



JNCC Report 782

**Development and testing of the Management Effectiveness of Protected and
Conserved Areas (MEPCA) Indicator**

Vol II: Appendices

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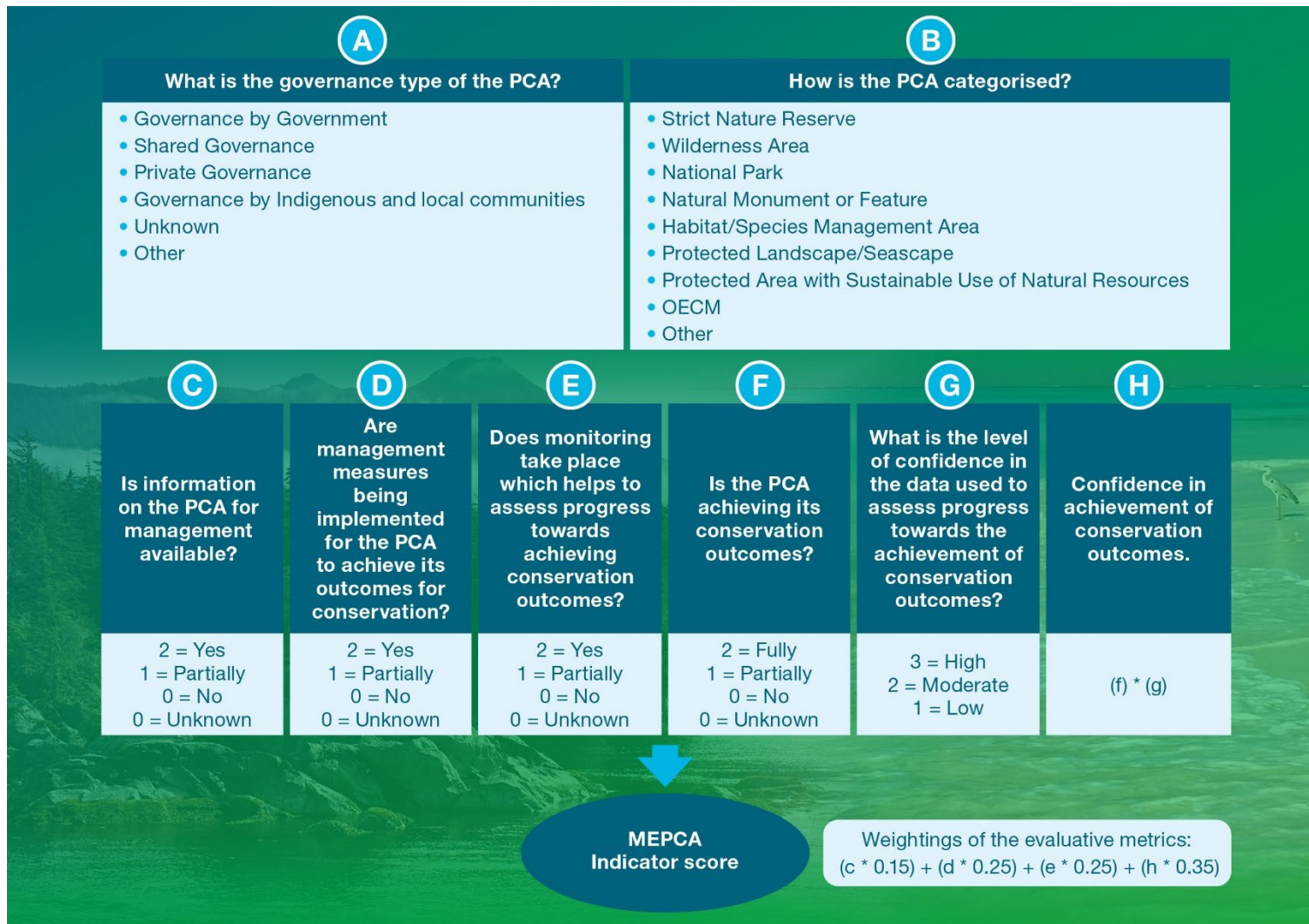


Figure A 1. The Management Effectiveness of Protected and Conserved Areas (MEPCA) indicator (v1).

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1. MEPCA Indicator Spreadsheet and Guidance

See the links below for a copy of the indicator spreadsheet and for a copy of the associated guidance document.

- [MEPCA Indicator metrics spreadsheet](#) (.xlsx)
- [A guide to using the Management Effectiveness of Protected and Conserved Areas \(MEPCA\) Indicator](#) (.pdf)

2. MEPCA Indicator Supporting Definitions

Management Effectiveness of Protected and Conserved Areas (MEPCA) indicator (v1) and associated definitions for global application.

Table A 1. Supporting definitions for each MEPCA indicator metric.

MEPCA Indicator metrics	Responses	Definition / Rationale
a) What is the governance type of the PCA?	<i>Based on IUCN Categories¹:</i>	
	Governance by Government	Governance by Government(s)
	Shared Governance	Shared governance by diverse rights holders and stakeholders together (not necessarily Governments)
	Private Governance	Governance by private entities
	Governance by Indigenous peoples and local communities	Governance by Indigenous peoples and/or local communities
	Unknown	Governance type is unknown
	Other	Governance type not listed – please state what this is
b) How is the PCA categorised?	<i>Based on IUCN Categories:</i>	
	Strict Nature Reserve	Category Ia: Strict Nature Reserve Protected areas that are strictly set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring.

¹ The definitions for responses for metrics a) and b) were based on IUCN Categories: <https://portals.iucn.org/library/sites/library/files/documents/PAG-020.pdf>

MEPCA Indicator metrics	Responses	Definition / Rationale
	Wilderness Area	<p>Category Ib: Wilderness Area</p> <p>Protected areas that are usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed to preserve their natural condition.</p>
	National Park	<p>Category II: National Park</p> <p>Large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.</p>
	Natural Monument or Feature	<p>Category III: Natural Monument or Feature</p> <p>Protected areas set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small, protected areas and often have high visitor value.</p>
	Habitat/Species Management Area	<p>Category IV: Habitat/Species Management Area</p> <p>Protected areas aiming to protect specific species or habitats, and management reflects this priority. Many Category IV protected areas will need regular, active interventions to address the requirements of specific species or to maintain habitats, but this is not a requirement of the category.</p>
	Protected Landscape/Seascape	<p>Category V: Protected Landscape/Seascape</p> <p>A protected area where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.</p>
	Protected Area with Sustainable Use of Natural Resources	<p>Category VI: Protected area with sustainable use of natural resources</p> <p>Protected areas that conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area.</p>

MEPCA Indicator metrics	Responses	Definition / Rationale
	Other Effective area-based Conservation Measure (OECM)	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; IUCN, 2019)).
	Other	Protected and conserved area type not listed please state what this is i.e., Indigenous Protected and Conserved Area (IPCA)
c) Is information on the PCA for management available?	2 = Yes	The PCA has appropriate management information documented and in use.
	1 = Partially	The PCA has appropriate management information, which is drafted but not yet in use.
	0 = No	The PCA has no appropriate management information drafted or in use.
	0 = Unknown	It is not known if management information is documented.
d) Are management measures being implemented for the PCA to achieve its outcomes for conservation?	2 = Yes	All appropriate management measures are implemented.
	1 = Partially	Some of the appropriate management measures are implemented or are in the process of being implemented.
	0 = No	None of the appropriate management measures are implemented.
	0 = Unknown	It is not known if appropriate management measures are implemented.
e) Does monitoring take place which helps to assess progress towards achieving conservation outcomes?	2 = Yes	Ecological, and/or environmental monitoring (e.g., by sample collection, imagery and/or remote sensing) takes place at frequencies considered appropriate to determine progress towards conservation outcomes.
	1 = Partially	Irregular ecological and/or environmental monitoring, compliance and/or proxy monitoring is conducted only (e.g., human activity data, modelled data, or remote sensing) and is relevant to assessing progress towards achieving the conservation outcomes.
	0 = No	No monitoring currently takes place which helps assess progress towards achieving conservation outcomes.
	0 = Unknown	It is unclear if monitoring is in place.

MEPCA Indicator metrics	Responses	Definition / Rationale
f) Is the PCA achieving its conservation outcomes?	2 = Fully	All the PCA's intended conservation outcomes are being met; noting there may also be social and economic intended outcomes that should also be considered.
	1 = Partially	Some, but not all, of the PCA's intended conservation outcome are being met and/or it is moving towards achieving intended conservation outcomes; noting there may also be social and economic intended outcomes that should also be considered.
	0 = No	The PCA's intended conservation outcomes are not being met; noting there may also be social and economic intended outcomes that should also be considered.
	0 = Unknown	No evidence is available to show if the PCA is achieving its intended conservation outcomes.
g) What is the level of confidence in the data used to assess progress towards the achievement of conservation outcomes?	3 = High	There is appropriate and sufficient direct ecological and/or environmental monitoring data available to have a high confidence in the condition of the PCA to assess progress towards achievement of ecological conservation outcomes.
	2 = Moderate	There is a combination of direct and proxy monitoring data (ecological, environmental, compliance data) available from the PCA to assess the moderate confidence in the condition of the PCA to assess progress towards achievement of conservation outcomes, but some expert judgement (or extrapolation of data) has been used to make the assessment.
	1 = Low	There are no data from direct ecological and/or environmental, compliance and/or proxy monitoring available from the PCA. The assessment of whether the PCA is moving towards or achieving conservation outcomes is therefore based largely on expert judgement e.g., an understanding of how the condition of the PCA might be impacted by ongoing activities.
	0 = Not applicable	No suitable information is available on which to base an assessment.
h) Confidence in achievement of conservation outcomes	f) * g)	Please note that metric h) is calculated within the indicator therefore there is no user input required. Metric f) and metric g) are multiplied together to produce metric h) to give higher weighting to PCAs that are fully achieving positive conservation outcomes and where this is based on high confidence in the evidence underpinning the assessment.

