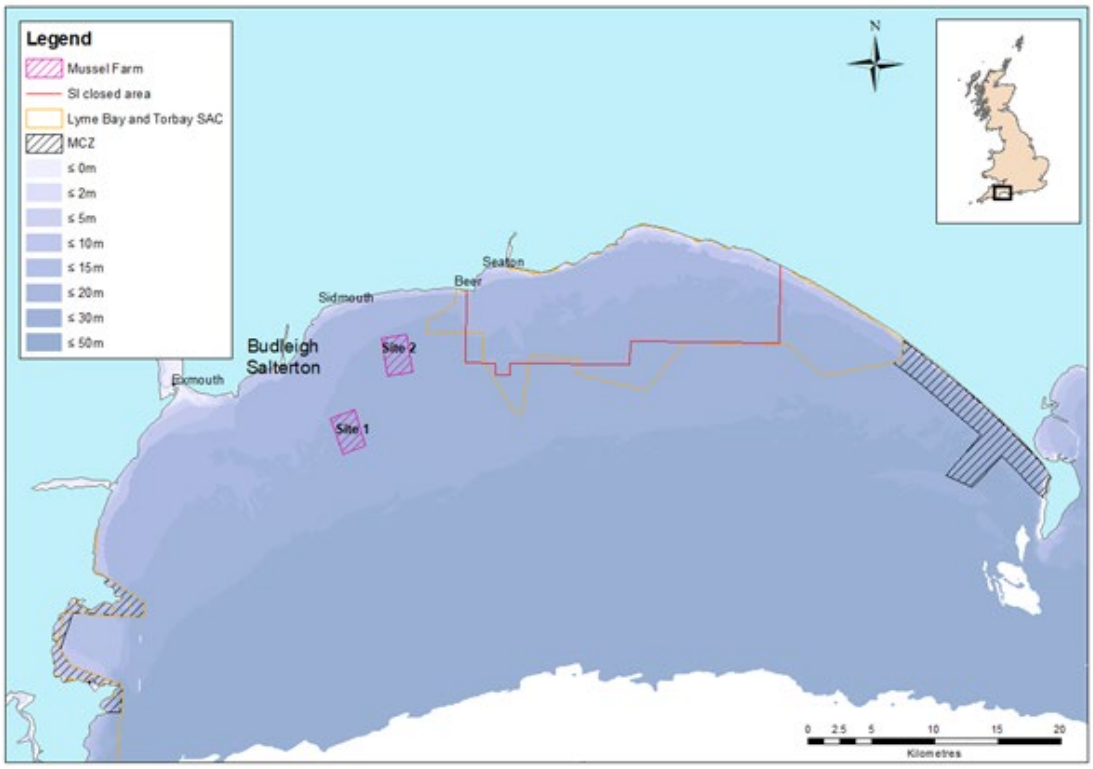

Figure 3. Location of the three proposed sites for the offshore mussel farm in Lyme Bay.

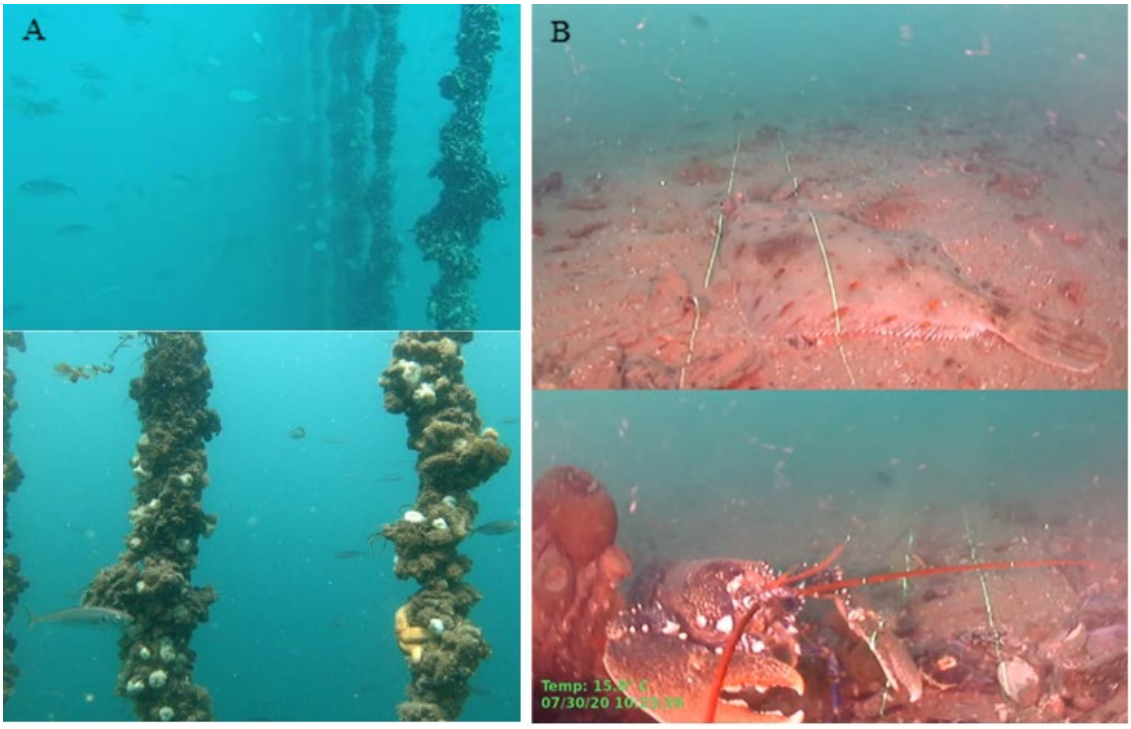

Figure 4. (A) Schools of fish have been captured in an offshore longline mussel farm in Lyme Bay, South West UK. Both frames have been taken from the recording of a non-baited midwater video (NMW) rig placed at 6 m depth. Longline ropes are full of mussels and biofouling (Mascorda Cabre 2020). (B) Remote operated vehicle (ROV) footage showing how the seabed underneath the mussel farm is being utilised by commercially valuable crustaceans and fish (Mascorda Cabre, 2019 in Mascorda Cabre *et al.*, 2021).

