Advancing Marine Conservation through Other Effective area-based Conservation Measures (OECMs): Expert Perspectives from a Delphi Study

by

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Abstract

To reverse unprecedented rates of global biodiversity loss, conservation efforts have focused on area-based conservation tools: protected areas (PAs) and other effective area-based conservation measures (OECMs). Recently, the CBD has formally adopted a definition of OECMs, and the significance of OECMs has been established. Yet, marine OECMs require more support from the conservation community to clarify their role in marine area-based conservation. To do so, the study sought to highlight the key opportunities created, potential challenges associated with implementation, process and stakeholders for evaluation of effectiveness and vision of success for marine OECMs. The research employed a Delphi study with a group of 18 international marine conservation experts. Consensus was reported for opportunities, challenges, stakeholders for evaluation and vision of success for marine OECMs. Results of this research provide support for the important contributions of marine OCEMs to biodiversity conservation, add clarity the concepts and highlight areas for future research.

Keywords: other effective area-based conservation measures (OECMs); marine biodiversity; area-based conservation; Aichi Target 11; Delphi study

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Introduction

Global biodiversity is in severe decline (Rockström et al. 2009). According to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), 66% of marine environments and 75% of land-based environments have been affected by human intervention (Díaz et al., 2019). The report, which is the first global assessment of biodiversity, finds that one million plant and animal species are facing the threat of extinction (Díaz et al., 2019). In response, academics and practitioners alike are calling for major transformative changes and integrated approaches across sectors and scales (Díaz et al., 2019; Steffen et al., 2015).

Area-based conservation, including Protected Areas (PAs) and Other Effective area-based Conservation Measures (OECMs), has been suggested as a promising conservation measures to bring about such transformative changes (Díaz et al., 2019; Diz et al., 2018). Indeed, there is considerable consensus on the significance of area-based conservation measures in conserving biodiversity (Sandbrook et al., 2019). For example, Woodley et al. (2019) surveyed 335 conservation scientists from 81 countries and find that 99 per cent of scientists agreed to the importance of area-based, or in-situ, conservation in addressing biodiversity decline.

Parties of the Convention on Biological Diversity (CBD), arguably the world's most influential multilateral biodiversity agreement, also support area-based conservation. To tackle the rapid loss of biodiversity, the CBD adopted a Strategic Plan for Biodiversity (CBD Decision X/2) in 2010 in Nagoya, Aichi Prefecture, Japan. As a part of the plan, 20 Aichi Biodiversity Targets were adopted to meet biodiversity conservation objectives between 2011 and 2020. Target 11 states:

> By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and **other effective area-based conservation measures**, and integrated into the wider landscapes and seascapes (CBD, 2010, p.9, emphasis added).

Over the last ten years of implementing the CBD's strategic plan, PAs have garnered considerable attention especially in marine area-based management (Diz et al., 2018). OECMs, on the other hand, have been largely overlooked (Laffoley et al., 2017). This may stem from a lack of guidance on the definition and recognition criterion on OECMs (Jonas et al., 2014). To raise their profile, the CBD tasked International Union for the Conservation of Nature (IUCN) and IUCN's World Commission on Protected Areas (WCPA) to develop guidelines to better define and support the implementation of OECMs. As a result of multiple deliberations, CBD adopted a formal definition of OECMs in 2018 which described them as:

> 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, p.1).

In recent years, OECMs have gained more traction. In global conservation community, there has been a massive push to establish OECMs as conservation measures in area-based conservation (see, e.g., Jonas et al., 2014; Jonas et al., 2018; Laffoley et al., 2017). In the light of post-2020 global biodiversity framework, which is currently being negotiated by the CBD and is

due for adoption in May 2021, OECMs have emerged as essential tools in the conservation sector with a promise to deliver quantitative and qualitative elements of current Aichi Biodiversity Target 11 and its potential successor (Jones et al., 2020). The significance of OECMs has been underscored in the literature (see, e.g., Diz et al., 2018; Jonas et al., 2018). These efforts have influenced the global narrative and supported the uptake of OECMs in global policy discussions (Laffoley et al., 2017).

OECMs are now at a critical juncture. As Dudley et al. (2018, p.5) remark, "OECMs are an essential tool in this [global conservation] process. With two years before the post-2020 biodiversity framework is expected to be adopted by Partiers to the CBD, efforts are urgently needed to examine and expand on these ideas". There is a two-fold gap in literature on OECMs. In-depth understanding of key opportunities, key implementation challenges and evaluation of effectiveness of marine OECMs is required to further clarify their role in area-based conservation (Geldmann et al., 2020). Scholars have argued that lessening this gap will require a shift in the global conservation community from defining and establishing the significance of OECMs, towards developing grounded guidance for mainstreaming their successful recognition, implementation and evaluation to ensure they realize their potential contributions to global conservation efforts. For example, Jonas et al. (2014) called for an OECM task force to develop further guidance on OECMs. Following the publication of this paper, a task force was established, which suggests a shift in the conservation community from defining OECMs towards developing tangible implementation guidance. Examples such as these indicate the power of conservation discourse in influencing policy decisions. This shift in focus, from defining OECMs towards mainstreaming their implementation, coupled with increased clarity on the contributions of OECMs in conservation will influence their future trajectory in the Post-

2020 biodiversity framework, position in area-based conservation and overall success (Jonas et al., 2018).

OECMs include marine as well as terrestrial measures. In a recent study, Jones et al. (2020) point out that the protected area cover for marine ecosystems is much less as compared to the land and the efforts to protect marine biodiversity are insufficient. Similar sentiments are echoed in a study by O'Leary et al. (2016) where they found that the United Nation's 10% target for marine conservation is inadequate for protecting marine biodiversity. In response to these claims, this major research paper (MRP) will focus on marine OECMs.

This MRP aims to explore the opportunities, challenges, and evaluation processes associated with mainstreaming marine OECMs in area-based conservation by capturing the perspectives on OECMs through a Delphi study with Science for Nature and People Partnership (SNAPP) 'Coastal Outcomes' working group. This study is timely as the post-2020 global biodiversity framework presents a unique opportunity to clarify the role of OECMs in area-based conservation. The Delphi study will help to synthesize and share the views of the expert working group that is involved in informing the post-2020 global biodiversity framework. Specifically, the study aims to answer the overarching research question:

- What is the trajectory of marine OECMs in the post-2020 global biodiversity framework?

To answer this overarching research question, I will pursue the following five research questions:

- What are the key opportunities created by the recognition of marine OECMs?
- What are the key challenges associated with the implementation of marine OECMs?
- How should the "effectiveness" of marine OECMs be evaluated and reported?

- Who should evaluate the effectiveness of marine OECMs?
- What constitutes a successful vision of OECMs?

The research questions highlighted above explore the key opportunities, associated implementation challenges, and evaluating effectiveness of OECMs. They are designed to contribute knowledge which might help shift in discourse – from defining to implementing marine OECMs – by adding clarity on the role of OECMs and are, therefore, in line with the solution-oriented nature of sustainability science (Lang et al., 2012). In the subsequent section, I review the literature on OECMs with a focus on their potential significance and the challenges associated with their effective implementation. In the methods section, I introduce Delphi studies and rationalize their use in the MRP and describe the study design, including data collection and analysis. The results are presented in the order of the five main themes, which align with the five MRP research questions. The discussion presents key findings within each theme and outlines potential policy implications of each. Finally, the MRP concludes by summarizing the key findings and providing recommendations for marine OECM researchers, practitioners, and policy makers.

Literature Review

The current section outlines the trajectory of OECMs in terms of their development in policy until now and the significance and challenges associated with OECMs. These areas have been the major focus of scholarship on OECMs since they are relatively new tools in area-based conservation. Further development and research on OECMs will lead to further clarification and addition of novel ideas associated with OECMs in the scientific literature.

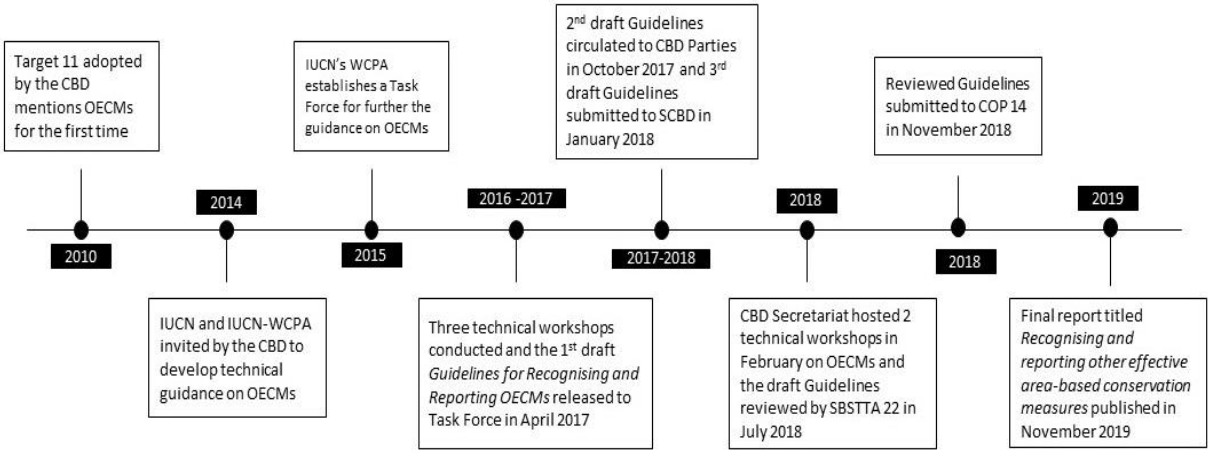
Before exploring the significance and challenges associated with OECMs, it is important to review their development within the global conservation community (Figure 1). After the

adoption of Strategic Plan 2011 – 2020 and Aichi Biodiversity Targets by the CBD, there was a lack of momentum on defining OECMs in conservation literature. Laffoley et al. (2017) explain that the addition of OECMs was a last-minute adoption in Aichi Biodiversity Target 11. OECMs have been overlooked and underappreciated due to cultural, socio-economic and political reasons and they have not been legally identified by any authority (Jonas et al., 2014).

As showcased in Figure 1, driven by the growing consensus on lack of a coherent definition and meaning, a task force was assembled by the WCPA to establish a set of guidelines to define, identify and monitor an OECM, and further the dialogue on its significance and implementation on regional and global scales in 2015. In the following years, from 2016 – 2017, three technical workshops were convened and the first draft of *Guidelines for Recognising and Reporting OECMs* was released in April 2017. In the year 2017 – 2018, the second draft of the Guidelines was submitted to the CBD and the third draft was circulated to the Secretariat of the CBD in early 2018.

Figure 1

Timeline of Key Events in Development and Mainstreaming of OECMs



The CBD Secretariat hosted two technical workshops in February 2018 and the draft document was reviewed by CBD's Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA 22) in July 2018. Reviewed Guidelines were submitted to COP 14 in November 2018 for CBD parties for further consideration. In 2018, the 14th Conference of the Parties to the CBD (COP 14) adopted a definition for OECMs (CBD/COP/DEC/14/8). The decision 14/8 which was adopted by 196 parties that officially defined OECMs. Final Guidelines titled 'Recognising and reporting other effective area-based conservation measures' (IUCN-WCPA, 2019) were published in November 2019.

In the report published by IUCN-WCPA (2019), there are several important elements of the definition, marking features for identification and tools for monitoring and evaluation. In addition, the report includes guidance on the areas that can be qualified as OECMs which include historic shipwrecks sites, sacred natural sites, hunting reserves, traditional agricultural systems, watersheds, or incidental areas such as military areas (IUCN-WCPA, 2019). OECMs can achieve conservation through primary, secondary and ancillary conservation approaches. Primary conservation refers to areas that fall under PA classification, but the managing authority decides not to not classify as a PA. Secondary conservation approach includes active management of areas that deliver biodiversity conservation as a secondary objective. Ancillary conservation approaches include areas that deliver biodiversity conservation as a by-product of management objectives. OECMs should protect various aspects of biodiversity which include rare and threatened endangered species, representative natural systems, areas with ecological integrity and connectivity, areas that provide ecosystem services and carbon sinks etc. (IUCN-WCPA, 2019). The report further highlights a four step Screening Tool to identify areas as a candidate OECM. Lastly, the report comments on monitoring and evaluation of OECMs and suggests that Protected

Area Management Effectiveness (PAME) tools supported by quantitative information to be the most appropriate strategy to assess the effectiveness OECMs.

The next sub-section highlights the significance and a brief list of challenges associated with OECMs. Part 1on Significance of OECMs comments upon relationship of Marine Protected Areas (MPAs) to OECMs, impact of OECMs on tackling climate change, overlaps with areas of biodiversity importance, achieving big bold conservation targets, recognition of the efforts of local communities in conservation. Part 2 on Challenges associated with OECMs outlines a brief list of challenges as highlighted in the literature.