3. Existing PAME Case Studies

To inform the initial development of the MEPCA indicator (Figure A 1), reviews were conducted of seven area-specific case studies to gain an understanding of existing PAME assessment approaches, including their advantages and disadvantages.

Papua New Guinea

In 2016–2017, the Government of Papua New Guinea's Conservation and Environmental Protection Authority (CEPA) assessed the management effectiveness of 58 of the country's PAs (as many as could be practically assessed), with support from the United Nations Development Programme (UNDP) (Leverington *et al.* 2017).

The assessment was conducted by adapting the standard METT questionnaire to Papua New Guinea. This included considering the role of customary landowners (as Papua New Guinea's PAs have no government employees), adding a section to enable participants to nominate the primary values of their PAs, and adding a benefits checklist (based on the RAPPAM methodology) to encourage participants to consider the various benefits provided by their PAs. The tool, named PNG-METT, was trialled, and adjusted in the field before being finalised and implemented through a series of workshops.

PNG-METT was considered a simple and effective tool. Since the standard METT questionnaire gathered little information about PA values and outcomes, incorporating these elements into PNG-METT was considered essential. The team faced challenges while conducting the assessments due to the remoteness of many PAs, lack of knowledge about management, and lack of customary landowner and key stakeholder contact details. To improve PNG-METT, suggestions were made to improve clarity of the assessment for customary landowners, and to improve workshop preparation in advance to ensure attendance by a representative group of people.

South Africa

In 2008, South Africa's Chief Executive Officer (CEO) Forum on PAs, recommended a national assessment of South Africa's PAs to assess their management effectiveness (Cowan *et al.* 2010). The Department of Environment Affairs, with representatives from most PA management authorities in South Africa, led the assessment of 230 terrestrial PAs using an adaptation of METT.

The questions in METT were rephrased to meet South Africa's particular needs and conditions. An automated scoring system was also applied in Excel to adjust the total assessment score to account for non-applicable indicators. The tool, named METT-SA, included 33 indicators and 10 supplementary questions. Scores were not considered as pass or fail marks but as an indication of effective PA management. Sub-committees provided project oversight and convened workshops where management authorities completed and submitted METT-SA score sheets for analysis.

The METT-SA was successfully applied during interactive discussions by multidisciplinary teams. It was considered a quick and easy self-evaluation tool for PAs managers, in which no external expertise was required. The tool provided a baseline for uniform reporting to track long term trends in PA management effectiveness of South Africa's PAs. It also identified priority actions and next steps that PA managers should take to improve their PAs. However, the scoring system in Excel sometimes malfunctioned, resulting in two versions of the tool being produced. METT-SA was also considered weak on measuring PA outcomes and biodiversity objectives, indicating that more detailed assessments were required to address these weaknesses.

Sangay National Park, Ecuador

An assessment of Sangay National Park, Ecuador, was completed in 2007 in efforts to provide management recommendations that were lacking from previous PAME assessments of the World Heritage Site (Hockings *et al.* 2008). The assessment was coordinated by the Ministry of the Environment, Fundación Natura, and EcoCiencia, with input from international, public and private sector organisations.

The assessment was adapted from the Enhancing our Heritage (EoH) Toolkit, the Nature Conservancy's Conservation Action Planning and several other methodologies, to address information gaps. The methodology considered key elements of PA management effectiveness including development of values and management objectives, threats to these values, staff needs, funding sources, performance standards, implementation of administrative plans, and PA outcomes. To assess the PA outcomes, biodiversity health and achievement of specific management objectives were considered according to research and monitoring initiatives. Two workshops were held to complete the assessment, which were attended by government, Non-Government Organisations (NGOs), communities, and indigenous groups.

The assessment of Sangay National Park provided a comprehensive baseline for future monitoring and assessment and is currently being used as a model for PA planning throughout Ecuador. The assessment provided a clear view of the strengths and weaknesses of current management and successfully brought stakeholders together, which facilitated stakeholder cooperation following the assessment. The assessment reports enabled implementation of management recommendations, including site level management plans. A challenge of the approach was the lack of experience of institutions cooperating and understanding each other's roles during the first workshop.

Catalonia, Spain

In 2002–2003, the Catalan Institution for Natural History (ICNH) completed an evaluation on the effectiveness of Spain's entire system of PAs (Hockings *et al.* 2006). The project aimed to adapt the IUCN-WCPA framework to assess the planning and management effectiveness of the existing PA system, disseminate evaluation findings to the public, and become a reference for future PA systems in Europe.

A workshop was held to adapt the IUCN-WCPA framework and develop a first draft of the assessment using 87 indicators. A pilot evaluation was then conducted in seven PAs to test the methodology and refine the indicators. Seminars were held to present the methodology to 130 PA evaluators, who completed the evaluation online and sent the evaluations to PA managers for comments. These comments were reviewed by ICNH, and evaluators were asked to address any problems. Data were then analysed, and several workshops were held to discuss the analysis and validate any interpretations.

The evaluation was considered successful, with the iterative participatory process enabling substantial refinements and simplifications to the IUCN-WCPA framework. Findings were made public which had significant intrinsic and educational value. The government's willingness to engage and the public's participation towards PA management had a high impact on the evaluation findings. However, the process was considered complex in delivering appropriate training and in coordinating evaluators that had different level levels of experience and knowledge. There was also some difficulty in obtaining data from public, local, and regional authorities, as authorities had variable levels of distrust in the assessment.

Western Indian Ocean

The management effectiveness of MPAs in Eastern Africa was assessed by the IUCN's Eastern African Regional Office (IUCN-EARO) in 2003 to determine where management could be improved and where capacity could be strengthened (Hockings *et al.* 2006).

The IUCN-EARO closely followed the IUCN-WCPA framework to create a workbook to conduct the assessments. Following introductory workshops on the methodology led by the IUCN-EARO, the workbook was tested on eight MPAs. Implementation teams were formed for each site, consisting of MPA personnel, key stakeholders and consultants. Worksheets were then reviewed in consultative workshops, informal meetings or by correspondence, then reports were written.

The assessment enabled MPA staff to consider the reasons behind establishment of their MPA, and how even small management issues can hinder the overall success of a site. The assessment provided management recommendations, including revising management plans, improving monitoring programmes, strengthening legislative frameworks, building capacity of personnel, and strengthening stakeholder involvement. It was essential that worksheets were amended to the understanding of the implementation teams, and that questionnaires and key worksheets were translated for stakeholders with local languages. Due to a lack of baseline survey data, it was often not possible to determine if sites were moving towards their objectives. When improvements to MPAs were recommended, some MPA staff feared some form of retribution, and so obtaining support from senior managers from the start of the process and providing a thorough introduction to the assessment was vital.

Great Barrier Reef

The Great Barrier Reef (GBR) Outlook Report was developed to collate information from multiple agencies conducting long-term monitoring programmes to assess the health and management of the GBR (Blue Belt Programme 2021). The report is aimed at decision-makers and is legally required every five years. The report includes a table of threats for the whole GBR region, a risk matrix detailing the likelihood and consequences of threats, gradings of conditions and trends in biodiversity values, and a management effectiveness assessment. The management effectiveness assessment is undertaken by six internationally recognised experts with input from Queensland and Australian Government agencies.

The management effectiveness assessment applies the IUCN-WCPA framework and addresses 14 management topics, such as climate change, coastal development, and fishing (Figure A 2). The assessment is completed by considering evidence provided by management agencies against indicators for each of the six effectiveness elements (GBR Marine Park Authority 2019). A 'means of verifying' each indicator is included to collate the most relevant evidence required to appropriately assess each indicator (GBR Marine Park Authority 2019).

Following completion of the report, several recommendations were made for conducting management effectiveness assessments. Measuring indicators for every aspect of each objective is not considered practical or necessary. Presenting the assessment results is important, with 'traffic light' colour coding being an effective way to show trends and confidence in evidence. It was also considered vital that evaluations are, open, transparent, and accessible to the community.