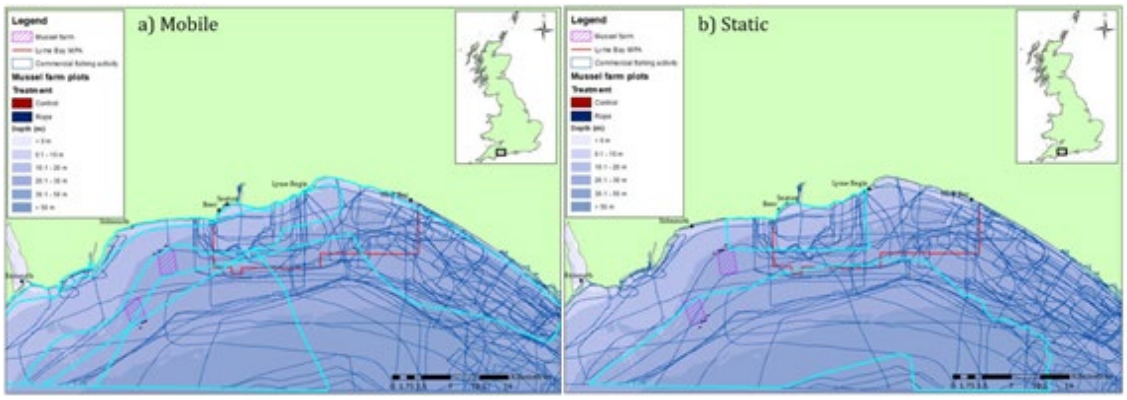

Figure 5. Commercial fishing tracks crossing the mussel farm area from vessels using a) mobile and b) static gear.

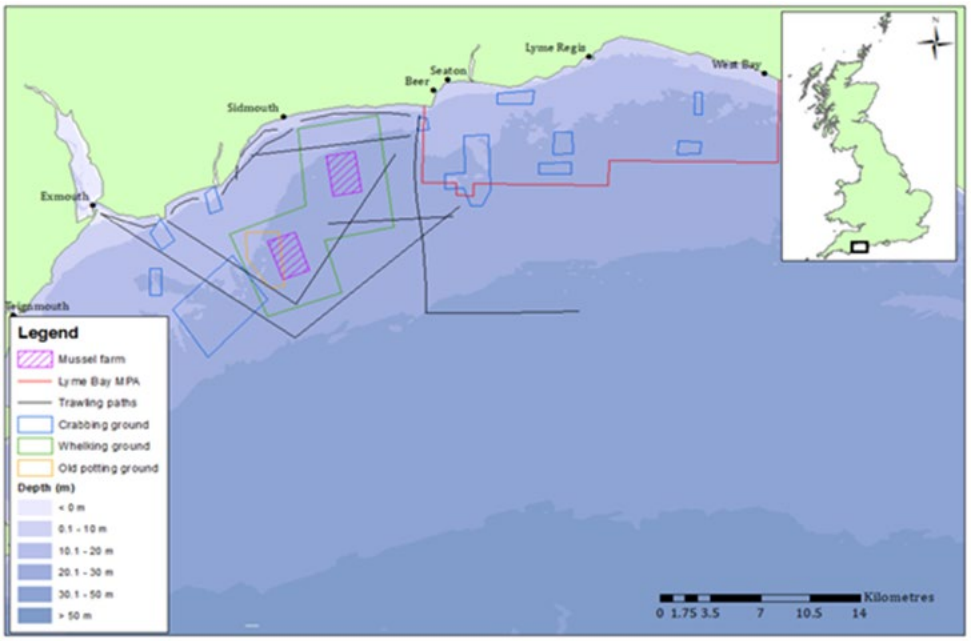

Figure 6. Map of Lyme Bay showing trawling paths (black lines), crabbing ground (blue squares) and whelking ground (green squares), and old potting ground (orange squares) around the mussel farm (purple hatched areas) and MPA (red outline).