1. Significance of OECMs

1.1 MPAs and their Relationship to OECMs in Area-based Conservation

Traditionally, PAs have been considered the major policy tool to achieve bold conservation targets (Lopoukhine & Dias, 2012; Watson et al., 2014). This sentiment is reflected in the scientific literature (see, e.g., Campbell & Gray, 2019; Dudley et al., 2018; Laffoley et al., 2017; Rees et al., 2020). Yet, despite their established role in conservation, protected areas are accompanied by certain limitations. Four of the main limitations of PAs, and the potential contributions of OECMs to these limitations, are discussed here. These include ecological connectivity, human rights to access marine environments, the risk of achieving quantitative targets without changing real-world biodiversity, and the right of Indigenous peoples.

First, there is evidence from assessments across a wide network of Marine Protected Areas (MPAs) that they are not ecologically coherent, meaning they are insufficiently representative and ecologically connected (Rees et al., 2018b). This affects the functioning of ecosystems services and human well-being. Moreover, individual MPAs are insufficient in protecting entire ecosystem processes due to high levels of spatial connectivity within marine

ecosystems (Rees et al., 2018b). Well-connected and ecologically coherent systems that consist of PAs complemented by OECMs have been suggested as a solution to such issues around ecological coherence. OECMs can work in tandem with the existing MPAs and thus building a strong network of area-based systems of conservation (see, e.g., Diz et al., 2018; Dudley et al., 2018; Jonas et al., 2014; Jones et al., 2020; Laffoley et al., 2017; Maxwell et al., 2020; Rees et al., 2018b; Rees et al., 2020)

Second, Dudley et al. (2018) highlight the human rights and ethical implications of protected areas as many countries have regulations for no human settlements in such zones. This remains one of the strongest critiques of protected areas especially in marine coastal zones where establishing 'no-take' coastal zones threaten the livelihood of communities dependent on marine resources for their survival (Humphreys & Herbert, 2018). Dudley et al. (2018) point out that OECMs present an opportunity for forming fair and equitable partnerships, which are based on placing governance power in the hands of people who protect the area.

Third, PAs have often led to the achievement of biodiversity objectives on paper, but not in practice which often referred to through the expression "paper parks" (Visconti et al., 2019). In terms of achievement of Aichi Biodiversity Target 11, OECMs participate in achieving the quantitative target of 10% for coastal and marine areas which is also underscored in the United Nations Sustainable Development Goal (SDG) 14.5. Not only quantitative but by the virtue of their definition, OECMs also aim at achieving qualitative aspects of the target that include effectiveness, equity, connectivity and representation. However, there is a risk of achieving the target in terms of quantity without delivering on the more important qualitative elements (Diz et al., 2018; Dudley et al., 2018; Jonas et al., 2018; Laffoley et al., 2017; Rees et al., 2018b; Watson et al., 2016). Rees et al. (2018a) thus argue for inclusion of qualitative elements of Target 11 in

SDG 14 to achieve realistic and meaningful conservation emphasizing the importance of qualitative elements of the target. More recently, Maxwell et al. (2020) also reported an increasing concern regarding meeting the targets in terms of numbers and failing at actual biodiversity conservation.

Finally, nearly a quarter of the land surface is either managed by or falls under the tenure rights of Indigenous peoples, which intersects with 40% of terrestrial protected areas and ecologically intact landscapes (Garnett et al., 2018). This finding emphasizes the importance of recognizing the role played by Indigenous peoples in achieving regional and global conservation targets as well as the significance of recognizing their land rights (Garnett et al., 2018). Jonas et al. (2017) argue that OECMs can increase the recognition of Indigenous controlled conservation areas (ICCAs). They found that the protected area framework is not universally applicable to recognizing the contribution of ICCAs in conservation but OECMs can be appropriate for supporting ICCAs and increasing their visibility. It is important to note that Indigenous communities and conservation efforts are underpinned by significant cultural and spiritual motivations and local knowledge. The ability to collaboratively understand the Indigenous knowledge with ecological science can increase our overall understanding of social – ecological systems (Ban et al., 2018). This can be facilitated by OECMs that recognize and support ICCAs.

1.2 Impact of OECMs on Tackling Climate Change

Dudley et al. (2018) highlight that more effective conservation could include protected areas augmented with OECMs. Gross et al. (2016) argue that strong climate-resilient ecosystems would require other conservation means in addition to PAs. A strong network of area-based measures including PAs and OECMs can build effective conservation while accounting for rapid climate change. Tittensor et al. (2019) corroborate their argument and support that a network of

spatially static marine management tools, such as MPAs and OECMs, integrated with dynamic conservation features such as short-term fishery closures can be instrumental in building climate-resilient seascapes that deliver conservation outcomes. Therefore, the vision shared by many scientists consists of an ecologically coherent network of protected landscapes and seascapes which can withstand the effects of climate change and deliver biodiversity conservation is inclusive of OECMs.

1.3 Overlaps with Areas of Biodiversity Importance

As the definition suggests, OECMs are not PAs. OECMs deliver *in-situ* long-term biodiversity conservation regardless of their management objective. In a recent study, Maxwell et al. (2020) claim that OECMs have higher benchmarks for biodiversity compared to many nationally recognized protected areas and thus they are major contributors in area-based conservation when formally recognised due to obligation to biodiversity conservation and public scrutiny of management. In a similar spirit, Donald et al. (2019) reported that 76% of the Key Biodiversity Areas (KBAs) could be partially classified as one or more potential OECMs. This suggests an opportunity for enhancing the protection of biodiversity in a more socially acceptable way when compared to strict protected areas (Dudley et al., 2018; Maxwell et al., 2020).

1.4 Achieving Bold Conservation Targets

Conservation targets have constantly been challenged over the years. As mentioned previously, O'Leary et al. (2016) found that the 10% UN target for marine conservation is insufficient to achieve conservation objectives which resonate with the findings from the study by Woodley et al. (2019). More recently, Jones et al. (2020) found that at least 26% of the ocean needs to be conserved through a network of MPAs and marine OECMs. This finding is

consistent with IUCN calling for 30% of the ocean to be protected by 2030 through MPAs and marine OECMs at 2014 World Parks Congress which was confirmed at the 2016 World Conservation Congress. Dudley et al. (2018) highlight conservation targets such as the idea of "Half Earth" approach by E. O Wilson and Wild Foundation's "Nature Needs Half" that calls for securing half of the planet for nature. Even though this proposal is contentious, they argue that OECMs could be involved with achieving such bold conservation targets without causing a humanitarian crisis and political instability in protected area systems. The inclusion of diverse worldviews along with collaborative governance strategies makes OECMs more acceptable in society and thus more effective in increasing biodiversity conservation (Dudley et al., 2018). In the marine realm, there is uncertainty around the protection of marine ecosystems beyond the national jurisdiction of any country i.e. the high seas which occupy 50% of the surface of the Earth (Laffoley et al., 2017). Laffoley et al. (2017) argue that considering these statistics, OECMs have a significant role in the management and efficient protection of high seas.

1.5 Recognition of Efforts of Local Communities in Conservation

There is considerable consensus on OECMs being useful in recognizing the efforts of Indigenous peoples and local communities in biodiversity conservation (see, e.g., Donald et al., 2019; Dudley et al., 2018; Garnett et al., 2018; Laffoley et al., 2017). Laffoley et al. (2017) point out that marine conservation in large parts of the globe, especially in the Pacific Ocean is achieved by Indigenous communities and OECMs are the appropriate way to designate such areas as they deliver biodiversity conservation through their practices rooted in local knowledge and culture. Moreover, Armitage et al. (2020) suggest community – centered conservation as the most appropriate governance strategy for the post-2020 global biodiversity framework. According to the authors, community-centred conservation is led by local and Indigenous

communities along with a multi-level governance process. This emphasizes the opportunity created by OECMs in ICCAs and LMMAs for achieving biodiversity conservation through such elaborate and complex governance schemes (Campbell & Gray, 2019). The decentralization and democratization of governance can be instrumental in achieving bold conservation targets and OECMs act as an important policy tool for such radical processes (Dudley et al., 2018).

2. Challenges Associated with OECMs

Despite the potential for OECMs to deliver on these social and ecological outcomes, OECMs have been criticized for lacking formal identifying, listing and reporting processes (Diz et al., 2018, Donald et al., 2019). Dudley et al. (2018) also highlight the need for a support network for OECMs such as platforms for dialogue and attention is required to make sure that the domain is not dominated by conservation professionals. Jonas et al. (2018) bring to light the potential challenges associated with the implementation of OECMs. The identification of conservation measures that can be classified as Aichi Target 11 can be misleading. For instance, temporary fishery closures are not OECMs but better classified under Aichi Target 6 (Laffoley et al., 2017). Jonas et al. (2018) caution to include Indigenous and local communities while implementing and policy-making process of OECMs. It will also be required to deal with understaffed and under-resourced implementing agencies, and lack of funding for the support needed to build capacity, manage and monitor the areas (Jonas et al., 2018). Lastly, the name OECMs has been disputed to be less user friendly (Dudley et al., 2018) and instead ‘conserved areas’ could be more acceptable once the ambiguity around the term is resolved (Jonas et al., 2018).

Methods

1. Delphi Study

This study employs the Delphi technique. The Delphi method named after the Greek oracle at Delphi was developed by RAND corporation in the United States in the 1950s (Dalkey & Helmer, 1963). Originally designed to be used as a predictive tool in the military, the Delphi technique has been since used in numerous fields such as nursing, health and sustainability science (Mukherjee et al., 2015). The Delphi technique is best described by Hasson et al. (2000) as a group facilitation technique that seeks to obtain consensus on opinion of experts through a series of structured questionnaires. The questionnaires often called rounds are deployed anonymously and the classical Delphi originally conducted four rounds, but contemporary studies preferred two or three rounds (Hasson et al., 2000). In a classical Delphi, round one employs open-ended questions to generate responses from the expert group, round two is devised based on the responses generated from round one and in round 3, experts are sent the results of round two with accompanying statistical information to showcase collective opinion. (Hasson et al., 2000). The process is carried out until consensus is achieved or law of diminished return applies to the successive rounds i.e. the summary of the responses is fed back to the experts after each round until consensus is reported or the number of responses per Round decreases (Hasson et al., 2000).

According to Rowe and Wright (1999), the classical Delphi method has four key features: anonymity of the participants allows for free expression of opinions; iteration allows for participants to refine their views based on group's performance; controlled feedback provides an opportunity to understand other perspectives and statistical analysis provides ground of quantitative analysis and interpretation of data. The Delphi technique allows for multiple

iterations, which combined with feedbacks allows the experts to modify their responses ensuring the credibility of the result (Eycott, Marzano & Watts, 2011 as cited in Mukherjee et al., 2015).

That said, the Delphi technique has a few limitations. First, consensus might be biased as certain group members might align their choices to the majority view inadvertently that might affect the validity of the data recoded (Hasson et al., 2000; Mukherjee et al., 2015). The Delphi technique might not support very large group studies as it generates vast amounts of qualitative data which might be tough to handle and analyse (Hasson et al., 2000) and put excessive strain on researchers conducting the study (Mukherjee et al., 2015). There are no face-to face meetings in a Delphi study which might lead to unresolved issues due to the lack of debate among the members (Mukherjee et al., 2015). The Delphi study requires time commitment from the experts and resources for the conduction of the study while also employing multiple iterations which are important for validity of the data but can cause sample fatigue (Hasson et al., 2000; Hsu & Sandford, 2007)

1.1 The Rationale for Employing the Delphi Technique

The main purpose of this study was to understand expert perspectives on key opportunities created, associated challenges with implementation, stakeholders and process of evaluation and vision of success for marine OECMs to clarify their role in marine area-based conservation. The classical Delphi methodology was deemed to be the most appropriate strategy to conduct the research for several reasons. First, it allows the experts to collectively move towards consensus without social pressures. The anonymous nature of the technique eliminates biases such as groupthink, halo effect, egocentrism and dominance (Mukherjee et al., 2015). Second, as pointed out by Mukherjee et al. (2015), the Delphi technique remains underexplored in the field of ecology and conservation even though it might be an appropriate method in the

issues related to biodiversity conservation. Third, the technique creates a safe space for experts from diverse backgrounds such as practitioners, policymakers, conservationists and Indigenous peoples to engage in discussions thus eliminating information bias or self interest (Mukherjee et al., 2015). Fourth, the expert panel's representation needs not be statistically significant as representation is indicated by the attributes of the experts (Powell, 2003 as cited in Mukherjee et al., 2015). Fifth, the Delphi technique can help with decision making and conservation policy, generate new insights and increase the current understanding of the topic which aligned with the goals of the study (Mukherjee et al., 2015). Sixth, the method does not require physical presence of the experts involved bypassing time and cost issues (Mukherjee et al., 2015). Finally, the Delphi technique is useful in graduate research to explore problems with incomplete knowledge or to understand opportunities and solutions (Skulmoski et al., 2007).