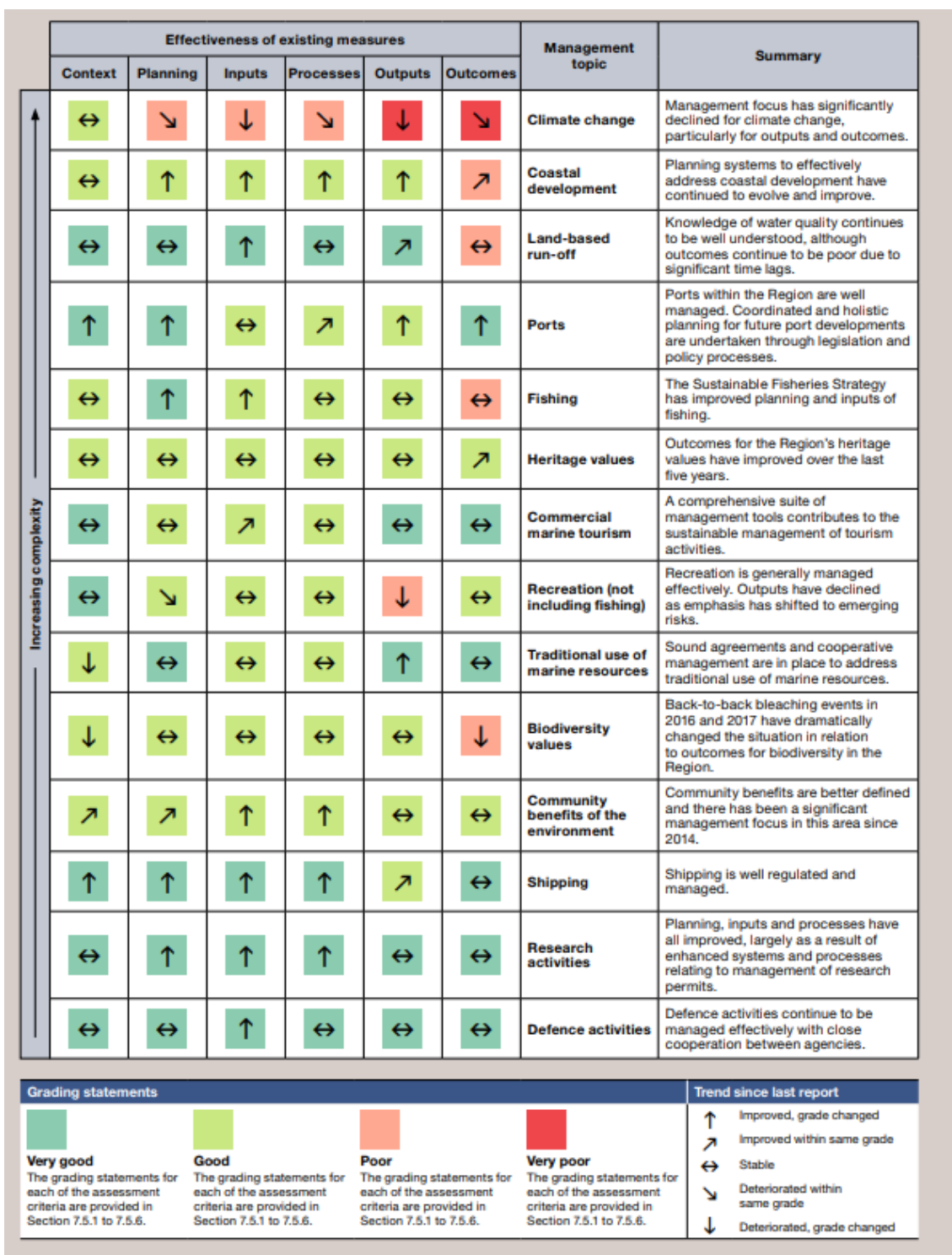


Figure A 2. Overall assessment of the management effectiveness of 14 measures to protect and manage the Great Barrier Reef (GBR Marine Park Authority 2019).

Baltic Sea

The management effectiveness of the Baltic Sea MPA network was assessed from 2019 to 2021, with the aim of determining whether the network is achieving its primary conservation goals of protecting important ecosystem features by managing threats (HELCOM – ACTION 2021). The assessment was coordinated by the Baltic Marine Environment Protected Commission (Helsinki Commission – HELCOM), an intergovernmental organisation.

It was not possible to assess the whole MPA network across the Baltic Sea, and so HELCOM assessed a representative subset of 65 MPAs. The assessment was based on the IUCN-WCPA framework and consisted of an online survey that was distributed to country representatives. Because of the lack of quantitative targets for MPAs and limited information on the status of conservation features, it was considered not possible to evaluate MPAs' achievement of conservation objectives from the outset. The assessment therefore focused on evaluating the management of human activities affecting conservation features (e.g., sandbanks, mudflats, and reefs) in each MPA (Figure A 3).

The assessment was effective at revealing the management performance of a regional MPA network and delivering key messages to inform management recommendations. The assessment was considered flexible as it could be adapted to include weightings and other conservation features when data becomes available. However, there were misinterpretations in the wording, such as around the management option 'other management instruments', which could be resolved by providing clearer background information and/or assessment examples.

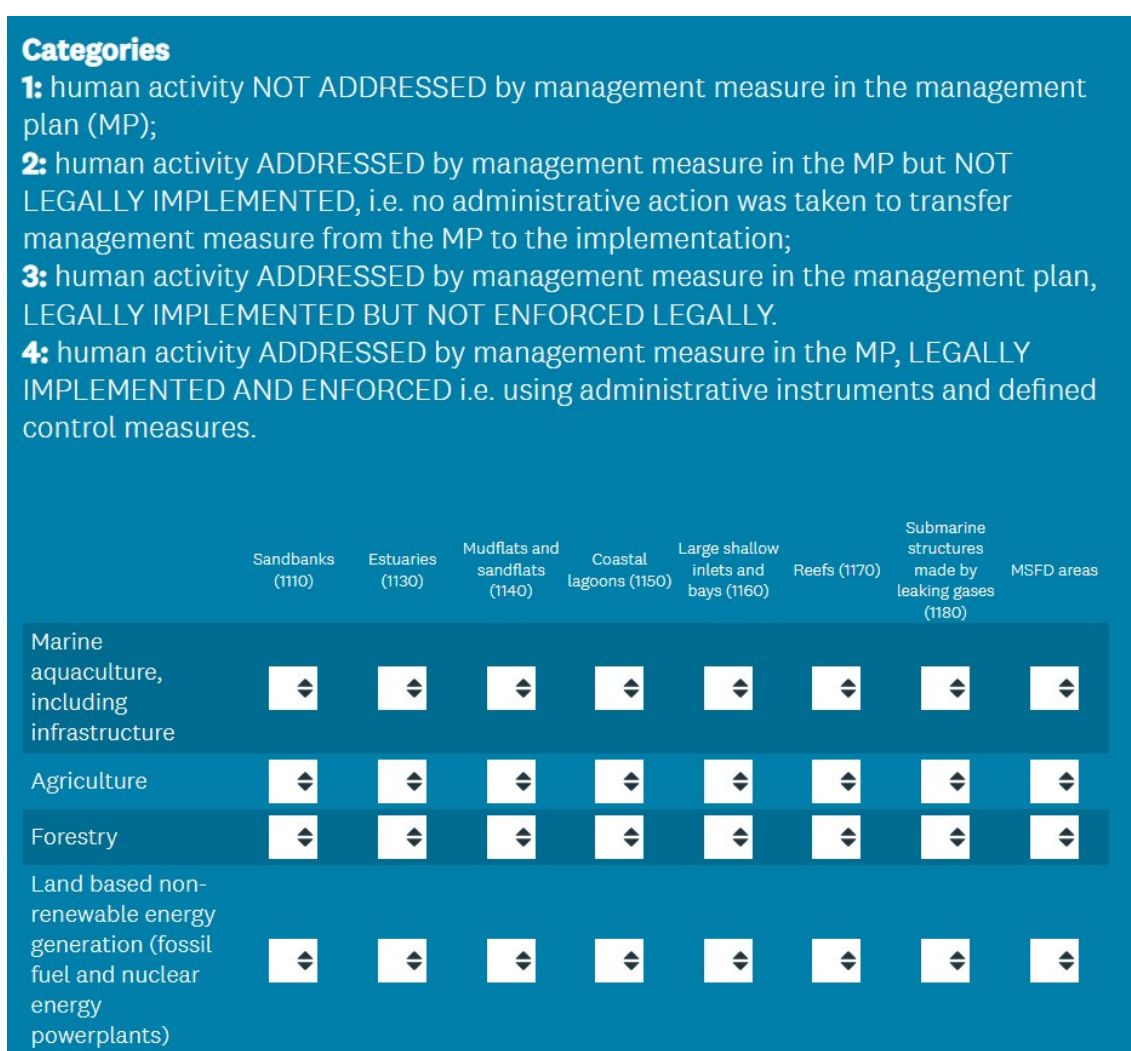


Figure A 3. First section of online survey to assess the effectiveness of MPAs in the Baltic Sea, with four answer options (HELCOM – ACTION 2019).

Indonesia

Indonesia has zoned MPAs where protection levels differ among zones to balance stakeholder needs, and so nationwide assessment is considered difficult. Andradi-Brown *et al.* (2020) applied the MPA Guide to conduct Indonesia's first nationwide MPA assessment. They determined the STAGE of establishment and LEVEL of protection of Indonesia's MPAs by breaking down the zonation of each MPA using zonation plans submitted to government ministries, and by applying previously completed PAME assessments ('E-KKP3K' and METT).

Only 42 of 196 MPAs, representing 57.4% of the total MPA area in Indonesia, could be assessed for LEVEL of protection using the MPA Guide as many MPAs did not have zonation plans available or MPAs were still being initiated. To establish LEVEL of protection, the MPA Guide required information on fishing gear permitted within MPAs, which was difficult to ascertain as this information is not a necessity for Indonesia's MPAs. PAME assessment outputs did not perfectly align with information required by the MPA Guide and so the most appropriate aligning questions were selected. The authors noted some concern over future reporting obligations. They highlighted that any future MPA assessments may need to realign with the MPA Guide, and that prioritisation of assessments should be clarified to avoid overwhelming reporting capacity.

Despite these difficulties, authors believed that applying the MPA Guide was successful at highlighting 'how much can be gained from looking at Indonesia's national MPA estate as more than just a single percentage area or millions of hectare target.' The results also clearly communicated Indonesia's progress towards meeting international MPA targets and positioned Indonesia 'as a leader in transparency and accountability.'

4. Indicator Development Case Studies

It was critical that the MEPCA indicator was adaptable to existing practices and approaches in a broad range of global contexts and therein does not increase the reporting burden on countries. As such, part of the development work was to trial the approach presented in this report in real world examples. These detailed case studies are presented below.