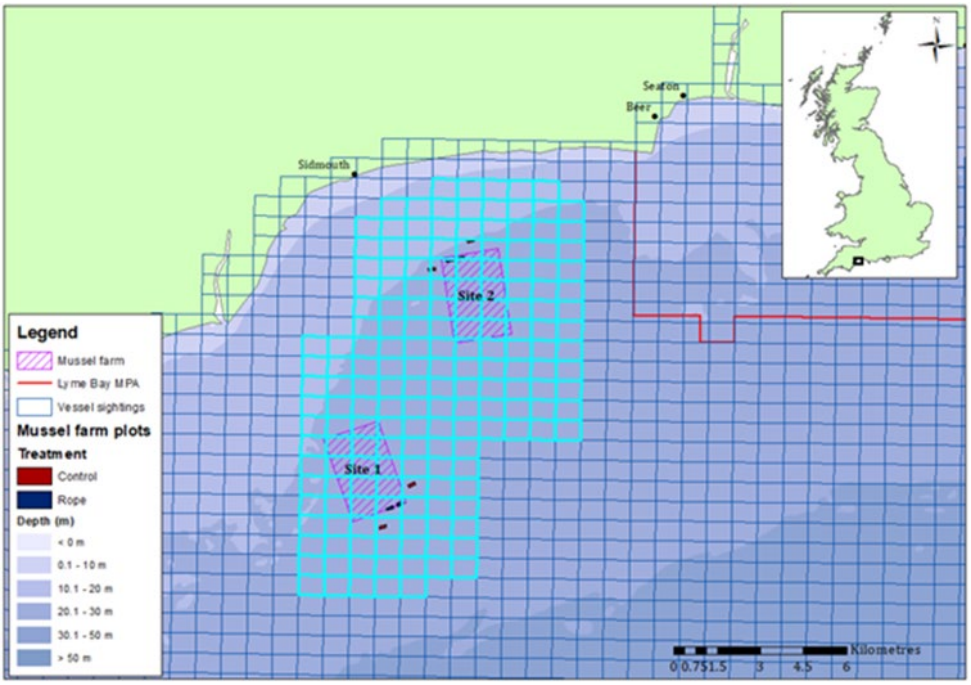

Figure 7. Three km area around the farm from which vessel sightings were taken.

Rights and permissions

(Indicate if there are any known issues with giving permission to share or publish these data and what any conditions of publication might be; provide contact details for a contact person for this issue)

At this point, none of this data can be shared if published as it is currently being prepared for scientific journal publication or has sensitive information and is owned by the farmers themselves.

Annex 13: Evaluations of the Garcia *et al.* (2020) Document by Case Study

Template for Comments on the Performance of the Stepwise Approach of the Garcia *et al.* (2020) Document in helping the WKTOPS Break-out Group Discussions and Decisions

Case Study being evaluated: NE UK Sandeel closed area
Criteria being evaluated: A, B, C, D

Break-out Group Instructions: After reviewing the Mock Pro Forma Template and the Garcia *et al.* (2020) Guidance Document complete this document for each case study and considering all of the Criteria A, B, C, D and 'Other' by selecting the response that *best characterizes the group discussions* and providing a narrative explaining the choice and any suggestions for improvements to the guidance. Note that there are 4 questions for each Criterion and responses cross over the pages with a final open opportunity to provide feedback:

1. ***Were the proposed Steps explained clearly enough that they were understood by all participants?***

Response – *None of these responses are a good reflection of the group's opinion*	**Tick One Box**
There was substantial confusion about the intent of the proposed Steps.	X
The intent of the Steps was clear only to those with substantial background in identification of OECMs and similar areas of priority for enhanced risk aversion in management of threats.	
The intent of the Steps was clear only to those with substantial background in the use for area-based fisheries management measures.	
The intent of the Steps was clear to all participants.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

Some members thought that the Steps were useful and easy to implement and respond to the criteria. However, other members had concerns listed below:

- The Steps were clear enough and in general provided a good overview for someone with little background to gain some understanding but the group felt the Steps were not helpful in filling out this criteria, except for Step 1.
- Pre-screening element – where did the 75% come from – not really useful in pre-screening? However, pre-screening guidance is important but needs some development (possibly needs a workshop for those required to do this process). Of course case studies decided prior to the meeting. Should focus on 3 - 4 key must have Criteria that an area needs to fulfil.
- The Steps do not follow the criteria, which caused confusion about what the intent of the proposed steps. Guidance is missing in the CBD but the Steps did not help to fill in the pro forma.
- More concise guidance on D.1 would have been helpful in knowing the level of detail required here.

2. ***Were the proposed Steps helpful in the application of the Criteria to the cases under study?***

Response	**Tick One Box**
The Steps actually impeded application of the Criteria, by leading the efforts into time-consuming actions or discussion that did not help with the evaluation.	X
The Steps did guide the application of the Criteria along appropriate pathways, but required more time than would have been needed to complete the task to a comparable level of rigour following other approaches.	
The Steps did guide the application of the Criteria along appropriate pathways, but weren't necessary because the pathway was obvious even if the Steps had not been provided.	
The Steps did guide the application of the Criteria along appropriate pathways, and was of some help because even though the general pathway was apparent, the Steps prompted valuable discussion of the information available, so there is greater confidence in the conclusions drawn.	
The Steps did guide the application of the Criteria along appropriate pathways, and were of substantial value because they led efforts and discussion down an efficient pathway for application of the Criterion that otherwise was not readily apparent to all participants.	
The Steps guided the application of the Criteria along appropriate pathways, and were of great value because without their guidance no efficient pathway for application of the Criterion was readily apparent to any participant.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

A stepwise approach would be very useful but needs to be better aligned to (mirroring) CBD and concise in the language used. Aligning content and integrity of definitions with CBD is important. The group recognised that CBD Criteria A-D have overlapping aims, which makes it difficult and we recognise the Garcia *et al.* (2020) tries to deal with this problem.

The Steps were more useful to certain Criteria than others. For example, Steps 2, 3 and 4 were helpful in evaluating B.3 and C. However, 'biodiversity features of concern' does not mirror CBD – again needs consistency with CBD. Also the term threat is used but not pressure in the CBD, while both used by Garcia *et al.* 2020.

The CBD guidance was fairly self-explanatory and Garcia *et al.* (2020) Step 1 did not mention the importance of whether the area was reported on, which is key or the importance of accounting for overlap with a protected area that is reported on – which is the case here (Firth of Forth MPA).

C.1.1 led to considerable debate as positive and sustained outcomes are not realistic for short-lived species with high natural variation and so the guidance Steps should help with framing a realistic view for this criterion by stating that a positive and sustained should refer to a continued reduction in pressure, rather than a biodiversity outcome.

Greater guidance on C.1.1 and C.3 *In situ conservation*... would have been useful.

Issues about equity were not well explained in the Steps but were clear from the CBD document.