1.2 Identifying the 'Expert' Group

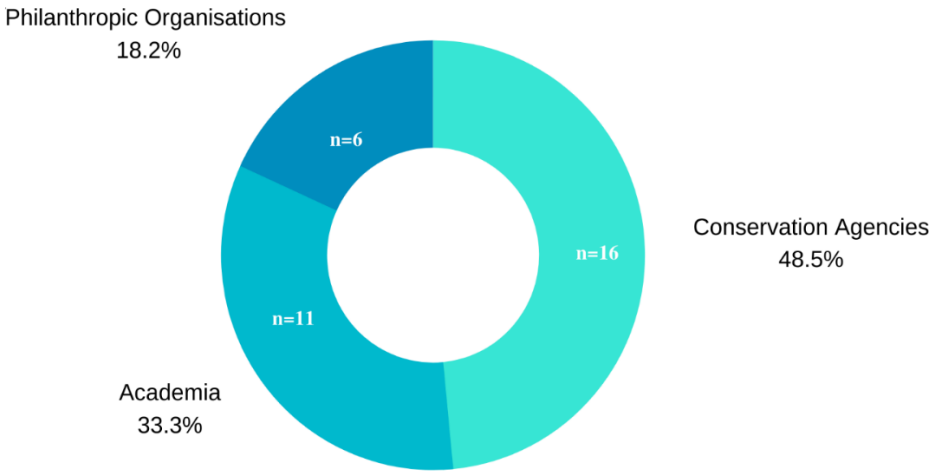
The expert group was identified through purposive sampling, meaning the experts were sought based on their knowledge of the problem under investigation (Hasson et al., 2000). As pointed out by Adler & Ziglio (1996), the Delphi experts should be chosen based on the "expertise" requirements. First, they must indicate knowledge and experience with the issues under investigation. Second, they must demonstrate capacity and be willing to participate. Third, they must have enough time to participate in the Delphi study. Lastly, they must possess effective communication skills. For the purpose of this study, the Science for Nature and People Partnership (SNAPP) Coastal Outcomes group was approached and they graciously agreed to participate in the study.

The Science for Nature and People Partnership (SNAPP) is a collaborative partnership opportunity that brings together experts from diverse backgrounds to develop evidence-based,

scalable solutions to the most pressing global challenges to ensure future sustainability and human well-being. The SNAPP 'Coastal Outcomes' group is one of the currently funded working groups that seeks to understand the social, ecological, economic and political conditions that lead to positive outcomes for nature and people while also understanding synergies and trade-offs that exist between multiple outcomes (https://snappartnership.net/teams/coastal-outcomes/). The SNAPP Coastal Outcomes team is currently focussed on MPAs and marine OECMs across seven countries in Africa, Asia and the Pacific. The main objectives of the group include providing a synthesis of social and ecological outcomes of different coastal conservation measures, building a decision support tool for the stakeholders who invest and implement conservation management actions and inform the ongoing negotiations on the post-2020 global biodiversity framework. The group includes 33 highly experienced members from leading universities, conservation agencies and philanthropic organizations (Figure 2). One of the strengths of the group is its diversity as it brings together natural and social scientists from different professional settings.

Figure 2

Composition of the Backgrounds of the Expert Group for this Delphi Study



As highlighted above and to reiterate the requirements put forth by Adler & Ziglio (1996), the SNAPP Coastal Outcomes working group demonstrates the expertise and knowledge on marine OECMs, willingness, capacity and time to participate in the study and possess effective communication skills as most participating members are published authors/leaders in their respective organizations. Therefore, the group fit perfectly with the expert group criteria required to conduct the Delphi study. Finally, in accordance with Brock University's ethics requirements, a research ethics approval was sought in January 2020 and the approval was received in February 2020 from the Research Ethics Board at Brock University under the file number REB 19-231 BLYTHE.

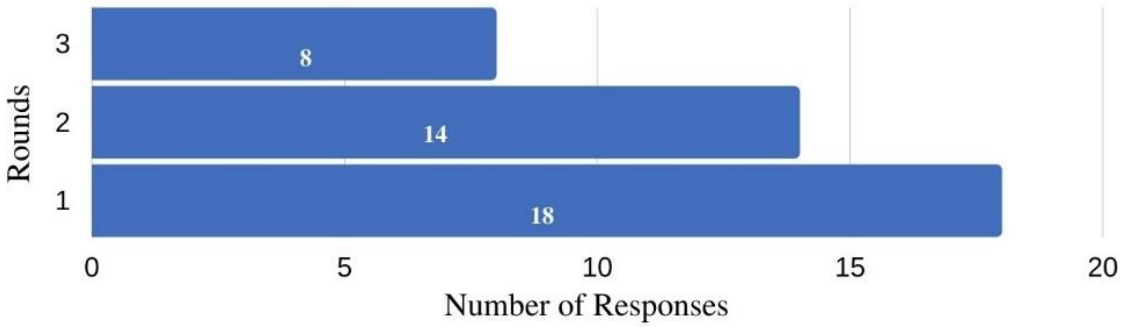
2. Design of the Delphi Study

2.1 Rounds, Responses and Termination

The classical Delphi study was conducted in three rounds. 18 participants responded to the first round of open-ended questions of the Delphi study. In the following round, 14 responses were retrieved from the participants. The last round recorded 8 responses (Figure 3). All three rounds of this study were completed between early May and early July.

Figure 3

Responses Recorded per Round of the Classical Delphi Study



The study was terminated after three rounds for two reasons. First, at least two iterations are recommended for Delphi studies if the first Round is qualitative, which was case in this study (Hsu & Sandford, 2007; Mukherjee et al., 2015; Thangaratinam & Redman, 2005). Round 1 was qualitative and Rounds 2 and 3 were quantitative. Second, the validity of the results might be diminished with low response rates (Hasson et al., 2000). After Round 3, only 8 responses were recorded, which was considered too low for a third iteration.

2.2 Pilot Testing

As suggested by Hasson et al. (2000), pilot testing with a small group before implementation should be conducted for Delphi studies. Pilot testing provides clarity (Rowe & Wright, 2011; Skulmoski et al., 2007), highlights procedural problems and helps in the assessment of research questions for their relevance (Skulmoski et al., 2007). Keeping in line with the best practices, rounds 1 and 2 were pilot tested before implementation. The Round 1 was pilot tested by 4 individuals and Round 2 was pilot tested by 3 individuals.

2.3 ***Consensus***

There are no set criteria for consensus determination in Delphi studies (Hasson et al., 2000; Hsu & Sanford, 2007; Mukherjee et al., 2015). The criteria are often decided based on the aim of the research. Diamond et al. (2014) found in 98 studies, percentage criteria is most used for consensus. The purpose of this research was to attain consensus on the issues raised and therefore, two criteria were employed to add robustness to the study. There is no strict rule for defining consensus in Delphi studies and often subjective criteria and descriptive statistics are used for establishing consensus (Gracht, 2012). The consensus for this study is determined by 75% or more experts either agreeing or strongly agreeing with a statement on a Likert scale of 5 i.e. $\geq$75% of the experts select 4 or 5 on the Likert scale and the mean of each item is ≥ 3.5.

These consensus criteria are used for retention of items in this MRP. The items that achieved the above-mention criteria were retained in Round 2 and circulated for Round 3.

2.4 Statistical Analysis

The Rounds 2 and 3 of the Delphi study were quantitative. In Round 2, mean, standard deviation and percentage agreement were calculated for each item. The aim of Round 3 was to move towards consensus. Group mean and individual scores were shared with the experts for each item to reconsider their choices in the light of the statistical feedback for the last (third) round. Finally, percentage consensus, mean and standard deviations were calculated to determine consensus after Round 3.

3. Rounds of the Delphi Study and Data Analysis

The Delphi technique involved 3 rounds. Round 1 included 4 open-ended questions and qualitative data analysis was used for investigating the data. Round 2 and 3 were based on Likert-scale assessments and, therefore, quantitative data analysis was used for examination.

3.1 Round 1

For Round 1, based on careful study of the literature and the identification of research gap, four open-ended questions were devised (Appendix). The questions were administered to the SNAPP Coastal Outcomes group using Qualtrics and a time period of 2 weeks was allotted to the group. 18 responses were received which were recorded in Microsoft Word documents and transferred to Microsoft Excel for coding.

The responses from Round 1 were analysed inductively which aimed at generating theory from collected data (Williams & Moser, 2019). Often content analysis or coding techniques are employed for qualitative data analysis (Hasson et al., 2000; Mukherjee et al., 2015). In the analysis for Round 1, the first step involved identification of distinct concepts present in the data

(Williams & Moser, 2019). It is a central tenet of open coding to group of the similar responses together in a systematic manner to reduce redundancy and increase efficiency (Williams & Moser, 2019). The responses were further analysed and combined to generate the final statements through the process of axial coding which aims at 'refining, aligning and categorizing' the concepts (Williams & Moser, 2019). The process of coding employed aimed to retain the wording of the experts, no items were added, and rare items were also retained (Hasson et al., 2000). Analysis of qualitative data from Round 1 produced 79 statements across 5 research questions which are referred as 'themes' in this MRP (Figure 4). The term 'theme' is employed here to designate the central areas of focus that associate with the overarching research question. The five themes generated in this study are linearly linked to 5 research questions as:

Theme 1: Theme 1 pertains to the first question on *key opportunities created by the recognition of marine OECMs*.

Theme 2: Theme 2 was identified from the second question on *key challenges associated with the implementation of marine OECMs*.

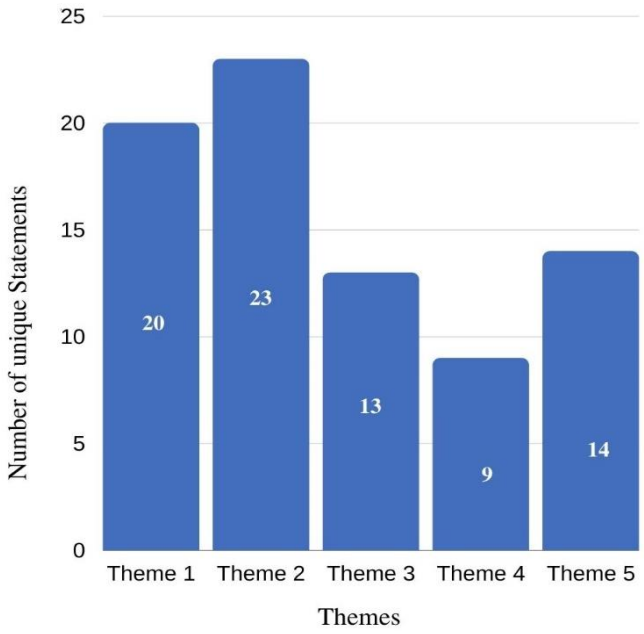
Theme 3: Theme 3 pertained to *how should effectiveness of marine OECMs be evaluated*. Only one response referred to the 'reporting' of marine OECMs which was considered inadequate for incorporation in theme 3 but it was retained as an item for Round 2.

Theme 4: Theme 4 was isolated from question 3 on *who should evaluate the effectiveness of marine OECMs?*

Theme 5: Theme 5 was generated from the fourth question on the *vision of success for marine OECMs.*

Figure 4

Number of Unique Statements Associated with Each Key Theme after Round 1 of the Delphi Study on Marine OECMs



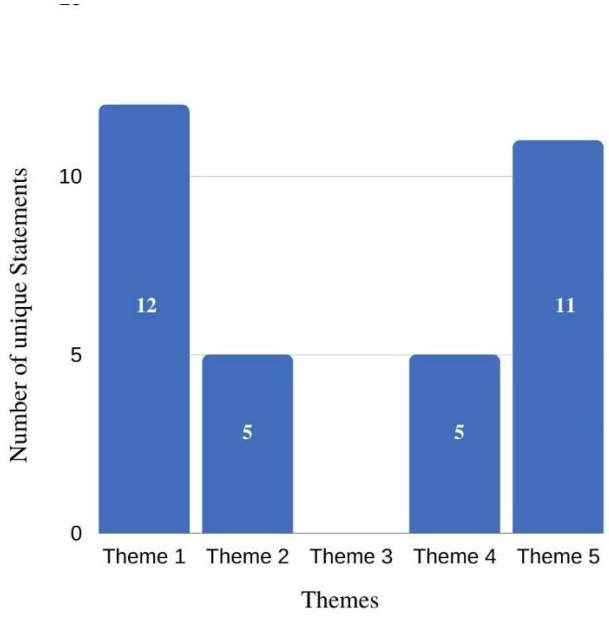
3.2 Round 2

The Round 2 of the Delphi study was conducted using Qualtrics with a time frame of two weeks to complete the survey. In total, 79 statements from 5 themes were reported back to the expert group to assess their agreement with each of the items using a 5-point Likert scale (Mukherjee et al., 2015). The Likert scale range included 1- Strongly Disagree to 5 – Strongly Agree. The estimated time for the completion of the study was 15 minutes. The experts were also asked to provide optional added information pertaining to the survey. 14 responses were received from the expert group. The data were exported in a Microsoft Excel sheet which was used for the analysis.