The case studies are grouped into rounds as some case studies were completed simultaneously, with feedback from each being combined to guide the development of the next indicator version (see Volume I, Figure 11). International partners were invited to share and help develop the indicator. In some case studies, the draft indicator was sent to the corresponding country to input their existing data directly, in others, the existing PAME data was shared with JNCC and transposed into the MEPCA Indicator (Figure A 4)². The early development stage case studies helped develop the indicator from v0.3 to v0.4 (Volume I, Section 3.2).

- North-East Atlantic Region: OSPAR MPA Network

The mid development case studies helped develop the indicator from v0.4 to v0.5.

- Canada
- Costa Rica
- Saint Helena
- British Indian Ocean Territory (BIOT)

The end development case studies helped develop the indicator from v0.5 to v0.6. There was also feedback from the workshops incorporated into v0.6.

- Scotland
- Australia
- Workshop summary

The final version of the indicator (v1.0) was developed through an internal review as detailed in Vol I: Section 3.4 of this report.

² Note that through the case studies the highest possible PCA effectiveness index score was revised therefore, where possible, the results are shown as percentage (%) of the total score, but in some case studies the results are also shown as a numerical figure.

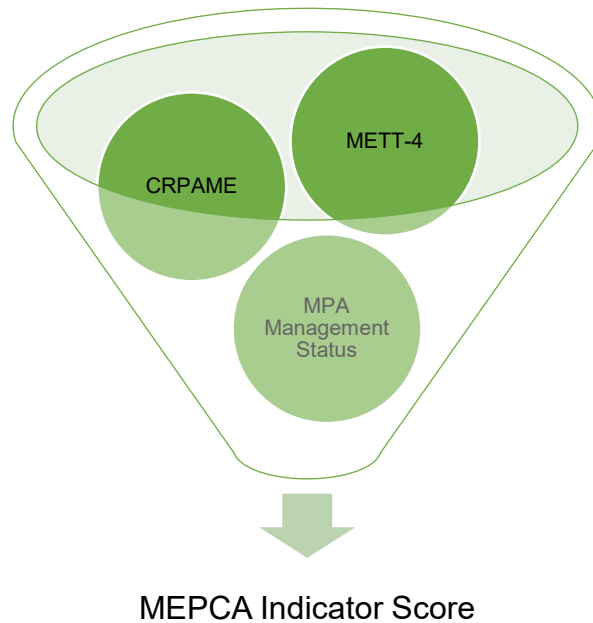


Figure A 4. Schematic showing how the outputs from different PAME methodologies can be transposed into a singular globally applicable MEPCA Indicator Score.

4.1 North-East Atlantic Region: OSPAR MPA Network

PCAs and Existing PAME Assessments

At the time of the case study (November 2021), Contracting Parties (CPs) across the OSPAR network in the North-East Atlantic region reported on the management status for 568 MPAs³ (11% of the OSPAR Maritime Area). IUCN category data is not required for OSPAR Management Status reporting and therefore was not used in this case study. The management status assessment of the OSPAR MPA network does not include OECMs or other types of PAs. As detailed in Section 2.2, in 2020, an additional question was added to the regional MPA management assessment asking the CPs to provide their confidence in each site's management status. The aim of this addition was to help supplement the degree of understanding underpinning the assessment. Previous reports can be found on the [OSPAR website](#).

Trialling the Indicator

The qualitative responses to the OSPAR management status assessment were converted into corresponding quantitative outputs to be used in the MEPCA indicator metrics (Table A 2). For the data to be useful, full management status responses, including confidence assessments, were required. To ensure the data were suitable, MPAs that did not have full responses were not included in the assessment (Table A 3). A total of 284 MPAs from the 2021 reporting year were used in this case study.

³ Note this case study was completed part way through the OSPAR assessment therefore the total number of MPAs and area coverage may vary from other reports.

Table A 2. Corresponding OSPAR MPA management status response for question C to metric e). Showing the suggested guidance associated with the proposed v0.3 metric responses.

OSPAR Response	Metric Response (v0.3)	Proposed Definition
N/A	3	Regular monitoring, good spatial resolution, time series is or will be ≥ 3 years
Yes	2	Good spatial resolution, time series is or will be ≤ 3 years
Partially	1	Coarse resolution, limited or proxy data only
No / Unknown	0	None / Unknown

Table A 3. The total number of OSPAR MPAs with management effectiveness assessments between 2016 and 2021*.

* Note this case study was completed part way through the OSPAR assessment therefore the total number of MPAs and area coverage may vary from other reports

Year	No. of MPAs (*,**)	* With full management responses	** including confidence scores
2016	437	318	N/A
2018	496	407	N/A
2021	568	479	284

All OSPAR MPAs are governed by government, therefore the answer to metric a) is 'Governance by Government'.

According to the OSPAR guidelines for the identification of MPAs, the mandatory data that is required for the OSPAR electronic nomination proforma should include the IUCN category attributes with the GIS shapefiles, although it is not always provided (OSPAR Commission, 2017). Therefore, there is existing data available to record against metric b): 'What is the type of PA?'. This data was not available during the case study but should be included in future studies.

Responses to metric a) determines which weighting of the metric is to be used, depending if the PA or OECM is governed by government or is community led. As all the OSPAR MPAs are government led, the same weighting was used for all:

$$\text{Index of PCA Effectiveness} = (c * 0.15) + (d * 0.25) + (e * 0.25) + ((f * g) * 0.35)$$

During the case study, v0.3 of the indicator metrics was initially used. Challenges occurred when trying to convert the responses of OSPAR question C to the metric e) (Table A 2). Metric e) did have a maximum score of 3, as it focused on time series data, however the level of detail needed to address this metric could not be answered within the OSPAR data. Due to this, the indicator was updated to remove the metric score of 3 which resulted in the development of v0.4 of the indicator where the maximum score changed from 3.65 to 3.4.

Challenges Encountered

As there were three years' worth of OSPAR MPA management status reporting, a review of temporal data was undertaken to see whether the sites could be directly compared. For the 2016 and 2018 data, the question about confidence scores was not yet introduced therefore the indicator calculations were adapted (see below). The adapted indicator scoring was also used for the MPAs within the 2021 dataset that did not provide information on confidence assessments.

Indicator equation, including confidence metric:

$$\text{Index of PCA Effectiveness} = (c * 0.15) + (d * 0.25) + (e * 0.25) + ((f * g) * 0.35)$$

Indicator equation, excluding confidence metric:

$$\text{Index of PCA Effectiveness} = (c * 0.15) + (d * 0.25) + (e * 0.25) + (f * 0.35)$$

To compare OSPAR MPA's management status over time, a subset of sites was randomly selected from each CP. MPAs were only selected if they had full management status responses from all reporting years (Table A 3). The subset shown in Figure A 5 includes three MPAs from United Kingdom, three from Germany, one from Spain, two from Sweden and two from Belgium.

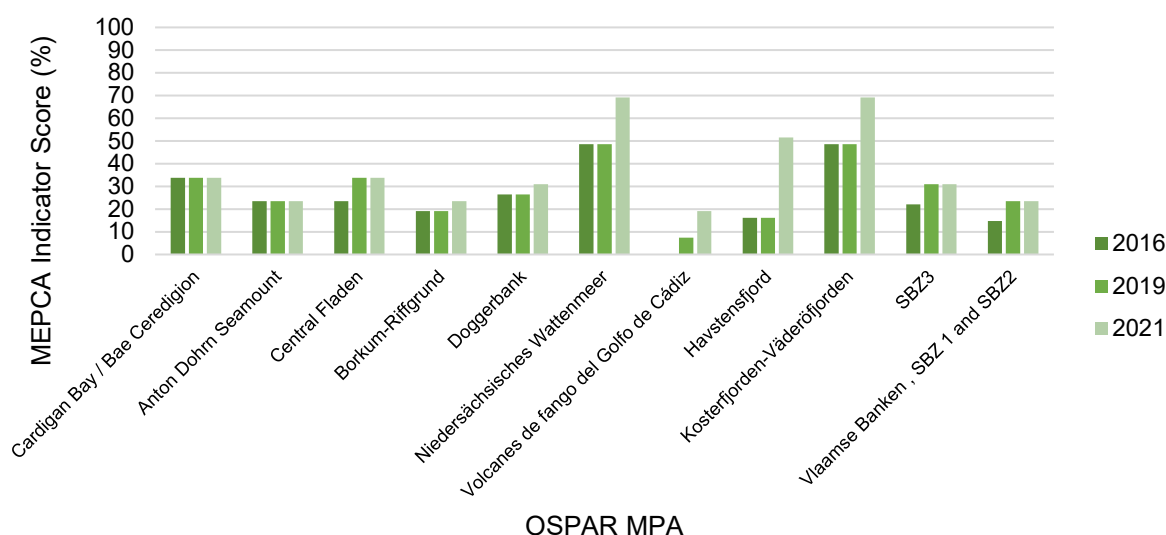


Figure A 5. A time series comparison of the MEPCA indicator scores across OSPAR MPAs in the North-East Atlantic.

The OSPAR datasets also have associated comments sections alongside each question, which can be used to see the rationale each CP had for their responses. Key observations are as follows:

- The main reasons cited for no change in scores over time for sites such as Cardigan Bay / Bae Ceredigion and Anton Dohrn Seamount were no recent monitoring or no long-term monitoring assessments.
- Sites such as Niedersächsisches Wattenmeer, Havstensfjord and Kosterfjorden-Väderöfjorden had the largest increases in their metric scores. The main reason for this change was the introduction of the confidence score.