3. ***Was application of the proposed Steps affected by the quantity and quality of information that was available for application of the criteria?***

Response	**Tick One Box**
The Steps were impossible to apply because even their minimal application demanded so much information that they could not be followed.	
The Steps were possible to apply, but they did not encourage use of at least some of the types of information that was available, so progress required deviation from the Steps to use all relevant information.	
The Steps were possible to apply, but their application was difficult because little information relevant to the Criteria was available.	
The Steps were possible to apply, but their application was difficult because the available information relevant to the Criteria was generally highly uncertain or otherwise of low quality.	
The Steps were possible to apply, but their application was difficult because there was substantial information available and following the stepwise approach fully meant efforts or discussion often bogged down in unnecessary detail.	
The Steps were possible to apply, and application used the available information effectively.	X

Provide a narrative explaining your choice and suggesting improvements to the guidance

Most of the information highlighted in the Steps was available for this case study area. A guidance summary of information that would be helpful in the evaluation was provided to the case study leaders (Annex 4) – which was good for Step 0 and may be a useful way of simplifying the process.

Robustness of information for Criteria D – social value and economics was difficult to obtain for both case studies.

Clarity about the risk assessment and binary versus weighted conditions is required.

The was discussion as whether there is enough focus on what are the necessary (core) conditions (the critical elements) needed as opposed to additional elements that just enhance the basis for OECM. Concern about not overwhelming those required to undertake these assessments of potential OECMs. Should be noted that the CBD Decision guidance has to be applied in a flexible manner. Need for practicality of the guidance to maintain robustness, particular difficult cases.

Simplification of the process while maintaining vigour.

Is the list in Steps 0 and 1 too overwhelming for some potential OECMs?

Criterion C.2 - Temporal aspect of OECMs is important for discussion. Conservation or fishery orientated rationale will be relevant for temporal question.

While the Steps helped the collation of information they did not have much impact on filling out the pro forma.

4. Did application of the proposed Steps bias the effort and discussion of the available information relative to the Criteria?

Response	**Tick One Box**
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information so strongly that the outcome of the discussion was considered predetermined by the proposed stepwise approach.	
Some participants in the subgroup felt that the Steps favoured certain kinds of information or uses of the information sufficiently strongly that the outcome of the discussion was largely predetermined by the Steps followed and not the information available.	
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. Participants agreed that had the Steps not been followed an outcome that made more balanced used of all the information would have resulted.	
Some participants of subgroup felt that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. However other participants agreed that following the Steps resulted in an outcome that made balanced used of all available the information.	
The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available. However the uses of the information was sufficiently obvious to all subgroup members that a similar outcome would probably have been reached without guidance on how to use the available information.	
The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available, and might have helped the discussion reach a more balanced outcome than would have been reached without guidance on how to use the available information.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

The way the group proceeded by going through the pro forma means that this question in not very relevant. Manager/scientists of the case study were necessary.

Apart from providing general guidance prior to filling out the form, especially Step 1, the group felt the Steps were insufficiently concise to guide the process. Concise explanatory notes for each CBD Criteria would have been more helpful.

However, we don't think the Steps biased the conversation.

Any other comments not captured in the above

Template for Comments on the Performance of the Stepwise Approach of the Garcia *et al.* (2020) Document in helping the WKTOPS Break-out Group Discussions and Decisions

Case Study being evaluated: Lophelia Coral Conservation Area
Criteria being evaluated: A, B, C, D

Break-out Group Instructions: After reviewing the Mock Pro Forma Template and the Garcia *et al.* (2020) Guidance Document complete this document for each case study and considering all of the Criteria A, B, C, D and 'Other' by selecting the response that *best characterizes the group discussions* and providing a narrative explaining the choice and any suggestions for improvements to the guidance. Note that there are 4 questions for each Criterion and responses cross over the pages with a final open opportunity to provide feedback:

1. ***Were the proposed Steps explained clearly enough that they were understood by all participants?***

Response – *None of these responses are a good reflection of the group's opinion*	**Tick One Box**
There was substantial confusion about the intent of the proposed Steps.	X
The intent of the Steps was clear only to those with substantial background in identification of OECMs and similar areas of priority for enhanced risk aversion in management of threats.	
The intent of the Steps was clear only to those with substantial background in the use for area-based fisheries management measures.	
The intent of the Steps was clear to all participants.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

Due to the simplicity of the case study, only Steps 0 and 1 needed to be completed to evaluate the LCCA. Within the context of this case study, the other Steps were not required. The site had previously been evaluated against the Canadian OECM guidance. The Steps as a whole were somewhat confusing in that they did not closely reflect the CBD criteria. If the guidance was structured in a way that follows the CBD Criteria it would be easier to apply.

2. ***Were the proposed Steps helpful in the application of the Criteria to the cases under study?***

Response	**Tick One Box**
The Steps actually impeded application of the Criteria, by leading the efforts into time-consuming actions or discussion that did not help with the evaluation.	
The Steps did guide the application of the Criteria along appropriate pathways, but required more time than would have been needed to complete the task to a comparable level of rigour following other approaches.	
The Steps did guide the application of the Criteria along appropriate pathways, but weren't necessary because the pathway was obvious even if the Steps had not been provided.	X
The Steps did guide the application of the Criteria along appropriate pathways, and was of some help because even though the general pathway was apparent,	

the Steps prompted valuable discussion of the information available, so there is greater confidence in the conclusions drawn.	
The Steps did guide the application of the Criteria along appropriate pathways, and were of substantial value because they led efforts and discussion down an efficient pathway for application of the Criterion that otherwise was not readily apparent to all participants.	
The Steps guided the application of the Criteria along appropriate pathways, and were of great value because without their guidance no efficient pathway for application of the Criterion was readily apparent to any participant.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

For the LCCA, Steps 0 and 1 were followed and this provided the information needed to evaluate the sites against the CBD Criteria. Step 0 was very useful when compiling the information needed to assess the site. A stepwise approach would be very useful but needs to be better aligned with the CBD criteria. It is recognized that the CBD Criteria A-D have overlapping elements, which makes it difficult to align the guidance with the separate Criteria.