In the analysis of data, mean, standard deviation and the agreement percentage based on the consensus criteria as reported above were determined. Each of the statements were assessed and thus retained for the next Round based on meeting the consensus criteria. Following analysis of data from Round 2, consensus was achieved for 33 statements (Figure 5).

Figure 5

Number of Statements for which Consensus was Achieved for Each Theme after Round 2 of the Delphi Study on Marine OECMs



As the purpose of the Round 3 was to move to consensus, the statements that achieved 100% agreement and required mean value for consensus were not circulated for Round 3.

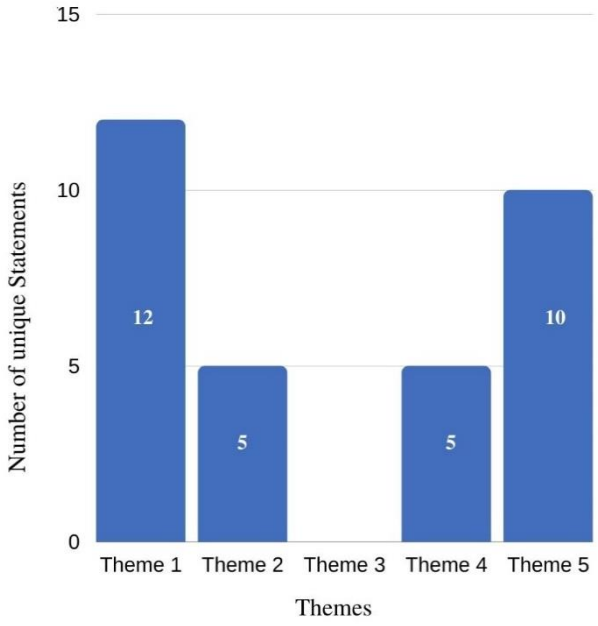
3.3 Round 3

For the Round 3 of the Delphi study, 28 statements retained from the Round 2 were circulated with feedback in the form of individual means and standard deviations as well as the group means for each of the 28 statements. The main aim of Round 3 was to reassess the choices in the light of group feedback to either retain the original response or modify it (Hsu & Sandford, 2007). Round 3 was also conducted through Qualtrics.

The responses were reported from 8 participants and the data were recorded and analysed in Microsoft Excel. After Round 3, consensus was reported on 32/79 statements (41%, Figure 6).

Figure 6

Number of Statements for which Consensus was Achieved for Each Theme after Round 3 of the Delphi Study on Marine OECMs



Results

The 79 statements generated after Round 1 are approached in the results section in accordance with the themes. The key results for each of the five themes are outlined below. For each of the themes, range and examples of responses are also highlighted. In addition, based on the high mean values and percentage agreement, selected statements of high importance are emphasized in bullet points as reflected in the group consensus. Lastly, for each of the themes, the result tables are included to highlight the mean values and percentage agreement for the last two rounds.

Theme 1. Key Opportunities Created by the Recognition of Marine OECMs

A wide range of perspectives were received in Round 1 of the Delphi process on key opportunities created by marine OECMs. The experts highlighted that formal designation of marine OECMs may reduce the pressure to establish new MPAs in order to meet CBD targets. Respondents also underscored that marine OECMs provide scope to improve biodiversity conservation along with improving human well-being and livelihoods. It is an opportunity to engage diverse stakeholders such as local communities, public and private organizations. The panellists also remarked that classifying seascapes as OECMs could be an opportunity to mainstream biodiversity conservation in natural resource management. Moreover, OECMs provide a source of increased motivation for the communities due to official recognition from the government. The responses below are representative of the range of data received from the respondents on the opportunities created by marine OECMs.

Response 4*: The commercial fishing sector may find this an inducement to improve sectoral practices to ensure areas qualify as OECMs.*

Small-scale fishing communities governing LMMAs may be take more seriously by government agencies and be provided greater legal recognition and support.

Having these areas reported to the WD-OECMs will provide a clearer picture of what is actually 'conserved'.

Response 11*: An ability to compare outcomes of management and governance options*

Response 13*: Marine OECMs are an important tool for achieving conservation goals, and will be key for achieving ambitious targets like 30x30 or half-Earth. Counting OECMs towards CBD targets allows the global community to get a clearer picture of the extent of ocean protection,*

provided the "effective" part of OECMs is adequately evaluated and reported. It also provides incentives for governing bodies to put OECMs in place, since they can get recognition on the world stage for doing their part towards achieving percentage targets. It also gives deserved recognition to areas that are already under conservation through indigenous or other local management, which may help secure resources for continued effective, long-term management.

Through open coding, 28 themes emerged from the data. Due to axial coding, these themes were reduced to 20 to minimize redundancy by grouping similar themes together (Table 1). In Round 2, members of the expert panel were asked to rank their level of agreement with the 20 themes. As mentioned previously, the statements with a mean ≥ 3.5 and ≥75% of participants ranking 4 or greater than 4 were retained. After Round 2, consensus was achieved for 12 out of the 20 statements (Table 1). For Round 3, 10 statements and feedback in the form of mean and standard deviation were circulated amongst the participants to reassess their choices. The 2 statements that achieved 100% consensus after Round 2 were not circulated in Round 3 as the purpose of this round was to move towards consensus. The results from Round 3 indicated consensus for all 10 statements. Final consensus for Theme 1 was achieved for 12 statements (Table 1). According to the mean values assigned by expert panel and percentage agreement, the key opportunities created by the recognition of marine OECMs include:

- Recognition and inclusion of diverse forms of conservation
- Increased recognition of local marine management efforts
- Increased collaboration between local and/or Indigenous communities, fisheries, and conservation actors particularly for customary marine governance institutions
- Balance between achieving biodiversity benefits and socioeconomic benefits of improved livelihoods

- Increased formal support of marine OECMs by national governments contributing to achieving legitimacy for OECMs in the conservation sector
- Increased access to additional resources that may be earmarked for initiatives other than conservation
- Improve understanding of the full extent of marine conservation through evaluation and reporting of OECMs

Table 1

Responses to statements on the key opportunities created by the recognition of marine OECMs. Mean and standard deviation represent experts' agreement with each statement on a five-point Likert scale (from 1 - strongly disagree to 5 - strongly agree). Agreement denotes the percentage of experts who agree or strongly agree with each statement (green rows denote statements on which consensus, defined as mean ≥3.5 and ≥75% of panelist agreeing or strongly agreeing, was achieved)

Statement	Round 2			Round 3		
	Mean	Standard Deviation	Agreement	Mean	Standard Deviation	Agreement
Countries can recognize and include diverse forms of conservation to meet CBD targets	4.71	0.47	100%			

Increased recognition of the contribution of existing local marine management efforts to marine conservation – local efforts including customary marine management systems, traditional governance institutions through Indigenous management systems, locally managed marine areas (LMMAs) and community based natural resource management (CBNRM), among others	4.71	0.47	100%			
Increased collaboration between conservation, fisheries and local/Indigenous actors for the existing conservation/management efforts, particularly customary and traditional marine governance institutions	4.29	0.61	92.9%	4.5	0.53	100%
Balance between achieving biodiversity benefits and socioeconomic benefits of improved livelihoods and well-being of people involved in managing the area	4	0.88	78.6%	4.25	0.46	100%
Increased formal support of marine OECMs by national governments, which will also contribute to achieving legitimacy for OECMs in the conservation sector	4.21	0.58	92.9%	4.25	0.71	87.5%

Increased access to additional resources (e.g. funding, enforcement capacity, education) that may be earmarked for initiatives other than conservation (e.g. fisheries), but which can be accessed for OECMs and therefore ultimately, contribute to conservation	4.21	0.7	85.7%	4.25	0.71	87.5%
Improve understanding of the full extent of marine conservation through evaluation and reporting of OECMs	4.29	0.73	85.7%	4.25	0.71	87.5%
Achievement of biodiversity conservation in areas outside no-take marine reserves and in areas where biodiversity conservation is not the primary objective for management	4.21	0.7	85.7%	4.13	0.64	87.5%
Engagement of fisheries departments in conservation efforts	4.14	0.66	85.7%	4.13	0.64	87.5%
Recognition of new actors in marine conservation and involve local communities	4.07	0.73	78.6%	4.13	0.64	87.5%
Sharing of the costs and benefits of meeting CBD targets across a wider set of stakeholders and actors	3.86	0.77	78.6%	4	0.53	87.5%
Reinforced or new recognition of official customary tenure rights for people who manage the OECM area	4.29	0.73	85.7%	4.13	0.83	75%
Mainstream biodiversity conservation into natural resource management and sectoral use of seascape	3.93	0.92	71.4%			

Enable comparison between outcomes of management and governance options	3.93	0.73	71.4%	
Increasing the use of outcome-oriented targets for both MPAs and OECMs (due to the emphasis on 'E' for Effectiveness in OECMs)	4.00	1.24	64.3%	
Increased motivation of communities involved in OECMs due to official recognition and support from the government	3.71	0.83	64.3%	
Incentives for the commercial fishing sector to improve sectoral fishing practices to classify as OECMs	3.50	1.02	57.1%	
Increased incentives for governing bodies to put OECMs in place since they can get recognition on the world stage for contributing towards achieving global percentage targets	3.5	0.76	50.0%	
Reduced pressure on countries to develop as many MPAs as possible to meet the CBD targets	3.43	1.09	42.9%	
Achievement of ambitious conservation targets such as 30x30 or Half-earth	2.79	0.97	21.4%	

Theme 2. Key Challenges associated with the Implementation of Marine OECMs

Copious data were received from the experts on the challenges associated with the implementation of OECMs. The responses highlighted important challenges such as the possibility of the top-down capture of community-based governance, ensuring gender and social

inclusion and training for OECM assessment tools. Moreover, the designation of marine OECMs might declassify currently existing MPAs and therefore affect the funding supply. There is considerable emphasis on the lack of resources and capacity to manage marine OECMs to be an obstacle in implementation of OECMs. Furthermore, the issue of effectiveness is highlighted among the responses. The issue of governments utilizing OECMs for achieving quantitative targets without addressing achievement of qualitative targets was also reported. Responses below indicate the nature of data collected from the experts on the challenges associated with marine OECMs.

Response 2*: Ensuring conservation effectiveness of OECMs*

Increased restrictions for local communities such as fisher groups

Response 3*: The same for all interventions: governance, finding win-win solutions for as many stakeholders as possible, balance environment against short term economic gains, addressing the needs of those most dependent on resources, adequate resources, gender and social inclusion, capacity, etc.*

Response 10*: Understanding how they will actually be assessed; Who is responsible for the assessment of "effectiveness"? Will the role that an OECM is playing for things like cultural provisioning or fisheries be down-weighted if it is identified as an area important for conservation? Will stakeholders move away from creating MPAs because of the perception that OECMs are easier to create?*

Response 17*: 1. lack of recognition or support for OECMs compared to other initiatives*

2. resources needed for design, implementation, management, monitoring

3. burden of evidence to prove that these are "effective"

4. conflicting narratives and discourses regarding conservation and extractive uses

Through open coding of the data, 32 themes emerged for the key challenges created by the implementation of marine OECMs. Axial coding reduced these themes to 23 statements (Table 2). In Round 2, members of the expert panel were asked to rank their level of agreement with the 23 statements on key challenges. For 5 out of the 23 statements, the mean value achieved was ≥3.5 and the experts reported ≥75% agreement and therefore these statements were retained (Table 2). Considering 18 statements achieved no consensus, the list for Round 3 was considerably shorter. For Round 3, the experts reassessed their choices from the previous Round based on the feedback provided for 4 statements. One statement received 100% consensus after Round 2 and was not circulated for Round 3 as the aim of this Round was to move towards consensus. Consensus was achieved for all 4 statements. Final consensus after Round 3 was reported for 5 statements for Theme 2. According to the mean ratings and percentage consensus achieved by the expert panel, key challenges created by the implementation of marine OECMs include:

- Burden to prove OECMs are effective
- Mobilizing enough resources to support the design, implementation, management and monitoring of OECMs
- Ensuring the ‘effective’ part of OECM is realized
- Implementing social safeguards so that new groups are not harmed as they engage in global conservation targets
- Lack of recognition and support for OECMs compared to other initiatives (e.g. MPAs)