To compare the OSPAR MPAs management effectiveness over time, a subset of sites was randomly selected from each CP (Figure A 6). MPAs were only selected if they had full management status responses from all reporting years. As the largest differences in the indicator scores were between 2018 and 2021, a comparison of the two indicator equations was undertaken to see how much of a difference including the confidence scores would make. It was important to see how the results differed when inputting the same MPA data into the two different indicator equations, and if the two indicators could be used to directly compare the management effectiveness over time.

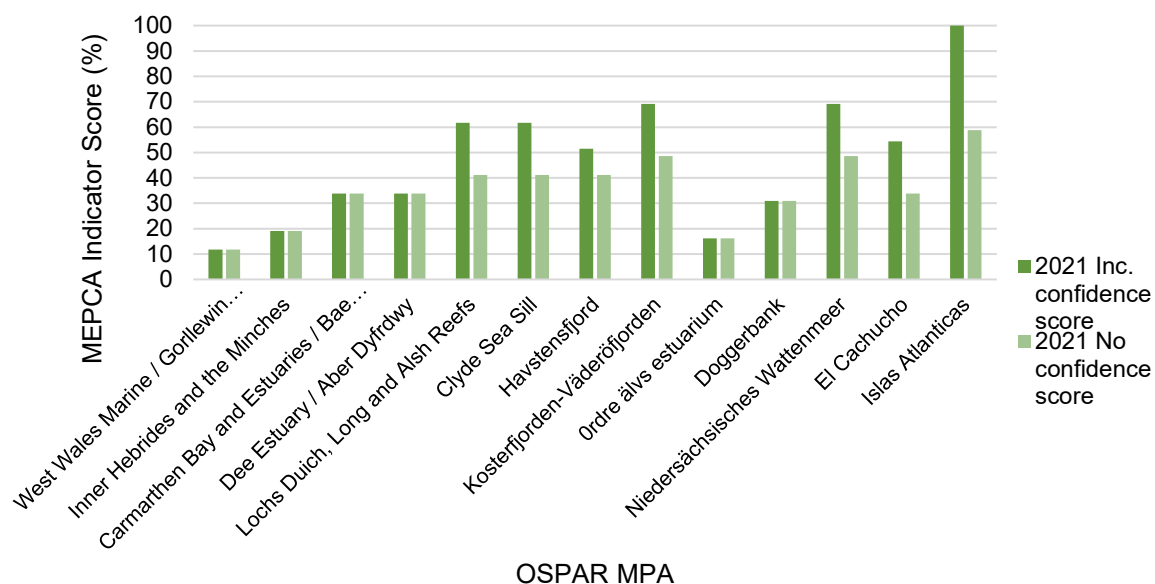


Figure A 6. Comparison of the two indicator calculations to understand the difference including the confidence scores (C/S) would make to the overall assessment of management effectiveness.

As the total scores of the two metric indicators differ, the results cannot be directly compared across the board. Key observations are as follows:

- OSPAR MPAs that had low confidence (scored 1) could be directly compared in a time series as the introduction does not have an overall difference to the result (the maximum score was the same).
- MPAs that had differences in their metric scores occurred due to the introduction of the confidence metric. The greatest difference occurred with a confidence score of 3. Sites such as Niedersächsisches Wattenmeer (1.65 to 2.35), Havstensfjord (0.55 to 1.75) and Kosterfjorden-Väderöfjorden (1.65 to 2.35) had the largest increases in their scores between 2018 and 2021 reporting years.
- For the 2021 dataset, the index of PA management effectiveness ranged from 0.4 – 3.4 (covering the full range of the total available weightings and averaged 1.48).

Next Steps

The MEPCA indicator was based on the OSPAR management status approach so, as expected, there were not a lot of challenges during the trialling with the indicator. The OSPAR case study could only review MPAs that were 'governed by Government' therefore it could not give insight for the 'community-led' indicator, or other types of PAs and OECMs. To see if the split in 'government' and 'community-led' PAs and OECMs metric indicator is

needed / useful, other types of data would be needed as this cannot be answered using only OSPAR data.

Following the OSPAR case study, the indicator was updated from v0.3 to v0.4. The change occurred when completing metric e). In v0.3, the metric response ranges from 3 – 0, with a response of 3 for “*Regular monitoring, good spatial resolution, time series is or will be ≥ 3 years*”, a response of 2 for “*Good spatial resolution, time series is or will be ≤3 years*”, a response of 1 for “*Coarse resolution, limited or proxy data only*”, and 0 for “*None / Unknown*”. The level of detail needed to address the metric was not available in the OSPAR dataset. As the time-series information was not available, the responses for metric e) were updated to v0.4 of the indicator.

The next steps for incorporating OSPAR MPA datasets into the MEPCA indicator would revolve around the size of the dataset; only 50% (284/ 568) of the MPAs had full management responses. To have a larger dataset, the Contracting Parties would need to provide full management responses, including the assessment of confidence.

Metric b) could be answered by using the OSPAR electronic nomination proformas as these contain the IUCN category attributes within the GIS shapefiles. Additional information that could be used as evidence for indications of management effectiveness within this indicator or within parallel component indicators include the size of the MPAs and time since designation. The designation year of OSPAR MPAs is included in the dataset however the size of the MPAs currently is not.

4.2 Canada

PCAs and Existing PAME Assessments

In efforts to conserve biodiversity, 9000 PAs have been designated in Canada, covering 11.9% of land and 8.9% of coastal and marine areas (UNEP-WCMC 2021). These PAs fall under a range of different governance and PA types, however the majority (81.1%) of PAs are governed by sub-national ministry or agencies (Table A 4) and over half of PAs classified as Habitat/Species Management Areas (Table A 5).

Table A 4. Different governance types of Protected Areas (PAs) in Canada* (UNEP-WCMC 2021).

*Correct as of November 2021

PA Governance type	Number of PAs in Canada	Percentage of PAs in Canada (%)
Sub-national ministry or agency	7302	81.1
Non-profit organisations	1049	11.7
Collaborative governance	307	3.4
Federal or national ministry or agency	229	2.5
Not reported	67	0.7
Joint governance	22	0.2
Individual landowners	21	0.2
Indigenous peoples	3	0.03

Table A 5. Type and number of IUCN PCAs in Canada* (UNEP-WCMC 2021).

Other PCAs include Ramsar sites, World Heritage sites, Biosphere reserves, Land Use Exclusion Zones in indigenous land use plans, First Nation Settlement Land, as well as OECMs.

**Correct as of November 2021.*

IUCN PCA category	Number of PCAs in Canada	Percentage of PCAs in Canada (%)
Ia Strict Nature Reserves	521	5.8
Ib Wilderness Areas	293	3.3
II National Parks	1650	18.3
III Natural Monument or Features	625	6.9
IV Habitat/Species Management Areas	4853	53.9
V Protected Landscapes/Seascapes	136	1.5
VI Protected area with sustainable use of natural resources	488	5.4
Other	434	4.9

Since 1887, the Protected Areas Program of the Canadian Wildlife Service (CWS) at Environment and Climate Change Canada (ECCC), a department of the Government of Canada, has sought to protect wildlife and migratory bird habitats of national importance. A network of 54 National Wildlife Areas (NWAs) and 92 Migratory Bird Sanctuaries (MBSs) were designated under their remit. NWAs are protected and governed under the Canada Wildlife Act and the associated Wildlife Area Regulations, while MBSs are governed under the Migratory Birds Convention Act and associated Migratory Bird Sanctuary Regulations. This network of PAs covers 12.4 million hectares, and range in IUCNs' PA category from Ia to VI.

In 2016, CWS conducted PAME assessments of all 54 NWAs and 64 of 92 MBSs (as the Quebec region was unable to provide survey results), to provide recommendations for PA management and a baseline for future assessments. The PAME assessment was repeated in 2019-2020 on 52 NWAs and 54 MBSs to identify any trends.

To conduct the PAME assessments, CWS used a modified form of the Management Effectiveness Tracking Tool (METT). METT was selected because it was considered relatively simple, quick, easy to understand by non-specialists, able to provide management recommendations, and consistent with international PAME standards. The METT consists of two sections: a datasheet for key information, and an assessment form with 30 questions containing a selection of possible answers, each with an associated score. CWS wrote a document titled 'METT Management Effectiveness in ECCC PAs: 2019-2020 Guidelines for Questionnaire Respondents', which provided guidance from the 2016 METT handbook, as well as CWS's specific guidance on answering each question. The questionnaires were distributed to PA managers (or their delegates), which were responsible for filling in the questionnaire for all sites in their region or subregion. Managers addressed metrics using their personal knowledge, history, and experience.

Trialling the Indicator

In order to trial the MEPCA indicator (v0.4) and develop it further for global application, data from the 2019-2020 PAME assessments of 106 Canadian ECCC PAs (52 NWAs and 54 MBSs) was converted to be input into the indicator. CWS provided spreadsheets of data,

including information obtained from the datasheet (such as PA ownership) and answers given to the 30 questions in the assessment form. A review of the 'METT Management Effectiveness in ECCC PAs: 2019-2020 Guidelines for Questionnaire Respondents' was undertaken to gain an understanding of the assessment questions and answers. An internal meeting was held to discuss which of these assessment questions best aligned with metrics in v0.4 of the MEPCA indicator. It was agreed which questions best conformed, then, since the answers and scores did not completely align, the PAME scoring system was translated so that it fit within the context of the MEPCA indicator scoring system (Table A 6).

Table A 6 MEPCA indicator (v0.4) metrics, answers, and scoring, and the corresponding ECCC PAME assessment questions and answers that best conformed. Right column shows the translation of ECCC PAME scoring to the MEPCA indicator scoring.