3. ***Was application of the proposed Steps affected by the quantity and quality of information that was available for application of the criteria?***

Response	**Tick One Box**
The Steps were impossible to apply because even their minimal application demanded so much information that they could not be followed.	
The Steps were possible to apply, but they did not encourage use of at least some of the types of information that was available, so progress required deviation from the Steps to use all relevant information.	
The Steps were possible to apply, but their application was difficult because little information relevant to the Criteria was available.	
The Steps were possible to apply, but their application was difficult because the available information relevant to the Criteria was generally highly uncertain or otherwise of low quality.	
The Steps were possible to apply, but their application was difficult because there was substantial information available and following the stepwise approach fully meant efforts or discussion often bogged down in unnecessary detail.	
The Steps were possible to apply, and application used the available information effectively.	X

Provide a narrative explaining your choice and suggesting improvements to the guidance

Most of the information needed to apply the Steps was available for this case study. Ellen provided a guidance summary for case study leaders – which was good for Step 0 and may be a useful way of simplifying the process.

4. ***Did application of the proposed Steps bias the effort and discussion of the available information relative to the Criteria?***

Response	**Tick One Box**
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information so strongly that the outcome of the discussion was considered predetermined by the proposed stepwise approach.	
Some participants in the subgroup felt that the Steps favoured certain kinds of information or uses of the information sufficiently strongly that the outcome of the discussion was largely predetermined by the Steps followed and not the information available.	
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. Participants agreed that had the Steps not been followed an outcome that made more balanced used of all the information would have resulted.	
Some participants of subgroup felt that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. However other participants agreed that following the Steps resulted in an outcome that made balanced used of all available the information.	
The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available. However the uses of the information was sufficiently obvious to all subgroup members that a similar outcome would probably have been reached without guidance on how to use the available information.	
The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available, and might have helped the discussion reach a more balanced outcome than would have been reached without guidance on how to use the available information.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

Only Steps 0 and 1 were applied so this question cannot be answered.

Any other comments not captured in the above

Template for Comments on the Performance of the Stepwise Approach of the Garcia *et al.* (2020) Document in helping the WKTOPS Break-out Group Discussions and Decisions

Case Study being evaluated: NAFO Sponge VME
Criteria and Step(s) being evaluated: A, B, C and D

Break-out Group Instructions: After reviewing the Mock Pro Forma Template and the Garcia *et al.* (2020) Guidance Document complete this document for each case study and considering all of the Criteria A, B, C, D and 'Other' by selecting the response that *best characterizes the group discussions* and providing a narrative explaining the choice and any suggestions for improvements to the guidance. Note that there are 4 questions for each Criterion and responses cross over the pages with a final open opportunity to provide feedback:

1. ***Were the proposed Steps explained clearly enough that they were understood by all participants?***

Response	**Tick One Box**
There was substantial confusion about the intent of the proposed Steps (why is this Step necessary to evaluate areas on the Criteria?).	
The intent of the Steps was clear only to those with substantial background in identification of OECMs and similar areas of priority for enhanced risk aversion in management of threats.	X
The intent of the Steps was clear only to those with substantial background in the use for area-based fisheries management measures.	
The intent of the Steps was clear to all participants.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

- The overriding purpose of Criterion A is to ensure there is no double counting of 'MPA' areas being reported towards meeting Target 11. The definition of MPA in this context needs to be made clearer in the Garcia *et al.* Guidance Document.
- Consideration may need to be given to whether a High Seas MPAs have binding effect globally or not?
- It would be useful to have more introductory material to familiarize the user with the new concept of OECMs.
- There should be some consideration about the complexity of going through the Criteria (overlap, duplications, small 'contradictions') and making it easier for the user to understand such complexities, whilst recognizing that the Decision text itself cannot be modified.

2. ***Were the proposed Steps helpful in the application of the Criteria to the cases under study?***

Response	**Tick One Box**
The Steps actually impeded application of the Criteria, by leading the efforts into time-consuming actions or discussion that did not help with the evaluation.	

The Steps did guide the application of the Criteria along appropriate pathways, but required more time than would have been needed to complete the task to a comparable level of rigour following other approaches.	
The Steps did guide the application of the Criteria along appropriate pathways, but weren't necessary because the pathway was obvious even if the Steps had not been provided.	
The Steps did guide the application of the Criteria along appropriate pathways, and was of some help because even though the general pathway was apparent, the Steps prompted valuable discussion of the information available, so there is greater confidence in the conclusions drawn.	X
The Steps did guide the application of the Criteria along appropriate pathways, and were of substantial value because they led efforts and discussion down an efficient pathway for application of the Criterion that otherwise was not readily apparent to all participants.	
The Steps guided the application of the Criteria along appropriate pathways, and were of great value because without their guidance no efficient pathway for application of the Criterion was readily apparent to any participant.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

- It was obvious for some (e.g., those who are familiar with the CBD Criteria and use of the term MPA – see point above), but for others what specific evidence was required to address each criterion was less clear.
- There was also an issue of inconsistent text describing the Criteria in the workshop pro forma with the Criteria described in the CDB Decision (14/18)
- It was considered by the group that, perhaps the link between an action within a Step and the related Criteria may not be explicit enough. In some steps/actions, the related Criterion is noted, but this has not been systematically done.
- The knowledge, expertise and familiarity with the case study evidence enabled the group to address the Criteria without needing to refer to the Guidance Document in any great detail.