Table 2

Responses to statements on the key challenges created by the implementation of marine OECMs. Mean and standard deviation represent experts' agreement with each statement on a five-point Likert scale (from 1 - strongly disagree to 5 - strongly agree). Agreement denotes the percentage of experts who agree or strongly agree with each statement (green rows denote statements on which consensus, defined as mean ≥ 3.5 and ≥75% of panelist agreeing or strongly agreeing, was achieved)

Statement	Round 2			Round 3		
	Mean	Standard Deviation	Agreement	Mean	Standard Deviation	Agreement
Burden of evidence to prove that OECMs are "effective"	4.64	0.5	100%			
Mobilizing funding/technical resources for design, implementation, management and monitoring of OECMs will be a challenge	4.07	0.47	92.9%	4.25	0.46	100%
A key challenge will be to ensure that the "effective" piece in the term OECM is meaningful so that countries don't apply low levels of protection that aren't achieving effective marine conservation	4.36	0.93	85.7%	4.38	1.41	87.5%
Challenges associated with implementing social safeguards so that new groups are not harmed as they engage in global conservation targets	3.93	0.83	78.6%	3.88	0.64	75%
Lack of recognition or support for OECMs compared to other initiatives (e.g. MPAs)	3.86	0.53	78.6%	3.88	0.64	75%
Challenges associated with enforcement	4.00	0.96	71.4%			

Effective OECMs will require co-management, strong community and government support, policy backing and economic incentives to deliver strong compliance with regulations, all of which are challenging to establish	3.50	0.94	71.4%	
Possibility of top-down capture of community-based governance	3.64	1.01	57.1%	
Strong focus on developing a typology of OECMs risks detracting from the more important issue of the actual outcomes or effectiveness of different types of marine management	3.57	1.16	57.1%	
Challenges associated with training on use of OECM assessment tools	3.43	1.16	57.1%	
Identification of OECMs might undermine local management of fisheries, social and cultural norms (e.g. through increased restrictions)	3.21	1.19	57.1%	
Ensuring the needs to those most dependent on marine resources are met	3.36	0.93	50.0%	
Low capacity of most stakeholders (communities, local governments, etc.) to manage OECMs	3.43	1.02	50.0%	
OECM sites might no longer be eligible for national resources (due to existing national legislation and policy terms that don't include OECMs) unless amendments to legislation are made, which can be a slow process	3.21	1.19	50.0%	
The development of separate targets and databases for MPAs and OECMs risks diverting resources from one to the other	3.43	0.94	42.9%	

Conflicts with national development goals (e.g., to develop the blue economy, extractive resource use, etc.)	3.29	0.99	42.9%	
OECMs can be a way for a person/institution to "own" marine areas and not allow others to use the areas	3.07	1.00	42.9%	
Ensuring gender and social inclusion	3.43	0.85	35.7%	
Government agencies will want to use OECMs as a framework to develop ‘cheap’ protected areas without meeting the ecological standards of an OECM or investing in the area – this could allow government actors to manipulate targets (i.e., achieving targets for spatial contexts that won't last potentially or that provide 'less' protection)	3.36	1.28	35.7%	
MPAs that are reclassified as an OECM may risk being cut from important funding schemes	3.29	0.83	35.7%	
OECMs may not be subjected to the same level of consultation, co-design, co-management as MPAs	2.86	1.17	28.6%	
Stakeholders might move away from creating MPAs because of a perception that OECMs are easier to establish	3.07	1.00	21.4%	
Implementing OECMs may pose problems for existing MPAs if the area becomes classified as an OECM on account that it does not have nature conservation as a primary objective	2.64	1.01	21.4%	

Theme 3. 'How' Should the Effectiveness of Marine OECMs be Evaluated?

For the evaluation of effectiveness, the panel's responses highlighted the importance of measuring biodiversity as well as socioeconomic and governance metrics on a national or global scale. Existing methods of evaluation such as MPA evaluation metrics and UNEP-WCMC guide on evaluating marine OECMs were also mentioned. The idea of building consensus through multi-sectoral engagement was also underscored. A simple yes/no checklist and using management options known to lead to successful conservation outcomes were also options highlighted by the expert panel. Reponses also touched upon tailored indicators based on implementing authority (i.e. governments vs community/resource use stakeholders) and economic status of the countries. Some of the responses below highlight the range of ideas received from the expert group on ways for evaluating the effectiveness of marine OECMs:

Response 1*: There is no easy answer to this question. From a biodiversity standpoint, at a minimum there should be no net decline in functional integrity over time, relative to unmanaged sites, to account for larger scale variability that may be due to climate variability and larger scale impacts. This, however, would require a global consensus on indicators of functional integrity across different marine ecosystems (and we are not there yet), as well as capacity to monitor and evaluate these indicators regularly. Most developing countries do not have the resources to be able to do this routinely. If countries can't measure the actual biodiversity outcomes, they could evaluate the social and governance contextual factors that are associated with positive biodiversity outcomes to say that the management is likely to be effective with some confidence.*

Response 3*: Look at a range of quantitative and qualitative indicators that cover ecological, socioeconomic and governance factors.*

Response 10*: Great question! In the context of meeting a CBD goal, then effectiveness really needs to be measured in terms of its biodiversity benefit. Perhaps some kind of checklist on the management conditions that have been shown to lead to successful conservation outcomes, e.g., local support, capacity within the managing group, adequate financing could be required. It would be hard to report on the actual effectiveness- one, because this takes time to accrue so, couldn't be demonstrated for a new area, so I think the best we could do is report on potential to be "effective."*

Response 11*: Effectiveness should largely be evaluated relative to sustainable yields, biodiversity status, and key ecological processes.*

A total of 13 themes emerged from the open coding of the data on how to evaluate the effectiveness of marine OECMs. All 13 themes were retained due to their uniqueness (Table 3). In Round 2, members of the expert panel were asked to rank their level of agreement with the 13 statements. No consensus was achieved on how to evaluate the effectiveness of marine OECMs (Table 3) i.e. none of the statements achieved mean value ≥3.5 and ≥75% agreement amongst the expert panel. Therefore, none of the statements were carried forward to the third round.

Table 3

Responses to statements on how to evaluate marine OECMs. Mean and standard deviation represent experts' agreement with each statement on a five-point Likert scale (from 1 - strongly disagree to 5 - strongly agree). Agreement denotes the percentage of experts who agree or strongly agree with each statement

Statement	Round 2		
	Mean	Standard Deviation	Agreement
Through a range of quantitative and qualitative biodiversity indicators (fish biomass, coral cover, seagrass cover, indicator species), sustainable yields and key ecological processes to assess functional integrity and heath of ecosystems	4.00	1.18	71.4%
Through transparent, legitimate and inclusive processes that involve multiple knowledge sources in a combination of expert opinions and empirical data	3.93	1	64.3%
Through variable measures in different settings depending upon the implementing authority (i.e. governments vs. community/resource user stakeholders) and the economic status of countries. Relatively wealthy countries in which government stakeholders implement OECMs should be required to meet a performance standard (in-situ conservation benefits). Poorer countries and/or those implemented by communities should meet a technical standard (rules established. monitoring in place) or a relaxed performance standard based upon behaviour (i.e. 80% compliance or something)	3.71	0.73	57.1%
Through a comprehensive evaluation of socioeconomic and governance metrics (using both quantitative and qualitative data)	3.57	1.02	57.1%
Through effective governance structure in its notoriety and capacity, insurance of equity in the management of the area, transparency of governance of the area, accountability	3.43	0.85	50%
Through a checklist on management conditions that have been shown to lead to successful conservation outcomes, e.g., local support, capacity within the managing group, adequate financing could be required	3.36	0.93	50%
Through multi-sectoral and multi-stakeholder partnerships building consensus on effectiveness	3.43	1.02	50%
Through standardized national indicators and in an ideal case, standardized global indicators	3.29	1.2	50%
Through the framework used for assessment of MPA via The MPA Guide (https://www.protectedplanet.net/c/mpa-guide), which outlines Level of Protection and Stage of Implementation for MPAs/MPA zones	3.14	1.03	35.7%
Through the development of marine spatial management plans, associated regulations and sustainability measures	3.00	0.96	28.6%

Through the World Database on Protected Areas so that there is one clear place that keeps track of progress. The report should be sent to :(i) first for approval to a national committee comprising department in charge of the environment; department in charge of ocean/fisheries; CBD Focal Point, CITES focal point; (ii) to OECM at international level. The assessment of the improvement should be run one year after the first assessment. The sites that have been classified as OECMs should be assessed every three years to see if they maintained the objectives. In case the assessment is not positive, the site may be declassified	2.93	0.92	28.6%
Through UNEP-WCMC's guidance on providing data, which sets out the different procedures for government, private and IPLC areas: https://www.protectedplanet.net/c/other-effective-area-based-conservation-measures. The IUCN methodology for identifying OECMs is intended to support self-assessment as well as external assessments	3.21	0.7	21.4%
Through a simple performance effectiveness tool - maybe just simple yes/no questions	3.07	0.83	21.4%

Theme 4. 'Who' Should Evaluate the Effectiveness of Marine OECMs?

On who should be responsible for the evaluation of marine OECMs, the responses from the expert panel ranged from OECM owners/managers, NGOs that support the OECM, citizen scientists, governments and community partnerships, government NGO partnerships with technical assistance for applied academics, local research institutions, third part reviews and conservation enforcement agencies. Some of the responses below reflect the nature of data collected.

Response 2*: Local research institutions*

Local marine resource management groups

Conservation Enforcement agencies

Response 3*: OECMs should be evaluated by government in partnership with NGOs/applied academics who can provide technical expertise*

Response 7*: simple performance effectiveness tool - maybe just simple yes no questions. Use citizen science to evaluate the performance.*

Response 9*: 3) should be multi-sector/multi-stakeholder partnerships building consensus on effectiveness*

4) independent, third party review (similar to a certification scheme)

Open coding of data on who should evaluate the effectiveness of marine OECMs generated 9 statements, which were all retained due to their uniqueness (Table 4). After Round 2, 5 of the 9 statements achieved the threshold value of ≥3.5 mean and ≥75% agreement. For the Round 3, all 5 statements along with the feedback were circulated and consensus was achieved on all 5 statements. Therefore, Theme 4 achieved consensus on 5 statements. According to the mean ratings and the percentage agreement amongst the expert panel, the following actors should be responsible for evaluating the effectiveness of marine OECMs:

- OECM managers/owners
- Government agencies in partnership NGOs, and/or applied academics
- Government agencies in partnership with communities
- NGOs that support the area
- Multi-sectoral or multi-stakeholder partnerships

Table 4

Responses to statements on who should evaluate marine OECMs. Mean and standard deviation represent experts' agreement with each statement on a five-point Likert scale (from 1 - strongly disagree to 5 - strongly agree). Agreement denotes the percentage of experts who agree or strongly agree with each statement (green rows denote statements on which consensus, defined as mean ≥3.5 and ≥75% of panelist agreeing or strongly agreeing, was achieved)

	Round 2			Round 3		
Statement	Mean	Standard Deviation	Agreement	Mean	Standard Deviation	Agreement
The OECM managers/owners (e.g., local communities)	4.00	0.55	85.7%	4.25	0.46	100%
Government agencies in partnership with NGOs/applied academics who can provide technical expertise	3.86	1.03	78.6%	3.75	1.16	87.5%
Government agencies in partnership with communities	3.93	1.07	78.6%	3.63	1.19	75%
NGOs that support the OECM	3.71	0.61	78.6%	3.75	0.89	75%
Multi-sectoral and multi-stakeholder partnerships who are responsible for the area	3.86	0.77	78.6%	3.88	0.99	75%
Local research institutions and marine management groups with participation from other local stakeholders	3.64	0.84	57.1%			
Conservation enforcement agencies	3.00	1.18	50.0%			
Citizen scientists	3.07	0.73	28.6%			
Independent third party	2.86	1.17	28.6%			

Theme 5. Visions of Success for Marine OECMs

The expert panel described successful vision of marine OECM that are built upon practices that provide ecological and biodiversity benefits. The importance of using

performance-based metrics to ensure the success of marine OECMs was mentioned. Efficient reporting and representation of meaningful targets were also identified as defining features of success for OECMs. Collaboration and recognition of stakeholders such as local/Indigenous communities/fisheries/industry engaged in meaningful marine conservation was also highlighted. When describing successful marine OECMs, respondents pointed out that they are instrumental in providing social, cultural, economic and political benefits that improve the livelihoods of vulnerable communities. The examples below provide insight into the diversity of the responses received regrading what success might look like for marine OECMs:

***Response 4**: A true picture of what is protected, conserved and not protected or conserved.*

A framework that encourages marine stewards to better conserve their areas.

Recognition of the diversity of actors involved in this effort.