Indicator v0.4 metric	Indicator v0.4 answers and scoring	PAME question(s) that best conformed	PAME answers and scoring	Translation of scoring for the MEPCA indicator
a) What is the governance type of the PA?	Governance by Government Shared governance Private governance Governance by indigenous and local communities	Ownership details Management authority	Federal Provincial Municipal Private/Indigenous Free text	N/A
b) What is the type of PA?	Ia Strict Nature Reserve Ib Wilderness Area II National Park III Natural Monument or Feature IV Habitat/Species Management Area V Protected Landscape/Seascape VI Protected Area with Sustainable Use of Natural Resources OECM	IUCN category	Ia Strict Nature Reserve Ib Wilderness Area II National Park III Natural Monument or Feature IV Habitat/Species Management Area V Protected Landscape/Seascape VI Protected Area with Sustainable Use of Natural Resources	N/A

Indicator v0.4 metric	Indicator v0.4 answers and scoring	PAME question(s) that best conformed	PAME answers and scoring	Translation of scoring for the MEPCA indicator
c) Is management information documented?	2 = Yes 1 = Partially 0 = No 0 = Unknown	Q7: Is there a management plan and is it being implemented?	3 = A management plan exists and is being implemented as part of regular regional operations. 2 = A management plan exists but it is only being partially implemented because of funding or other problems. 1 = A management plan is in progress or has been developed but is not yet being implemented. 0 = There is no management plan for the PA.	3 or 2 --> 2 (Yes) 1--> 1 (Partially) 0 --> 0 (No)
d) Are management measures being actively implemented?	2 = Yes 1 = Partially 0 = No 0 = Unknown	Q4: Is management undertaken according to agreed objectives?	3 = The PA has agreed objectives and is managed to meet these objectives. 2 = The PA has agreed objectives but is only partially managed according to these objectives. 1 = The PA has agreed objectives but is not managed according to these objectives. 0 = No firm objectives have been agreed for the PA.	3 --> 2 (Yes) 2 --> 1 (Partially) 1 or 0 --> 0 (No)

Indicator v0.4 metric	Indicator v0.4 answers and scoring	PAME question(s) that best conformed	PAME answers and scoring	Translation of scoring for the MEPCA indicator
e) Is ecological/environmental monitoring in place?	2 = Yes 1 = Partial 0 = None 0 = Unknown	Q7c: The results of (ecological) monitoring, research and evaluation are routinely incorporated into planning.	1 = Yes, monitoring, research and/or evaluation are taking place onsite, and results are informing/being incorporated into planning. 0.5 = Monitoring takes place, but results are not incorporated into planning. 0 = Not at all.	1 or 0.5 --> 2 (Yes) 0 --> 0 (No)
f) Is the site achieving its conservation objectives?	2 = Fully 1 = Partially 0 = No 0 = Unknown	Q5: Is the PA the right size and shape to protect species, habitats, ecological processes and water catchments of key conservation concern?	3 = PA design helps achievement of objectives; it is appropriate for species and conservation of their habitats; and maintains ecological processes such as surface and groundwater flows at a catchment scale, natural disturbance patterns, etc. 2 = PA design is not significantly constraining achievement of objectives but could be improved. 1 = Inadequacies in PA design mean that achievement of major objectives is difficult, but some mitigating actions are being taken. 0 = Inadequacies in PA design mean achieving the major objectives of the PA is very difficult.	3 --> 2 (Fully) 2 or 1 --> 1 (Partially) 0 --> 0 (No)

Indicator v0.4 metric	Indicator v0.4 answers and scoring	PAME question(s) that best conformed	PAME answers and scoring	Translation of scoring for the MEPCA indicator
g) What level of confidence is associated with achievement of conservation objectives?	3 = High 2 = Moderate 1 = Low	Q9: Do you have enough information to manage the area?	<p>3 = Information on the critical habitats, species, ecological processes and cultural values of the PA is sufficient to support all areas of planning and decision making.</p> <p>2 = Information on the critical habitats, species, ecological processes and cultural values of the PA is sufficient for most key areas of planning and decision making.</p> <p>1 = Information on the critical habitats, species, ecological processes and cultural values of the PA is not sufficient to support planning and decision making.</p> <p>0 = There is little or no information available on the critical habitats, species and cultural values of the PA.</p>	<p>3 --> 3 (High)</p> <p>2 --> 2 (Moderate)</p> <p>0 or 1 --> 1 (Low)</p>
h) Confidence in achievement of conservation objectives.	f*g	N/A	N/A	f*g

The MEPCA indicator (v0.4) provided an index of PCA effectiveness using a formula that applied weightings to scores obtained for metrics c) to g). For PCAs governed by the government, which included most ECCC PAs, the following formula was applied:

$$\text{Index of PCA Effectiveness} = (c * 0.15) + (d * 0.25) + (e * 0.25) + ((f * g) * 0.35)$$

For PCAs governed by communities, which included ECCC PCAs categorised as ‘Private’ and ‘Governance by indigenous communities’, the following formula was applied:

$$\text{Index of PCA Effectiveness} = (c * 0.10) + (d * 0.30) + (e * 0.25) + ((f * g) * 0.35)$$

The index of PCA effectiveness for ECCC PAs ranged from 0% to 100% of the total possible weighting (with indices of 0 to 3.4 respectively) and averaged 51.1% of the total possible weighting (with an index of 1.74) (Figure A 7). The index varied according to type of PA, averaging the lowest at 1.07 for Protected Landscapes/Seascapes and averaging the highest at 2.66 for PAs with sustainable use of natural resources (Figure A 8).

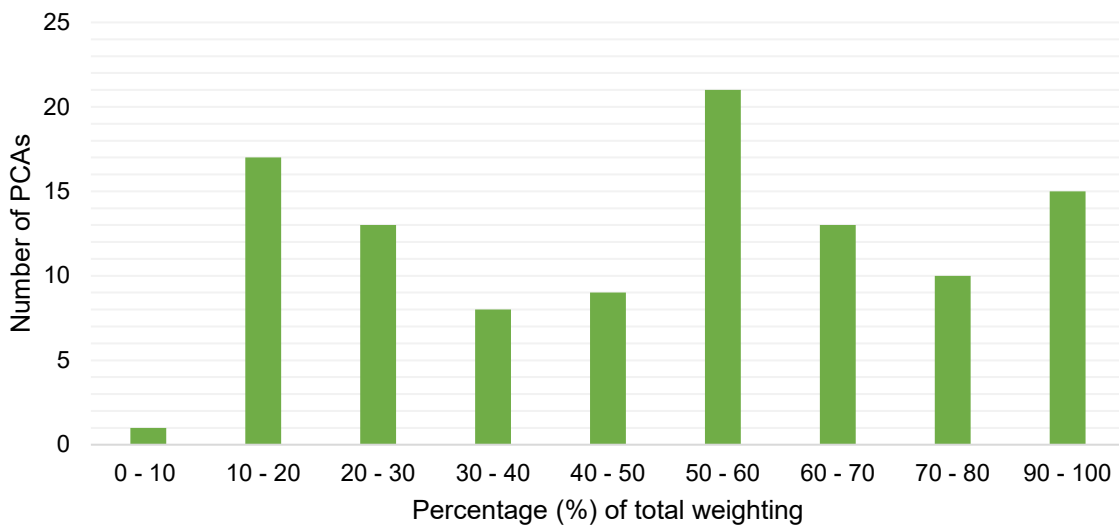


Figure A 7. Frequency distribution showing the number of PCAs with the percentage of total weighting, from trialling 2019-2020 ECCC PAME assessment data in the MEPCA indicator (v0.4).

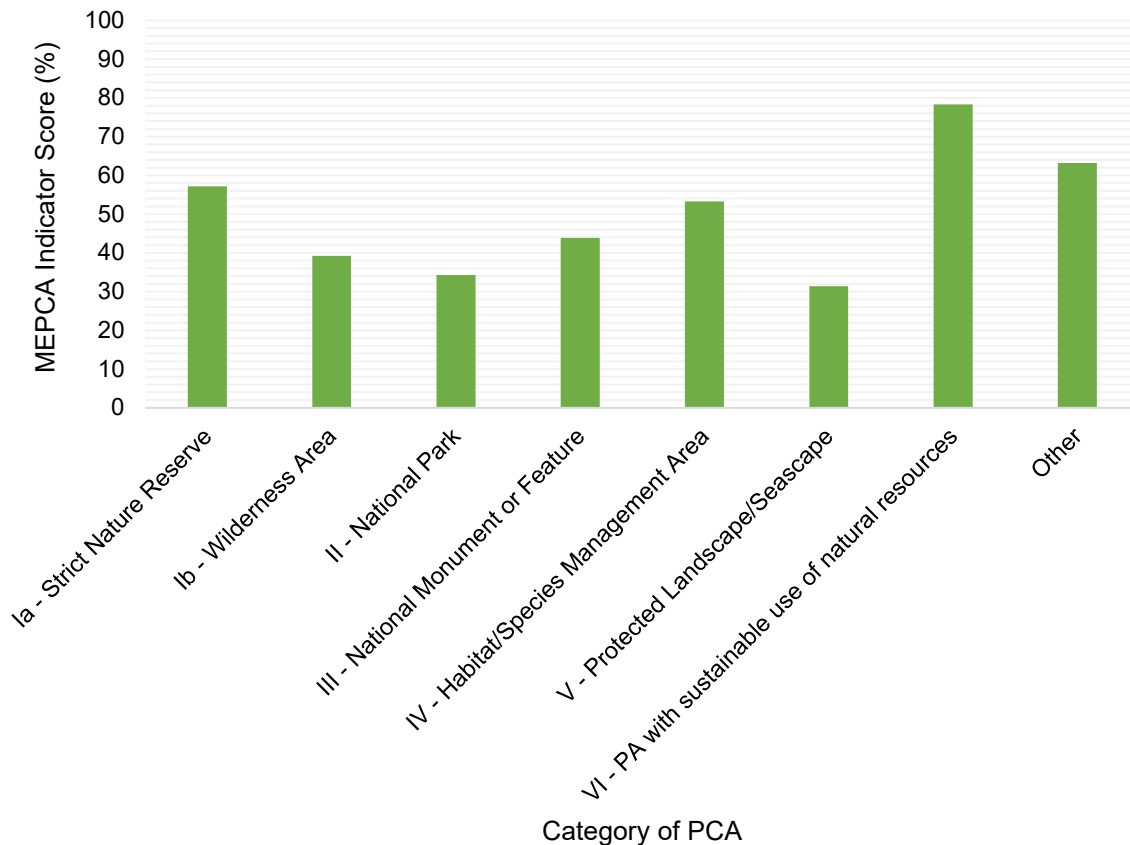


Figure A 8. Average index of PCA effectiveness from trialling 2019-2020 ECCC PAME assessment data in the MEPCA indicator.