3. ***Was application of the proposed Steps affected by the quantity and quality of information that was available for application of the criteria?***

Response	**Tick One Box**
The Steps were impossible to apply because even their minimal application demanded so much information that they could not be followed.	
The Steps were possible to apply, but they did not encourage use of at least some of the types of information that was available, so progress required deviation from the Steps to use all relevant information.	
The Steps were possible to apply, but their application was difficult because little information relevant to the Criteria was available.	

The Steps were possible to apply, but their application was difficult because the available information relevant to the Criteria was generally highly uncertain or otherwise of low quality.	
The Steps were possible to apply, but their application was difficult because there was substantial information available and following the stepwise approach fully meant efforts or discussion often bogged down in unnecessary detail.	
The Steps were possible to apply, and application used the available information effectively.	X

Provide a narrative explaining your choice and suggesting improvements to the guidance

- Addressing Criterion A is not a data issues *per se,* e.g., it is either reported as an MPA or it is not as long as you know what an MPA is in the context of reporting against the CBD protected area target.
- Whilst some in the group thought it was obvious that the applicability of the Steps depends on the quantity and quality of information available, others were of the opinion that the Steps could still be applied in data limited situations. What changes in the level of certainty you have in the evidence provided and therefore the outcome of the assessment, but lack of data did not necessarily prevent an appropriate assessment from being undertaken.
- The approach described by the Steps is generally well known and is reflected in other frameworks (e.g., DPSIR). However, local circumstances will largely dictate the specific types of data and information required against each Step of the assessment framework described in Garcia *et al.* (2020).
- Some of the Steps were considered more useful in guiding the OECM evaluation process for the NAFO Sponge VME. For example much what is described by Steps 2 – 5 is well known and applied within the NAFO governance and management systems. NAFO, as an RFMO, is subject to periodic review of its performance to ensure it is complying with relevant UNGA Resolutions and the Code of Conduct for Responsible Fisheries. However, Step 1 and 6 were considered especially useful in guiding the assessment process by the Group.

4. ***Did application of the proposed Steps bias the effort and discussion of the available information relative to the Criteria?***

Response	**Tick One Box**
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information so strongly that the outcome of the discussion was considered predetermined by the proposed stepwise approach.	
Some participants in the subgroup felt that the Steps favoured certain kinds of information or uses of the information sufficiently strongly that the outcome of the discussion was largely predetermined by the Steps followed and not the information available.	
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. Participants agreed that had the Steps not	

been followed an outcome that made more balanced used of all the information would have resulted.	
Some participants of subgroup felt that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. However other participants agreed that following the Steps resulted in an outcome that made balanced used of all available the information.	
The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available. However the uses of the information was sufficiently obvious to all subgroup members that a similar outcome would probably have been reached without guidance on how to use the available information.	X
The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available, and might have helped the discussion reach a more balanced outcome than would have been reached without guidance on how to use the available information.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

- Of primary consideration by the group was whether or not the Steps make the identification of OECMs too easy, leading to potential paper OECMs? Or, by contrast, it makes the identification of OECMs too demanding, leading to non-identification of OECMs which may have been useful? The group considered on balance that the OECM Criteria and the assessment Steps are 'pitched' at the right level, indeed offering a level of potential effectiveness not typically associated with MPA designations.
- The discussion was mostly influenced by the range of expertise in the sub-group and their familiarity of the case study evidence so this was not a problem as the guidance was not used in any detailed way.

Any other comments not captured in the above

Template for Comments on the Performance of the Stepwise Approach of the Garcia *et al.* (2020) Document in helping the WKTOPS Break-out Group Discussions and Decisions

Case Study being evaluated: Corner Rise Seamounts
Criteria and Step(s) being evaluated: All criteria and the application of the Steps as a whole

Break-out Group Instructions: After reviewing the Mock Pro Forma Template and the Garcia *et al.* (2020) Guidance Document complete this document for each case study and considering all of the Criteria A, B, C, D and 'Other' by selecting the response that *best characterizes the group discussions* and providing a narrative explaining the choice and any suggestions for improvements to the guidance. Note that there are 4 questions for each Criterion and responses cross over the pages with a final open opportunity to provide feedback:

1. ***Were the proposed Steps explained clearly enough that they were understood by all participants?***

Response	**Tick One Box**
There was substantial confusion about the intent of the proposed Steps (why is this Step necessary to evaluate areas on the Criteria?).	
The intent of the Steps was clear only to those with substantial background in identification of OECMs and similar areas of priority for enhanced risk aversion in management of threats.	x
The intent of the Steps was clear only to those with substantial background in the use for area-based fisheries management measures.	
The intent of the Steps was clear to all participants.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

Given the limited time and virtual nature of the break out groups, it was difficult to assess two case studies in light of the Criteria and the guidance. Therefore, it was challenging to find answers to sticky questions pertaining to the interpretation of the CBD Criteria in the guidance.

On structure:

Some participants felt the need for more detailed guidelines on the application of each criterion (in its application to fisheries measures), while others would prefer a clustering of Criteria by themes (as reflected in the guidance) given the duplication of requirements across the criteria. Or further cross-referencing may be needed to accommodate both perspectives.

On substance, some issues that were identified as requiring further guidance include those issues that arose in the emerging topics (being addressed by the Monday break out groups), as well as/including:

- In Step 1: express reference to the WCMC WDPA as a means to determine if the area-based management tool (ABMT) is an MPA or not as a simple way to address this issue.
- Further guidance and examples concerning the temporal aspects of the measure and of the biodiversity outcomes (e.g., is a 5 year closure (although often renewed or adjusted) sufficient for long-lived VME species such as those deep water corals and sponges found in seamounts?