More areas recognised, supported and reported as OECMs and more biodiversity conserved.

***Response 13**: I envision success built on clear guidance on what is/isn't an OECM and how to report (i.e., using the same Levels of Protection and Stages of Establishment outlined in The MPA Guide and reported through WDPA). This ensures that high-level reporting for tracking percentage targets is accurate and represents meaningful protection. This clear tracking also enables celebration of diverse ways of achieving conservation goals, which will help the conservation community at large!*

***Response 15**: 50% of existing marine conservation area (MPA excluded) are qualified OECM by 2030 and served as reference for terrestrial conservation.*

Response 17*: Individually, able to*

1. provide positive conservation impacts,

2. facilitate collective action/cross-sectoral/between group collaboration.

3. empower local/indigenous communities to participate in or lead marine governance.

Collectively,

1. increase the legitimacy and adoption of a broad spectra of marine governance approaches (e.g. fisheries, indigenous) that can meet conservation as well as other societal goals.

2. Able to facilitate collaboration and empowerment (as described above) at larger scales

Open coding of the data on visions of success for marine OCEMs resulted in 14 themes, which were retained after axial coding due to their singular nature (Table 5). In Round 2, consensus was achieved for 11 out of 14 statements (Table 5). Nine statements were circulated in the third Round and consensus was reflected for 8 of the 9 statements i.e. mean value achieved is ≥3.5 and ≥75% of participants agree or strongly agree for 9 statements. Two statements achieved 100% consensus after Round 2 and were excluded from Round 3 as the purpose of this round was to move towards consensus. Finally, consensus was achieved for 10 statements for Theme 5. According to the mean and agreement observed by the expert panel, marine OECMs will be successful when they:

- Increase creative solutions for achieving conservation goals
- Empower local and Indigenous communities
- Complement, rather than replace, marine protected areas (MPAs)
- OECMs support the adoption of a broad spectrum of marine governance approaches to meet conservation as well as other societal goals
- Generate social, cultural, economic, and political benefits

Table 5

Responses to statements on visions of success for marine OECMs. Mean and standard deviation represent experts' agreement with each statement on a five-point Likert scale (from 1 - strongly disagree to 5 - strongly agree). Agreement denotes the percentage of experts who agree or strongly agree with each statement (green rows denote statements on which consensus, defined as ≥ 3.5 mean and ≥75% of panelist agreeing or strongly agreeing, was achieved)

	Round 2			Round 3		
Statement	Mean	Standard Deviation	Agreement	Mean	Standard Deviation	Agreement
OECMs build local stewardship through including and empowering local/Indigenous communities to participate in or lead marine governance	4.64	0.50	100%			
OECMs recognize the diverse stakeholders (local/Indigenous communities, fisheries, industry, etc.) who are meaningfully engaged in global marine conservation	4.43	0.51	100%			
OECMs provide social, cultural, economic and political benefits that improve the well-being of vulnerable groups while mitigating impacts on their livelihoods	4.43	0.65	92.9%	4.50	0.53	100%
Recognition of conservation practices to supplement - not replace - efforts such as MPAs	4.43	0.65	92.9%	4.63	0.52	100%
An increase in creative solutions for achieving conservation goals considered and implemented	4.36	0.63	92.9%	4.75	0.46	100%
OECM practice and policy is connected with other spatial based management processes so the benefits and learning are broadly distributed across national and regional boundaries	4.14	0.53	92.9%	4.38	0.52	100%

OECMs facilitate the collaboration of marine conservation and management stakeholders across scales and sectors	4.21	0.70	85.7%	4.25	0.46	100%
OECMs support the adoption of a broad spectrum of marine governance approaches (e.g. commercial fisheries, Indigenous) supported by newly mobilized resources to meet conservation as well as other societal goals	4.29	0.73	85.7%	4.63	0.52	100%
More areas are recognized and supported as OECMs with clear guidelines on qualification and management criteria of OECMs	3.93	0.62	78.6%	4.00	0.53	87.5%
OECMs precipitate a shift in perspective towards performance-based metrics for all marine conservation initiatives	4.07	1.07	85.7%	3.75	1.28	75%
OECMs are shaped by ecological objectives to provide sustained biodiversity benefits	3.86	1.17	78.6%	3.50	1.20	62.5%
The conservation effectiveness of OECMs is measured accurately	3.93	1.27	71.4%			
Efficient reporting of OECMs, which ensures high-level reporting for tracking percentage targets is accurate and represents meaningful protection	3.57	0.76	57.1%			
OECMs are managed and supported by government	3.36	0.93	57.1%			

Discussion

This classical Delphi study aimed at highlighting the key opportunities and challenges associated with mainstreaming OECMs for marine conservation. The discussion section highlights the key statements (with high consensus as pointed out in results section) associated

with each theme and discusses them in relation to existing literature. This section is supported with references from literature to evaluate the obtained results. Mukherjee et al. (2015) point out the difficulty of evaluating outcomes of a Delphi technique can be tackled by complementing the results of the Delphi study with published literature. Therefore, following their suggestion, results from the themes are discussed in detail from a literature as well as policy perspective. In addition, I also discuss how the key findings of this study contribute to ongoing policy development on marine OECMs.

Theme 1. Key Opportunities Created by the Recognition of Marine OECMs

The range of qualitative data obtained highlights the wide scope of opportunities that are created by the recognition of marine OECMs. Here, I will discuss five of the key opportunities highlighted in the literature and by the experts and their implications for policy discussions.

First, OECMs provide an opportunity for countries to recognize and include other forms of conservation to count towards CBD targets. In terms of quantitative targets, Aichi Target 11 states that 10% of coastal and marine areas are conserved by 2020 through a network of PAs and OECMs. Even though Protected Areas are considered 'tried and tested' approach to conservation (Woodley et al., 2012), the recognition of marine OECMs will contribute to the achievement of area-based conservation targets. Conservation is taking place outside of formal PAs (Jonas et al., 2014; Jonas et al., 2018) without being accounted towards the CBD targets. Jonas et al. (2018) underscore the importance of ecologically representative and well-connected conservation areas which are integrated into wider seascapes. Therefore, marine OECMs are a timely opportunity to recognize and report other forms of conservation to be considered towards the CBD targets to realize the full scope and intent of Aichi Target 11.

The opportunity for countries to recognize and include other forms of conservation to count towards CBD targets has potential policy implications. In the post-2020 global biodiversity framework, OECMs form an integral part of the ongoing negotiations. As observed in the recommendations by the working group on the post-2020 global biodiversity framework, the new percentage targets are being deliberated and include representation from OECMs along with PAs (CBD, 2020a). The potential opportunity to include more diverse conservation practices is in line with calls for the separation of the percentage targets for PAs and OECMs (Jonas et al., 2014; Jonas et al., 2018) to achieve desired qualitative and quantitative conservation targets set by the CBD. Similarly, in an event that the post-2020 biodiversity framework decides in a single ambitious target (rather than separate targets for PAs and OECMs), governments might fit existing conservation designations under OECMs to meet the target numbers, which is a further reason for advocating separate targets for PAs and OECMs (Dudley et al., 2018).

Second, OECMs provide the opportunity for local marine management efforts in marine conservation to be recognized. These systems include (but are not limited to) customary marine management tenure (CMT), Indigenous management systems that include 'territories and areas conserved by indigenous peoples and local communities' (ICCAs), locally managed marine areas (LMMAs) and community based natural resource management (CBNRM). This finding is in line with scholars who have pointed to the conservation benefits provided by these local marine management systems (Jupiter et al. 2017). With the uptake of the concept of OECMs into global policy circles, the recognition of the efforts of local communities involved in conservation has been identified as a key opportunity (see e.g. Dudley et al., 2018; Jonas et al., 2014; Laffoley et al., 2017). For example, Jonas et al. (2017) point out that careful implementation and policy formulation of OECMs might address the lack of recognition of conservation efforts of

Indigenous Peoples and local communities, which could be symbolic for restorative ecology where it could initiate a 'healing and transformative' process for all the stakeholders. Similarly, Diz et al. (2017) reported the conservation benefits provided by LMMAs in Northern Mozambique. In a more generalized context, Jupiter et al. (2014) examined the multiple objectives for the establishment and implementation of LMMAs in the tropical Pacific. A careful inspection of the objectives highlights stark similarities with the underlying principles of OECMs. LMMAs require recognition and support but following the IUCN guidelines for classification of MPAs, clash arises with nature conservation being the primary objective for MPAs while LMMAs are a source of livelihoods and long-term biodiversity conservation (Govan & Jupiter, 2013). Therefore, OECMs support the goals and objectives of LMMAs and hence their classification as OECMs would ensure the required support is delivered.

The CBD recognizes the importance inclusion of Indigenous peoples and local communities in decision making (CBD, 2020a). From a policymaking perspective, the implications of recognizing wider perspectives from Indigenous and local communities through OECMs could be understood on two levels. First, research on perceptions has highlighted that local support for conservation measures is positively correlated with perceived social benefits of conservation including equal sharing of benefits, cultural sensitivity and respect for rights of people who protect the area (Bennett et al., 2019b). Second, biodiversity policy frameworks must be developed as part of wider legal and institutional frameworks in consultation with Indigenous and local communities while also ensuring proper respect for the communities' culture, traditions and rights. OECMs, therefore, present an opportunity to advocate for larger systemic changes that are needed to support the rights of Indigenous and local communities (Jonas et al., 2017).

A third opportunity highlighted by this MRP includes the potential for OECMs to increase collaboration between local and/or Indigenous communities, fisheries, and conservation actors particularly for customary marine governance institutions. Effective governance of ecological landscapes and seascapes is dependent on strong linkages among partners and actors across scales (Borrini-Feyerabend & Hill, 2015). OECMs create opportunities to recognize various forms of governance by private individuals, governments, Indigenous peoples or shared governance (IUCN-WCPA, 2019). Moreover, Indigenous peoples and communities have governed natural areas for centuries. In addition, existing customary marine governance institutions, such as the LMMAs in the Pacific, are governed by local resource-users and communities who are often supported by NGOs and government institutions (Jupiter et al., 2014). Therefore, OECMs by their design present an opportunity to develop effective co-ordinated governance efforts or in some cases reinforce the collaborative governance strategies (i.e. LMMAs).

In the ongoing discussions at the CBD for the post-2020 biodiversity framework, emphasis is placed upon an integrative governance structure to ensure implementation of the framework with special focus on existing customary and Indigenous governance frameworks (CBD, 2020a). From a policy perspective, Armitage et al. (2020) argue for a community-based governance structure for the post-2020 biodiversity framework where Indigenous and local communities are central to the conservation which is further nested in multilevel governance frameworks. On a wider scale, policy discussions associated with the 'blue economy' highlight the importance of sharing decision making powers and inclusivity for NGOs, civil society and governments with emphasis on Indigenous groups and small scale fisheries as they are often

sidelined from ocean governance even though they are integral to conservation practice (Bennett et al., 2019a)

A fourth opportunity created by the recognition of marine OECMs includes better balance between achieving biodiversity benefits and socioeconomic benefits of improved livelihoods. Recent developments in conservation literature point towards the need to achieve a balance between biodiversity conservation and human and economic development (Borrini-Feyerabend & Hill, 2015). Strict emphasis on biodiversity conservation, without understanding the impacts on livelihoods of small-scale fisheries and local resource users, undermines the long-term success of conservation efforts (Bennett et al., 2019a). No-take MPAs are classic examples of creating spaces for ecological resources to regenerate while the small-scale fishers lose access to their source of livelihood (Govan & Jupiter, 2013). MPAs have been criticized for undermining local livelihoods by conservation community (see, e.g., Campbell & Gray, 2019; Jonas et al., 2014, Jonas et al., 2017). There is an increased awareness of equity as an integral component of effective and just area-based conservation (Campbell & Gray, 2019). Given this growing recognition of the role of balancing biodiversity and socioeconomic objectives in marine conservation, OECMs present an opportunity to support more equitable and effective conservation (Campbell & Gray, 2019; Jonas et al., 2017).

From a policy standpoint, greater emphasis on the critical linkages between socioeconomic and biodiversity goals is required across the marine realm (Nash et al. 2020). The post-2020 global biodiversity framework negotiations are considering targets such as ‘fair and equitable benefit sharing from relevant resources’ with biodiversity conservation (CBD, 2020a). The lessons from the SDGs could be employed to understand the requirements to integrate social and economic goals with biodiversity conservation. For example, Nash et al. (2020) found an

integral relationship between the SDG 14 (Life Below water) and SDG 1(No Poverty), where ensuring sustained poverty alleviation is contingent upon long-term health of the oceans. These lessons could inspire policy makers to build a more holistic policy framework for the post-2020 biodiversity framework and area-based conservation strategies, that accounts for both biodiversity and socioeconomic goals.