Challenges Encountered

Several challenges were encountered while trialling the ECCC PAME assessment data in the MEPCA indicator. The main challenge was found when translating the Canadian ECCC PAME assessment questions into the MEPCA indicator metrics; there were often no directly equivalent questions due to differences in wording and available answers. For questions where wording differed, definitions of the ECCC PAME assessment questions were compared and aligned to the MEPCA indicator metrics. Another challenge came from transferring the Canadian scoring system across for some questions as their categories did not necessarily reflect what was proposed in the MEPCA indicator.

To address metric a) of the MEPCA indicator, the governance type of each PCA was directly sought from CWS as answers from the PAME assessment did not align. For PCAs governed both by the Government and privately, CWS stated that categorising these PAs as 'Governed by Government' would be considered more accurate than categorising them as 'Shared governance'. However, CWS noted that this is debateable, indicating that there may be inconsistencies in interpreting the governance categories. One PA did not fall under a PA type listed in the MEPCA indicator and so 'N/A' was written. For metric b), information was sought from CWS as the data was not initially provided, but the PCA types directly aligned as this question was asked in the PAME assessment data sheet.

Metric c) addressed 'management documentation', while the most suitable PAME question used the words 'management plans'. Since answers to this PAME question also included additional information (i.e., implementation of management plans), only sections of answers were required to align with the MEPCA indicator answers. For metric d) on active implementation of management, the PAME question that included implementation of

'management according to objectives' was selected as most appropriate, since the MEPCA indicator is geared towards achievement of conservation objectives. For metric e) regarding ecological and environmental monitoring, it was challenging to find the most suitable PAME question as most relevant questions related to monitoring of management. The most appropriate question that related to ecological monitoring did not include a 'Partial' option and therefore only 'Yes' and 'No' options were included in the scoring translation.

Metrics f) and g) of the MEPCA indicator (v0.4) were the most difficult to align with the PAME assessment questions. For metric f) there was not an obvious PAME question that directly stated and answered whether a PCA was or was not achieving its conservation objectives. One relevant PAME question asked about the state of biodiversity, ecological and cultural values compared to when the PCA was first designated, but answers only encompassed whether values were or were not intact, and so did not address value recovery. To address metric f) we therefore used a PAME question on PCA design, as the answers indirectly stated whether the PA was, was partially, or was not achieving its conservation objectives, and could therefore be used as a proxy. However, the answers may not fully capture whether the conservation objectives have been achieved. Metric g) addressed confidence in achieving conservation objectives, and the most relevant PAME question asked about the level of information used to manage the area. Although this PAME question did not explicitly consider confidence in achieving conservation objectives, it was considered most relevant as the achievement of objectives were presumably incorporated into management. The MEPCA indicator v0.4 definitions for low, medium, and high confidence were very detailed and this level of information was absent from the PAME assessment answers. These confidence definitions were therefore disregarded to address the metric.

The ECCC PAME assessment provided explanations for each level of a PAME assessment outcome. For example, ECCC stated an outcome value of 33% as 'management is clearly inadequate', a value of 34 – 67% as 'management is basic with significant deficiencies and a value of greater than 68% as 'management is adequate'. Interpreting the outcomes of the MEPCA indicator were not as obvious and adding definitions in a similar way could therefore be beneficial.

It should also be noted that the MEPCA indicator was only trialled on data obtained from PAME assessments of NWAs and MBSs, most of which are governed by the Government. Trialling the indicator on other types of PCAs may therefore reveal different insights into its global applicability. Given that the indicator was only applied to 1.6% of Canada's PAs, applying the indicator to all 9000 PAs would be practically difficult.

Next Steps

This case study has informed development of the MEPCA indicator to improve its global applicability. To ensure that MEPCA indicator questions are interpreted and answered correctly, it is pertinent that the MEPCA indicator guidelines are written as clearly as possible. This is to ensure that assessors fully understand the MEPCA indicator metrics, to make appropriate judgements and select questions from existing PAME assessments that best align. PAME assessment questions that appear suitable at the outset may not always be the best option, as answers may not align, and other PAME assessment questions may be more relevant proxies of information. In the absence of relevant questions, it would be advisable to seek expert judgement or additional sources of information. For example, for metric f) it could be argued that expert judgement would provide more reliable answers than the most suitable question selected from the ECCC PAME assessment.

Several specific recommendations can be made to further develop v0.4 of the MEPCA indicator. It would be useful to add an 'N/A' or 'other' response to metrics a) and b) to account for any PAs that do not conform to the governance and PA type options already

listed. To minimise any inconsistencies in interpretations, it would be beneficial to clarify in the MEPCA indicator guidelines whether PCAs that have shared governance should be categorised as ‘Shared governance’ or whether the primary governor should be selected if one is present. For metric e) on ecological monitoring, the ‘Partial’ option could potentially be removed, if it is considered unlikely that enough information will be provided to ascertain differences between ‘Partial’ and ‘Yes’. The definitions for low, medium and high confidence in metric g) should be broadened and edited to better reflect the level of detail provided by PAME assessments.

It would be useful to add explanations for different outcomes of the MEPCA indicator, so that the indices are easier to interpret. This could involve examining the formula and researching where the appropriate cut off points should be between protected area effectiveness being classed as ‘inadequate’, with ‘deficiencies’ or ‘adequate’.

The lessons learnt from this Canadian case study should be considered alongside those of the other case study areas, as well as examining the types of questions asked in other PAME assessments, such as those in METT-4, is essential to develop the MEPCA globally applicable indicator. This will ensure that the MEPCA global indicator can be interpreted correctly, is non-biased towards different PCA types, governance types, and PAME assessment methods, and is answered reliably so that it can be applied around the world.

4.3 Costa Rica

PCAs and Existing PAME Assessments

Costa Rica has over 160 PCAs, currently accounting for 28.4% of the country’s total terrestrial landmass and 2.7% of its territorial waters. While the majority of PCAs in Costa Rica are managed under a federal governance system, several sites fall under private or joint ownership (Table A 7). The PCAs follow a national categorisation system, which includes “Biological reserves” and “National wildlife refuges”, with IUCN categorisation equivalents for these areas ranging from Ia (Strict Nature Reserve) to VI (Protected area with sustainable use of resources) (Table A 8). The management effectiveness of all PCAs has not yet been assessed.

Table A 7. Number of PAs according to different governance types in Costa Rica in November 2021 (UNEP-WCMC 2021).

PA Governance type	Number of Pas in Costa Rica	Percentage (%) of Pas in Costa Rica
Federal or national ministry or agency	134	81.2
Not reported	18	10.9
Individual landowners	12	7.3
Joint governance	1	0.6

Table A 8. Type and number of IUCN PCAs in Costa Rica in November 2021 (UNEP-WCMC 2021). Other PCAs that do not fall under IUCN categories include Ramsar sites, Biosphere reserves and World Heritage sites.

IUCN PCA category	Number of PCAs in Costa Rica	Percentage (%) of PCAs in Costa Rica
Ia Strict Nature Reserves	10	6.1
Ib Wilderness Areas	1	0.6
II National Parks	42	25.5
III Natural Monument or Features	0	0
IV Habitat/Species Management Areas	32	19.4
V Protected Landscapes/Seascapes	0	0
VI Protected area with sustainable use of natural resources	62	37.6
Not reported	12	7.3
Not applicable	6	3.6

Officially created in 1994, Costa Rica's national environmental agency: Sistema Nacional de Áreas de Conservación (SINAC), part of the Ministry of Environment and Energy, oversees the conservation and sustainable management of the country's wildlife and natural resources, including PCAs. PCAs have a General Management Plan (GMP), which set out the conservation goals, strategies and actions to reduce or eliminate the most important threats, and to secure the sustainable use of the biological and cultural resources, according with the officially declared PA category. To measure the level of implementation of the strategies and actions defined in the GMP, and the impact of those actions, SINAC has conducted their own tailored Costa Rican Protected Area Management Effectiveness (CRPAME) assessment on an annual basis since 2016. The most recent CRPAME assessment was conducted on 73 PAs in 2020.