- Relationship between the area-based fishery management (e.g., seamount VME measure – in this case, not a total closure but a mixture of measures – bottom trawl ban but mid-water trawl allowed with gear modification to avoid bottom impacts) and the potential mismanagement of the target stock fished on that VME (splendid alfonsino) due to stock assessment uncertainties, and a recent moratorium triggered by an express recommendation from the RFMO Performance Review, as well as the high bycatch of other species (including Greenland sharks).
- Differences concerning new measures being adopted and old measures in assessing effectiveness.
- How to best deal with equity, cultural and spiritual values in areas beyond national jurisdiction (ABNJ)?
- What should be the minimum standards for coordination/coordination efforts with respect to ABNJ when there is no overarching authority responsible for the management of biodiversity?

2. ***Were the proposed Steps helpful in the application of the Criteria to the cases under study?***

Response	**Tick One Box**
The Steps actually impeded application of the Criteria, by leading the efforts into time-consuming actions or discussion that did not help with the evaluation.	
The Steps did guide the application of the Criteria along appropriate pathways, but required more time than would have been needed to complete the task to a comparable level of rigour following other approaches.	
The Steps did guide the application of the Criteria along appropriate pathways, but weren't necessary because the pathway was obvious even if the Steps had not been provided.	x
The Steps did guide the application of the Criteria along appropriate pathways, and was of some help because even though the general pathway was apparent, the Steps prompted valuable discussion of the information available, so there is greater confidence in the conclusions drawn.	
The Steps did guide the application of the Criteria along appropriate pathways, and were of substantial value because they led efforts and discussion down an efficient pathway for application of the Criterion that otherwise was not readily apparent to all participants.	
The Steps guided the application of the Criteria along appropriate pathways, and were of great value because without their guidance no efficient pathway for application of the Criterion was readily apparent to any participant.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

The Steps can be useful for the management authority to follow, but as discussed in the section 1 above, there wasn't sufficient time to apply them in the context of the case studies' pro forma for the reasons stated above.

3. ***Was application of the proposed Steps affected by the quantity and quality of information that was available for application of the criteria?***

Response	**Tick One Box**
The Steps were impossible to apply because even their minimal application demanded so much information that they could not be followed.	
The Steps were possible to apply, but they did not encourage use of at least some of the types of information that was available, so progress required deviation from the Steps to use all relevant information.	
The Steps were possible to apply, but their application was difficult because little information relevant to the Criteria was available.	
The Steps were possible to apply, but their application was difficult because the available information relevant to the Criteria was generally highly uncertain or otherwise of low quality.	
The Steps were possible to apply, but their application was difficult because there was substantial information available and following the stepwise approach fully meant efforts or discussion often bogged down in unnecessary detail.	x
The Steps were possible to apply, and application used the available information effectively.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

See general comments provided in Section 1 above.

4. ***Did application of the proposed Steps bias the effort and discussion of the available information relative to the Criteria?***

Response	**Tick One Box**
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information so strongly that the outcome of the discussion was considered predetermined by the proposed stepwise approach.	
Some participants in the subgroup felt that the Steps favoured certain kinds of information or uses of the information sufficiently strongly that the outcome of the discussion was largely predetermined by the Steps followed and not the information available.	
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. Participants agreed that had the Steps not been followed an outcome that made more balanced used of all the information would have resulted.	
Some participants of subgroup felt that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. However other participants agreed that following the Steps resulted in an outcome that made balanced used of all available the information.	

The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available. However the uses of the information was sufficiently obvious to all subgroup members that a similar outcome would probably have been reached without guidance on how to use the available information.	x
The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available, and might have helped the discussion reach a more balanced outcome than would have been reached without guidance on how to use the available information.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

The discussions were largely influenced by the different range of expertise in the group and reflected in the emerging questions that emerged from the application of the CBD Criteria to the specific case studies. Not everyone was familiar with each case study so there was a need to drill deep into the application of each Criterion/Sub-criterion to the specific case study to have a better understanding of the issue.

Any other comments not captured in the above

As noted above, there were divergent views on how to best structure the guidance – either on a Criterion by Criterion basis - acknowledging that there will be duplication – or at least cross-referencing needed, given the fact that there is duplication across different Sub-criteria; or by themes. An alternative approach would be to keep the Steps, but to add further information/guidance on the emerging topics that required further discussion during the workshop into Step 1.

Template for Comments on the Performance of the Stepwise Approach of the Garcia *et al.* (2020) Document in helping the WKTOPS Break-out Group Discussions and Decisions

Case Study being evaluated: Lyme Bay Mussel Farm
Criteria being evaluated: All

Break-out Group Instructions: After reviewing the Mock Pro Forma Template and the Garcia *et al.* (2020) Guidance Document complete this document for each case study and considering all of the Criteria A, B, C, D and 'Other' by selecting the response that *best characterizes the group discussions* and providing a narrative explaining the choice and any suggestions for improvements to the guidance. Note that there are 4 questions for each Criterion and responses cross over the pages with a final open opportunity to provide feedback:

1. ***Were the proposed Steps explained clearly enough that they were understood by all participants?***

Response	**Tick One Box**
There was substantial confusion about the intent of the proposed Steps (why is this Step necessary to evaluate areas on the Criteria?).	
The intent of the Steps was clear only to those with substantial background in identification of OECMs and similar areas of priority for enhanced risk aversion in management of threats.	X
The intent of the Steps was clear only to those with substantial background in the use for area-based fisheries management measures.	
The intent of the Steps was clear to all participants.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

In terms of filling the pro forma's section where the site was described, the case group leads compiled the sections using all the evidence available. None of the Steps were followed as each point had a description of what was required. If any of the Steps from Garcia *et al.* had to be taken into account, this was not clear to the case group leads for this area.