The fifth opportunity highlighted in this research is the potential for OECMs to increase formal support of marine OECMs by national governments contributing to achieving legitimacy for OECMs in the conservation sector. The support from national governments is instrumental in achieving legitimacy for OECMs (Jonas et al., 2014). To realize the true potential of marine OECMs in area-based conservation, and therefore advance the conservation agenda, garnering the support of national governments would be a step in the right direction. However, support from national governments for an OECM is not necessarily permanent (Jonas et al., 2018). Over the years, waning government support has been observed for PAs, often referred to as Protected Area Downgrading, Downsizing, & Degazettement (PADDD). Diminishing government support for conservation is often associated with financial or political opportunities to exploit natural resources (Woodley et al., 2012). Therefore, OECMs also run a risk of classification and declassification based on convenience.

From a policy perspective, the opportunity for the national governments to achieve area-based targets (by counting OECMs) while the conservation agenda also moves forward is ideal as it may allow them to reach their conservation targets more easily than using PAs alone. However, it is also important that national governments realize the gravity of designating an area as marine OECM and do not use OECMs as a loophole to avoid genuine conservation efforts. For example, Fisheries and Oceans Canada (DFO) adapted marine OECM designation to

contribute to area-based targets without maintaining the integrity of the definition and the scientific discourse around OECMs (Lemieux et al., 2011). Mainstreaming OECMs on a national scale could be a potential issue as international recommendations might misalign with national agendas even after the countries have adopted the recommendations. Policymakers at national and subnational levels could use semantics of conservation to achieve conservation goals that are contradictory to long-term sustained conservation (Jonas et al., 2014).

Theme 2. Key Challenges Associated with the Implementation of Marine OECMs

A diverse range of challenges were reported by the expert panelists, as evidenced by the 23 unique statements that emerged under this theme (which is the highest number for a single theme). Here, I discuss five of the key challenges highlighted by the experts in the context of existing literature and their implications for marine conservation policy.

The first key challenge highlighted by this MRP is the high burden of proof required to demonstrate that OECMs are effective. Since their conception, critiques have questioned the ability for OECMs to add value to area-based conservation. As Campbell and Gray (2019) point out, during the negotiations for Aichi Targets at the CBD COP 10, there were concerns that OECMs would not be 'real' PAs and therefore numerical targets should be set accordingly. However, OECMs were added to Target 11 to celebrate the conservation efforts occurring outside of protected areas (Laffoley et al., 2017). That said, there is a requirement for OECMs to prove they are effective in long-term biodiversity conservation, whereas no such criteria exist for PAs. In contrast, PAs are reported to WDPA by the virtue of their designation and are counted towards area targets without having to prove anything (Campbell & Gray, 2019). This challenge is, therefore, in line with conservation scientists who have raised concerns over the need for OECMs to demonstrate effectiveness from the outset (Jonas et al., 2014; Laffoley et al., 2017).

This requirement is an added 'burden' for the communities to report the long-term conservation success. Moreover, there is no guarantee for the communities to retain the OECM status if periodic reporting reflects shortfalls in meeting conservation outcomes, which might take away the much-needed support from the communities managing the area. Local communities' and Indigenous peoples' traditional knowledge and practices are often not aligned with western practices for impact assessments (Bennett, 2016). Jonas et al. (2017) highlight this concern and reiterate that practices of reporting outlined by national and international bodies might be inconsistent with the traditional ways of assessing biodiversity conservation.

In terms of policymaking, if OECMs are required to prove their effective from the outset, more emphasis is needed to legitimize their position in area-based conservation both by national governments and international organizations. In doing so, the support required to assess the effectiveness of OECMs could be mobilized, and therefore, the burden could be justified.

Second, this research finds that mobilizing sufficient resources to support the design, implementation, management and monitoring of OECMs represents a considerable challenge for marine OECMs. This finding is in line with existing literature that highlights the challenges encountered while implementation of new policy measures is continued access to resources. For example, in a global review Gill et al. (2017) found that funding and staff support for 433 MPAs was instrumental in achieving conservation success and most MPAs were understaffed and underfunded. For OECMs, which are burdened with the condition to prove their effectiveness, continuous resources would be required. For example, at local levels, governing bodies for OECMs will have to showcase the capacity to monitor wide range of biodiversity indicators which will need capacity building (Jonas et al., 2018). Moreover, implementing agencies will be responsible for dealing with the added stress of reporting towards another framework that might

impinge on their already under-resourced capacity (Jonas et al., 2018). As noted by Gill et al. (2017), there is already a lack of funding for MPAs. Therefore, adding additional strain on marine conservation funding allocations will present a roadblock for OECM implementation.

From a policy standpoint, it is essential that private organizations and implementing agencies work together to ensure sufficient funding is available to meet the needs of OECMs (Jonas et al., 2018). From the perspective of national governments, who will likely enforce the new targets, adequate funding is necessary to legitimize OECMs. In a study by Donald et al. (2019), a vast majority of KBAs (which could potentially qualify as OECMs) were managed by the governments. Moreover, the funding for these 'potential OECMs' was sourced mostly from local/municipal authorities, followed by no funding at all and central governments occupied the third place in funding sources for conservation (Donald et al., 2019). These studies indicate the dependence of OECMs on governments for their successful management. From the perspective of Post-2020 biodiversity framework, Donald et al. (2019) reiterate that the future of OECMs is essentially in the hands of governments that are negotiating the framework. This places immense power with the governments to determine the outcomes for people who could potentially benefit from OECM classification (e.g. Indigenous peoples. In that spirit, the post-2020 biodiversity framework draft guidelines recognize the need for resources to ensure collective success of the agenda (CBD, 2020a).

Third, results of this MRP suggest that ensuring the 'effective' part of OECM is realized represents a significant challenge for mainstreaming marine OECMs. As mentioned previously, OECMs are carrying the burden to prove they are effective. However, the 'effective' part in OECMs might be a necessary evil. In the race to achieve quantitative conservation targets, the qualitative elements of Aichi Target 11 might be compromised (see, e.g., Diz et al., 2018;

Dudley et al., 2018; Jonas et al., 2018; Laffoley et al., 2017; Lemieux et al., 2019; Rees et al., 2018b; Watson et al., 2016). There are considerable gaps in measuring the ongoing effectiveness of MPAs (Campbell & Gray, 2019). Lessons from these experiences could be applied to OECMs in a more proactive fashion to avoid this challenge and to ensure that *in situ* conservation is achieved. Nonetheless, it will be challenging to meet and maintain the requirements of effective conservation.

In terms of policy, the challenges associated with delivering biodiversity benefits through marine OECMs have broader implications for conservation. For example, limited progress on slowing the decline of biodiversity loss suggests that rethinking the IUCN (management/intent based) and CBD (outcome/conservation based) definitions of Protected Areas and conservation might be required (Jonas et al., 2014).

Fourth, implementing social safeguards so that new groups are not harmed as they engage in achieving global conservation targets was identified as a considerable challenge associated with marine OECMs. While area-based conservation through OECMs presents an opportunity to recognize the efforts of people who have been engaging in conservation outside of PAs, there is considerable risk associated with it in terms of social equity when these areas are implemented and by whom. Throughout the history of MPAs, there has been continuous displacement of local communities and therefore loss of livelihoods due to establishment of no-take MPAs (see, e.g., Bennett & Dearden, 2014; Humphreys & Herbert, 2018). Considerable attention is required to prioritize social well-being of the groups that engage in conservation along with biodiversity conservation as it is crucial for the success of conservation (Armitage et al., 2020). However, MPAs and their relationship to equity has been a subject of concern but there is dearth of literature and therefore it requires more investigation (Bennett et al., 2020a). If anything could be

learned from MPA implementation and their current stance on social equity after all these years of implementation, it is important to note that similar situations might arise for marine OECMs depending on the managing entity and their intentions for the area.

In terms of policy, careful attention by all stakeholders is required to safeguard the groups who have been or will involved in conservation efforts (Jonas et al., 2014). This principle is reflected in the draft guidelines of the post-2020 framework (proposed Target 19, CBD, 2020a). Social safeguards should be put in place while implementation plans are developed as OECMs most likely will represent more complex governance structures. As advocated by Armitage et al. (2020), community-centred conservation can be the cornerstone for the implementation of the post-2020 biodiversity framework. It is also important to monitor social well-being through social indicators for example, research on perceptions can inform management actions (Bennet et al., 2016) so that the integrity of marine OECMs is upheld in the long-term. As Dudley et al. (2018) point out, establishing social safeguards will be much harder than getting the conservation science right. Therefore, they argue for human rights and social safeguards to be at the core of conservation and propose just and equitable partnerships integrated in global/regional frameworks to ensure successful conservation (Dudley et al., 2018).

A fifth key challenge highlighted through by this MRP is the lack of recognition and support for OECMs compared to other initiatives (e.g., MPAs). As highlighted previously, MPAs have been established as the cornerstones of marine conservation. Over the years, despite the critiques regarding effectiveness and equity (see, e.g., Bennett et al., 2020a; Campbell & Gray, 2019; Gill et al., 2017), MPAs have gained more traction. This is in part because of clear guidelines that exist regarding the definition, recognition and implementation of MPAs. However, the context for OECMs is significantly different than that of MPAs. After their

conception in 2010, it took eight years for the conservation community to develop and adopt a definition of OECMs which was two years before the conclusion of the Aichi Targets (CBD, 2018). This lag experienced by the OECMs is responsible for their slow growth and uptake in policy and conservation. That said, they are being slowly incorporated in policy discussions (CBD, 2020a). However, achieving legitimacy and recognition continues to present a challenging path for marine OECMs. As highlighted by the Delphi panelists, there are massive challenges with the implementation. For example, burden to prove effectiveness, which is not the case for MPAs, capacity shortfalls, not enough design and implementation support as garnered by the MPAs. The concerns regarding OECMs being reduced to just a 'tool' to achieve area targets as opposed to conservation are legitimate. Marine OECMs are a new concept compared to MPAs and are being negotiated at international levels, which will translate to national and therefore local levels of recognition and hence, have an added layer of complexity for their implementation (Jonas et al., 2014).

From a policy standpoint, the formal recognition of marine OECMs in global conservation negotiations represents one way to overcome this challenge. CBD in its early post-2020 biodiversity framework negotiations is giving more weightage to OECMs (CBD, 2020a) and IUCN-WCPA developed the official guidelines for OECM recognition (IUCN-WCPA). Recognition on a global scale undeniably increases the credibility of marine OECMs, but at national and local scales it requires more policy initiative. There is hope that the momentum from global conversations will 'trickle down' to national/local agendas once the post-2020 framework is adopted.

Theme 3. 'How' Should the Effectiveness of Marine OECMs be Evaluated?

One of the most challenging and uncharted dimensions of OECMs is associated with the "E" or effectiveness. While demonstrating 'effectiveness' is part of the formal definition of OECMs, no guidance currently exists on how effectiveness should be monitored. Tellingly, no consensus was obtained from the Delphi expert panel for this theme. Following from Round 1, 13 statements about potential measures of effectiveness were presented to the SNAPP group in Round 2. I will now discuss the implications of this complete lack on consensus from literature and policy perspective.

As discussed previously, the purpose of marine OECMs is to deliver effective long-term conservation of biodiversity. Therefore, establishing monitoring protocols, in other words organizing 'how' the evaluation of the marine OECMs is executed, is essential to ensure that OECMs fulfill their central purpose. Increasingly, the conservation community has emphasized the need to report on effectiveness of marine conservation strategies where MPAs are the most prominent example (see, e.g., Bennett et al., 2020a, Campbell & Gray, 2019; Gill et al., 2017). The suggested methods to evaluate MPAs have been Protected Area Management Effectiveness (PAME) which has over 40 tools under it to assess MPAs (UNEP-WCMC 2018). In the case of OECMs, the official guidelines suggest the uptake of PAME as the most suitable framework for their evaluation (IUCN-WCPA, 2019).

The complete lack of consensus on how to measure effectiveness of marine OECMs indicates an urgent need to address the monitoring and evaluation of marine OECMs. Dudley et al. (2018) highlight the need to develop approaches to monitoring social and biological outcomes for OECMs. Similarly, Gurney et al. (2019) utilized Elinor Ostrom's Social-ecological Systems (SES) framework to develop a global monitoring approach for coral reefs. Interestingly, the

SNAPP Coastal Outcomes group, which served as the expert panel for this research, is also exploring the ecological and social outcomes from the data being generated to inform the post-2020 global biodiversity framework to support further work on OECMs. Several authors have pointed out the viability of OECMs in delivering effective conservation outcomes (see, e.g., Jonas et al., 2018; Dudley et al; 2018). In the context of area-based fisheries management measures (ABFMs), the FAO draft guide recommends that the existing Monitoring, Evaluation & Reporting (MER) for a particular fishery subset extends to OECM as well with the recognition that Target 11 is more nuanced with requirements to meet conservation objectives (Garcia et al., 2019). Bennett et al. (2020a) focus on small-scale fisheries in Mediterranean and measure perceptions of social equity as a proxy for conservation effectiveness. These examples indicate increase in breadth and depth of marine conservation monitoring programs, which could serve as starting points for developing monitoring for the 'effectiveness' of marine OECMS. However, much more effort is required to understand and develop the most appropriate framework that justifies all the aspects of OECMs, and in broader context, all aspects of conservation.