In order to fill the part 'Assessment of the area against CBD Criteria', the break-out group mainly used Step 1: Determine eligibility for assessment: quick screening. The group found that this was not a 'quick screening' and a lot of time was put into discussing each Criteria and each Criteria description in order to provide a ranking. The group did at times use some of the information in Steps 2-4 but overall found it confusing to jump from Step to Step for the same Criteria. In particular:

Criterion A: The group agreed that the meaning of this was to avoid double counting of MPA areas in the WCPA as counting towards meeting Target 11. This should be clarified within the Garcia *et al.* (2020) guidance.

Criteria B and C: Steps 1-3 were used to address this Criteria but the fact that the guidance was over several Steps for one Criteria was confusing and difficult to address. In several places, it did not answer the questions being raised.

2. ***Were the proposed Steps helpful in the application of the Criteria to the cases under study?***

Response	**Tick One Box**
The Steps actually impeded application of the Criteria, by leading the efforts into time-consuming actions or discussion that did not help with the evaluation.	
The Steps did guide the application of the Criteria along appropriate pathways, but required more time than would have been needed to complete the task to a comparable level of rigour following other approaches.	
The Steps did guide the application of the Criteria along appropriate pathways, but weren't necessary because the pathway was obvious even if the Steps had not been provided.	X
The Steps did guide the application of the Criteria along appropriate pathways, and was of some help because even though the general pathway was apparent, the Steps prompted valuable discussion of the information available, so there is greater confidence in the conclusions drawn.	
The Steps did guide the application of the Criteria along appropriate pathways, and were of substantial value because they led efforts and discussion down an efficient pathway for application of the Criterion that otherwise was not readily apparent to all participants.	
The Steps guided the application of the Criteria along appropriate pathways, and were of great value because without their guidance no efficient pathway for application of the Criterion was readily apparent to any participant.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

As a guidance, the group found that the Steps were useful but due to not being in concordance with the 'Assessment of the area against CBD Criteria' table, it was difficult to apply the Steps given and complete the table at once. The group had extensive discussions about the Criteria and descriptions and struggled to find answers to these within the Garcia *et al*. (2020) or the CBD documents. This in addition to the fact that the mussel farm case study raised many questions resulted in the group falling behind and not being able to complete the pro forma (Criteria D has been assessed separately and responses jointly compiled). The group found that many terms need clarification and that the stepwise guidance would be more useful if it followed the same order as the CBD Criteria.

3. ***Was application of the proposed Steps affected by the quantity and quality of information that was available for application of the Criteria?***

Response	**Tick One Box**
The Steps were impossible to apply because even their minimal application demanded so much information that they could not be followed.	
The Steps were possible to apply, but they did not encourage use of at least some of the types of information that was available, so progress required deviation from the Steps to use all relevant information.	

The Steps were possible to apply, but their application was difficult because little information relevant to the Criteria was available.	
The Steps were possible to apply, but their application was difficult because the available information relevant to the Criteria was generally highly uncertain or otherwise of low quality.	
The Steps were possible to apply, but their application was difficult because there was substantial information available and following the stepwise approach fully meant efforts or discussion often bogged down in unnecessary detail.	X
The Steps were possible to apply, and application used the available information effectively.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

The group found that it was not so much an issue related to the information available but more that the description of the Criteria needed clarification and it could be evaluated in many different ways depending on the person/institution, hence some terms needing to be described and further explained. Addressing the Criteria and applying the Steps could be done even if no data was available from the site itself (inferred from other areas), i.e., independently of the quality/quantity of the data.

4. ***Did application of the proposed Steps bias the effort and discussion of the available information relative to the Criteria?***

Response	**Tick One Box**
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information so strongly that the outcome of the discussion was considered predetermined by the proposed stepwise approach.	
Some participants in the subgroup felt that the Steps favoured certain kinds of information or uses of the information sufficiently strongly that the outcome of the discussion was largely predetermined by the Steps followed and not the information available.	
The subgroup all agreed that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. Participants agreed that had the Steps not been followed an outcome that made more balanced used of all the information would have resulted.	
Some participants of subgroup felt that the Steps favoured certain kinds of information or uses of the information enough that the outcome of the discussion was influenced by the proposed stepwise approach. However other participants agreed that following the Steps resulted in an outcome that made balanced used of all available the information.	
The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available. However the uses of the information was sufficiently obvious to all subgroup members that a similar outcome would probably have been reached without guidance on how to use the available information.	X
The subgroup all agreed that the Steps promoted a balanced discussion based on the kinds of information available, and might have helped the discussion reach a more balanced outcome than would have been reached without guidance on how to use the available information.	

Provide a narrative explaining your choice and suggesting improvements to the guidance

The Steps were not applied in a stepwise manner, rather the discussion was influenced by the range of expertise from both the case studies leads and the wide range of experts from different backgrounds while following the Criteria table. No bias was discussed during the break-out groups.

Any other comments not captured in the above

It was not clear to the group what would happen if one, few or half of the Criteria was not met. I wasn't clear to the group either whether the task was to fill in the pro forma to assess the case studies, the criteria, the specific Steps in Garcia *et al*. (2020), the full Garcia *et al*. (2020) guidance or all of the above.

Overall, we found that the Steps did not help fill the assessment Criteria part of the form. The group thought that the Steps should either follow the same order as the Criteria (a Step for each Criteria and description) or expand on the current Steps to accommodate for more clear guidance, especially clarifying points such as authority and governance. In some cases where those overlap, there would be no need for repetition but rather cross-referencing.

The knowledge coming from the case study leads and the experts in the group helped in shaping the discussions - posing some very interesting questions and answering some of those raised.