From a policy perspective, this finding reveals a major research gap. In the context of marine area-based conservation, effective conservation has major implications for the ongoing biodiversity crisis, which is being compounded by climate change effects. Therefore, a much more robust evaluation system is required to create a feedback loop that can inform management actions (Plummer and Armitage, 2010). From the perspective of post-2020 biodiversity framework, the report called 'Thematic consultation on transparent implementation, monitoring, reporting and review for the post-2020 global biodiversity framework' delineates some of the proposed measures on monitoring and review procedures (CBD, 2020b). First, it identifies that monitoring is a crucial element for the post-2020 global biodiversity framework and requires

both global and national processes (CBD, 2020b). Second, it acknowledges the gaps in the previous Strategic Plan for Biodiversity 2011-2020 and suggests adoption of indicators for monitoring at the same time as adoption of targets (CBD, 2020b). Moreover, the document suggests the requirement of synergies with other biodiversity conservation groups and SDGs (CBD, 2020b), which is one of the most important and urgent suggestions (Nash et al., 2020). Having clear indictors aligned with different agendas, which are steering the earth towards sustainability, would be idealistic yet logical. The document also reports that National biodiversity strategies and action plans (NBSAPs) are proposed to be the main national planning instrument with national reporting to be the main source of monitoring and reporting (CBD, 2020b).

Policy implications are also a function of the research outcomes from boundary organizations (e.g., the organizations that work at the nexus of science and policy). The most important role played by these organizations in the conservation realm is to create a space to navigate conservation science and practice. The biggest strength of these organizations is transdisciplinary nature of interactions which is a core component of sustainability science (Kates, 2011). By promoting various perspectives and co-producing knowledge, boundary organizations can play a massive role in defining the trajectory of evaluation programs in conservation science and heavily influence their policy uptake (Cvitanovic et al., 2016). As reported by Gurney et al. (2019), developing boundary spaces while working on the SES framework facilitated inclusive decision making and fostered willingness to learn which is essential to ensuring success of any monitoring framework.

While monitoring approaches are becoming an integral part of policy frameworks, more work is required to inform management of marine area-based conservation measures. The results

of this Delphi study highlight the lack of consensus on monitoring frameworks. Future research could explore monitoring and evaluation frameworks that could be most appropriate for marine OECMs.

Theme 4. 'Who' Should Evaluate the Effectiveness of Marine OECMs?

Consensus on 'who' should evaluate the effectiveness of marine OECMs was achieved for all 5 statements generated within this theme. In this section, I will discuss the results from literature and policy perspective.

The expert panel reported that the stakeholders who are responsible for managing a marine conservation area should be responsible for evaluation. From some respondents, OECM managers and/or owners are considered as the most appropriate stakeholders for evaluating the effectiveness of the area. On the other hand, multi-stakeholder and multisectoral partnerships among the people who are responsible for the area were also highlighted by the expert panellists, but with a lower consensus. Armitage et al. (2020) argue for a community-centred governance framework for the implementation of post-2020 biodiversity framework. The framework considers Indigenous peoples and local communities central to the conservation with a multilevel governance unit, which is essentially supports the communities as they engage in conservation. From that perspective, multi-stakeholder and multisectoral partnerships are better suited to evaluating the area. For OECM managers and/or owners, the evaluation of OECMs might be difficult because of capacity and funding shortfalls (Jonas et al., 2018). However, Donald et al. (2019) also found that the KBAs that qualified as potential OECMs were supported by the governments. In that scenario, government agencies in partnership with communities might be the best way forward for evaluating OECMs. Furthermore, NGOs that support the OECM might be the most pragmatic pathway for the evaluation strategy. For example, Gurney et al. (2019)

designed a monitoring framework for coral reefs across 4 countries which was supported by Wildlife Conservation Society (WCS), an NGO supporting wildlife conservation across 60 countries. Finally, in a similar spirit, NGOs in partnership with the governments and applied academics who can provide technical expertise could prove beneficial for LMMAs (as OECMs) as their governance structure supports collaboration at a local level which is comprised of local communities, NGOs, governments and civil societies (Jupiter et al., 2014).

In the context of policy, these findings have implications for future research. First, independent third parties and citizen scientists received lowest consensus. It highlights that the groups closest to managing the area are supported as the prime stakeholders to monitor the area which is legitimate. In the context of post-2020 biodiversity framework, there is a disconnect between global goals and local implementation. Translation of global and national targets to local implementation always carries the risk of top-down capture of the conservation agenda and thus loss of focus is customary. That said, the onus lies with the national governments to support the initiatives and evaluation at the local level of conservation. This also implies local/municipal governments are supported by the national governments through a transparent process of reporting and evaluation. Circling back to the first point, more research is required to develop frameworks that can sustain monitoring and review cycles in a governance structure. The panacea approaches might not be suitable in these contexts, and developing tailor made approaches to monitoring might be expensive and time consuming (Gurney et al., 2019). Drawn from the literature, the investment in monitoring frameworks is worth the effort and long overdue (Trimble and Plummer, 2019). Therefore, developing monitoring frameworks and understanding the most appropriate stakeholders for its implementation is understudied and requires much greater attention to ensure long-term success of biodiversity conservation.

Theme 5. Visions of Success for Marine OECMs

For visions of success for the OECMs, consensus was achieved for 11 out of 14 statements. In this section, I will discuss some of the most agreed upon statements from the lens of literature and highlight some of the policy implications of the collective vision. This section is reflective of opportunities created and challenges resolved for marine OECMs.

Conservation targets have been revisited several times over the years. Dudley et al. (2018) highlight the big bold conservation targets that have been put forth in the conservation community. One of the most radical ideas of 'Half-Earth' or 'Nature Needs Half' argues for 50% of the earth conserved in some form of protected area met with support and extreme rejection (Dudley et al., 2018). Similarly, it is often reported the 10% target for marine conservation (as reported in SDG 14.5 and Aichi Target 1)1 is not enough to conserve marine biodiversity (O'Leary et al., 2016). Rather, 30% of oceans conserved as MPAs and OECMs was posited and adopted at 2016 World Conservation Congress by the IUCN, this proposal is often referred to as 30 by 30 (meaning 30% area-based conservation coverage by the year 2030). Moreover, Woodley et al. (2012) challenge the authenticity of percentage targets set by the global negotiations. Regardless of the differences between these proposals, conservation needs momentum as biodiversity continues to decline.

The results of this MRP suggest that OECMs could play a major role in moving the agenda forward where they foster the development and support of LMMAs (Diz et al., 2017; Campbell & Gray, 2018) and ICCAs (Jonas et al., 2018). The expert panel also agreed that OECMs will be seen as successful if they foster local stewardship. They empower and recognize the agents (i.e. Indigenous Peoples and local communities) central to marine governance with adoption of a wide range of governance approaches (Armitage et al., 2020). Moreover, there is

consensus on success of OECMs by being complementary to MPAs and not replacing them (see, e.g., Diz et al., 2018; Dudley et al., 2018; Jonas et al., 2014; Jones et al., 2020; Laffoley et al., 2017; Maxwell et al., 2020; Rees et al., 2018b; Rees et al., 2020). Providing social, economic, cultural and political benefits defines the success of marine OECMs (Campbell & Gray, 2019; Armitage et al., 2020).

From a policy perspective, the vision of success for OECMs along with PAs has broad implications. COVID-19 has become a collective human tragedy of an unimagined scale, with negative impacts extending to coastal communities (Bennett et al. 2020b). Due to COVID-19, the network of protected areas and conserved areas (previously proposed title for OECMs, see Jonas et al., 2018) on land and the oceans has been severely impacted but it also presents a possible solution (Hockings et al., 2020). Hockings et al. (2020) support 'One Health' approach that considers the interconnectedness of human, animal and ecosystem health. They call for more attention to cementing the networks of protected areas and conserved areas in the form of ecologically connected and effectively and equitably managed to lessen the probability of such pandemics and support a sustainable future (Hockings et al., 2020). The pandemic is a wake-up call for humanity, and it puts area-based conservation at the forefront of conservation initiatives. It requires considerable efforts by the governments across the world to ensure the success of such measures through inclusive policy frameworks. In the aftermath of COVID-19, successful marine OECMs may have a new meaning. Their success contributes to building a sustainable future for human beings and the ocean ecosystems. The global pandemic has underscored the urgency to address our fragmented approach to conservation and suggests the utility of a holistic lens to ensure long-term conservation of biodiversity and sustained ecosystem services.

Conclusions

Marine OECMs are an important policy tool for achieving sustained long-term biodiversity conservation, while also ensuring social well-being of local and vulnerable communities by supporting their livelihoods and respecting their cultural and spiritual values. The ongoing development of the post-2020 biodiversity framework presents a timely opportunity to mainstream conservation that is taking place outside the designated protected areas. Moreover, marine OECMs could be instrumental in maintaining ecosystem health, protecting wildlife habitats, fostering ecosystem resilience and connect fragmented landscape and seascapes. As a formal a part of Aichi Target 11, marine OECMs could serve as an important complement MPAs in achieving biodiversity targets, while also ensuring ecologically representative and well-connected ecosystems.

However, to date marine OECMs have been largely overlooked by the global conservation community. Mainstreaming marine OECMs will require more support from global conservation community as we move towards adopting post-2020 biodiversity framework. In response to this challenge, this MRP sought to clarify and cement role of marine OECMs in conservation by highlighting the key opportunities, potential challenges associated with implementation, process and stakeholders for evaluation of effectiveness and visions of success for them. This research project employed a Delphi study to understand the perspectives of an international group of marine conservation experts on these aspects of marine OECMs through engaging in open-ended questions and their derivatives for subsequent rounds.

The Delphi study found consensus on 4 out of 5 research questions. Key opportunities highlighted the inclusion of diverse forms of conservation and recognition of stakeholders such as Indigenous and local communities, balance between socioeconomic and biodiversity

conservation, increased collaborations among the stakeholders and legitimacy of OECMs due to national recognition. Key challenges associated with implementation of marine OECMs include burden to prove effectiveness, ensure effectiveness is realized, capacity and budget shortfalls, social safeguards are implemented and lack of support as compared to MPAs. No consensus was found on how to measure the effectiveness of marine OECMs. Consensus was achieved on 'who' should be responsible for measuring the effectiveness of marine OECMs. Appropriate stakeholders identified by the expert panel included governments in partnerships with communities or NGOs, NGOs that support the marine OECM, and marine OECM managers and owners. Lastly, successful visions for marine OECMs included aspects such as providing creative conservation solutions, building local stewardship, providing social, cultural, political and economic benefits to the communities and supporting MPAs and adoption of range of governance approaches.

The results highlight the urgency to address some of the most important issues associated with marine OECMs. In terms of future research, first, more research is needed to develop strong monitoring and evaluation frameworks for marine OECMs. Second, marine OECMs require momentum to garner private/ public funding to meet capacity and budget requirements for managing and monitoring these areas – which is granted in addition to MPAs. Third, representation of Indigenous and local communities in developing policy frameworks, planning and management of marine OECMs requires urgent action. Lastly, national governments must support marine OECMs to legitimize their position in marine area-based conservation. As the negotiations for the post-2020 biodiversity framework come to a close within the next six months, continued efforts to clarify the role of mainstreaming OECMs into the global agenda are

urgently needed if they are to contribute to global biodiversity conservation benefits and their associated contributions to human well-being.

From the perspective of the Delphi study, future research could focus on conducting a Q-sort among the expert group as there are different viewpoints within the group to further understand dichotomies in perceptions of marine conservation through OECMs. Certain limitations of this study could also open more avenues for future research. The Delphi technique has often been supported with face-to-face workshops to build on the results of the study. Moreover, to ensure reliability of the results, similar Delphi studies could be performed with different expert groups working with marine OECM conservation.

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Appendix

Questionnaire for Round 1 of the Delphi Study

Q1. What are the key opportunities created by the recognition of marine OECMs as counting towards Convention on Biological Diversity (CBD) percent area targets?

Q2. What are the key challenges associated with the implementation of marine OECMs (e.g., for stakeholders such as Indigenous peoples and local communities, government agencies, intergovernmental organisations, NGOs, and private organisations, etc.)?

Q3. How should the "effectiveness" of marine OECMs be evaluated and reported, and by whom?

Q4. What is your vision of success for marine OECMs?