The CRPAME assessment is based on methodologies from the IUCN World Commission on Protected Areas (WCPA) framework but has a fundamentally different design to the commonly used Management Effectiveness Tracking Tool (METT). The CRPAME assessment consists of 19 non-weighted questions (Table A 9), grouped within three broad themes: "Social management", "Administrative management" and "Natural and cultural resources management". Each question is answered on a scale of between one and four, according to the level of action implemented and its impact. To conduct the CRPAME assessments, a full day workshop is held for each PA, utilising the knowledge of both site managers and all relevant stakeholders. The results are then collated at a regional level and a national level. The overall score for the effectiveness of a PA is based on the average score for all indicators, and a quantitated scale of performance (Table 10).

Table A 9. List of indicators and categories used in CRPAME assessment. (SINAC 2017).

Theme	Indicator Question
Field of Social Management	S1. Patterns and Intensity of Resource Use
	S2. Volunteer Plan
	S3. Communication Plan
	S4. Environmental Education Plan
	S5. Sustainable Tourism Plan
	S6. Participation Strategy
Field of Administrative Management	A1. ASP Boundaries
	A2. Equipment and Infrastructure Maintenance Plan
	A3. Necessary Personnel
	A4. Suitable Team
	A5. Management Infrastructure
	A6. Comprehensive Staff Development Plan
	A7. Information System
	A8. Waste Management Plan
Field of Natural and Cultural Resources Management	R1. Protection Plan
	R2. Research Plan
	R3. Climate Change Adaptation and Mitigation Plan
	R4. Resource Management Plan
	R5. Ecological Integrity

Table A 10. Percentage of the overall score of PCA effectiveness obtained from a CRPAME assessment and the corresponding category.

Percentage (%) of overall score of PA effectiveness	Category
0 - 50	Not acceptable
50 - 60	Almost acceptable
60 - 75	Acceptable
75 - 90	Very good
90- 100	Excellent

The CRPAME assessment method is currently being developed further. PCA managers in Costa Rica are required to complete the CRPAME assessments before PCA budgets are confirmed so many assessments are completed. However, the assessments can be time-consuming, both due to training requirements (including the need to explain questions) and decision-making. As the method has become more established and capacity has increased, the time taken to complete assessments has decreased. Training and workshops may be hosted online in the future, which could also reduce the time and resources required. As CRPAME assessments are currently only conducted on PCAs with management plans and

documentation in place, there is a drive to ensure documentation is in place for all PCAs, so that all PCAs can be assessed. The CRPAME assessment questions currently have no associated weighting, but weighting may be applied in the future to ensure that more relevant questions and those focused on PCA objectives have a greater contribution to the overall score.

Trialling the Indicator

To test the applicability of the MEPCA indicator, we invited the SINAC colleagues to assess which questions from their PAME assessment most appropriately matched each MEPCA indicator metric (if any). SINAC trialled the MEPCA indicator using the questions and scoring that they believed best aligned from their 2020 PAME assessment data, as well as by applying their expert knowledge on 73 additional PAs (146 PAs in total). JNCC held several internal meetings to discuss the SINAC team's rationale and response to each MEPCA indicator metric, and evaluate the indicators used to address each metric in line with the aim of the MEPCA indicator (Table A 11).

Table A 11. MEPCA indicator (v0.4) metrics, their answers and scoring, and the corresponding response from SINAC, including their PAME assessment questions and answers that they believed best conformed. Right columns indicate JNCC’s comments and any proposed changes.

Indicator metrics v0.4	Indicator v0.4 answers and scoring	SINAC team response	JNCC comments
a) What is the governance type of the PA?	<ul style="list-style-type: none"> • Governance by Government • Shared governance • Private governance • Governance by indigenous and local communities 	All PAs included in this pilot had governmental governance.	N/A
b) What is the type of PA?	<ul style="list-style-type: none"> • Ia Strict Nature Reserve • Ib Wilderness Area • II National Park • III Natural Monument or Feature • IV Habitat/Species Management Area • V Protected Landscape/Seascape • VI Protected Area with Sustainable Use of Natural Resources • OECM 	A translation was performed of each PA to its corresponding IUCN category.	We did not receive information on how PA types were translated to IUCN PA equivalents.

Indicator metrics v0.4	Indicator v0.4 answers and scoring	SINAC team response	JNCC comments
c) Is management information documented?	2 = Yes 1 = Partially 0 = No 0 = Unknown	Question was scored according to presence of a GMP and/or implementation of a CRPAME assessment in 2020. 0= PAs with no GMP and that did not apply CRPAME 1 = PAs that have a GMP but did not apply the CRPAME 2 = PAs that have a GMP and applied the CRPAME	Requirement of PAME assessment to achieve full score goes above the requirements of our trial indicator. However, nearly all Costa Rican PAs in this case study met their own highly set standard. If PAs from other countries (including UK) were judged against this high level- they would score poorly.
d) Are management measures being actively implemented?	2 = Yes 1 = Partially 0 = No 0 = Unknown	Nine CRPAME questions (S4, S5, A1, A8, R1, R2, R3, R3, R4, R5; Table A 9) were considered relevant, and the average percentage value of these was calculated and converted to a score.	Several of the nine CRPAME questions were not considered relevant to the overall ecological management of the PA. With no weighting applied, a low score on a less relevant question could unfairly lower the overall average score.
e) Is ecological/environmental monitoring in place?	2 = Yes 1 = Partial 0 = None 0 = Unknown	Expert knowledge of SINAC monitoring programme was used.	Expert judgement was considered most appropriate in absence of relevant CRPAME questions on ecological monitoring. However, it is unclear whether other types of monitoring were included or not.

Indicator metrics v0.4	Indicator v0.4 answers and scoring	SINAC team response	JNCC comments
f) Is the site achieving its conservation objectives?	2 = Fully 1 = Partially 0 = No 0 = Unknown	Overall score of PAME was used as a proxy, then converted to a score.	Although we understand a well-managed PA is needed for a PA to meet its conservation aims, we are not sure using the overall CRPAME score for a PA is appropriate. As the overall scoring takes into equal account the non-ecological values of the PA. A low score in one of these would therefore pull down the overall score for this metric even though it does not relate to the ecological outcomes of the PA.
g) What level of confidence is associated with achievement of conservation objectives?	3 = High 2 = Moderate 1 = Low	The answers to (e) and (f) were used to answer this question, creating a table with (g) values according to the combination of (e) and (f) scores.	This indicator metric addresses the evidence used to answer (f). SINAC's method therefore does not appropriately address the metric. Further guidance and discussion with Costa Rica is needed.
h) Confidence in achievement of conservation objectives.	f*g	N/A	Because of way (g) has been answered, this score essentially represents e*f*f, which is not appropriate.

Using the CRPAME derived answers for each PCA, we applied the MEPCA indicator using the following formula for sites that had a federal governance system. All sites provided by SINAC fell into this governance category and so underwent the same weighting.

$$\text{Index of PCA Effectiveness} = (c * 0.15) + (d * 0.25) + (e * 0.25) + ((f * g) * 0.35)$$

The MEPCA indicator revealed that most sites received low scores of PCA effectiveness, with an average index of 0.37, equating to an average of 10.9% (Figure A 9). Most PCAs assessed fell into the sustainable use of natural resources category (type VI), and several PCA categories (e.g., IUCN categories Ib, III and V) were not present within the country. The MEPCA indicator found that PCAs which generally conformed to stricter conservation requirements (i.e., Strict Nature Reserves and National Parks) generally scored higher in overall PCA effectiveness (Figure A 10).

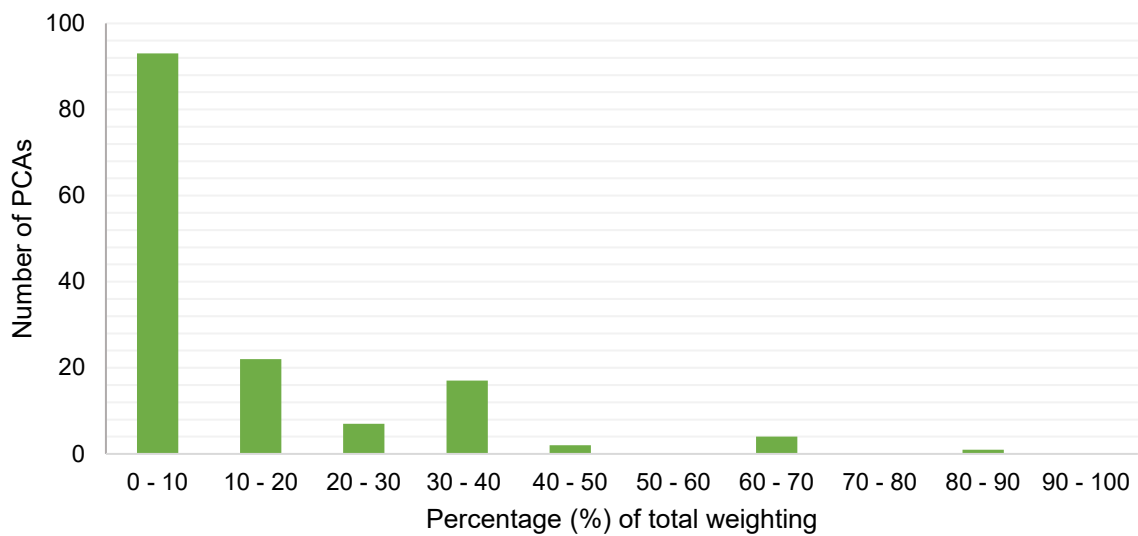


Figure A 9. The frequency distribution showing the number of PCAs with the percentage of total weighting, using the 2020 CRPAME assessment data in the MEPCA indicator (v0.4).

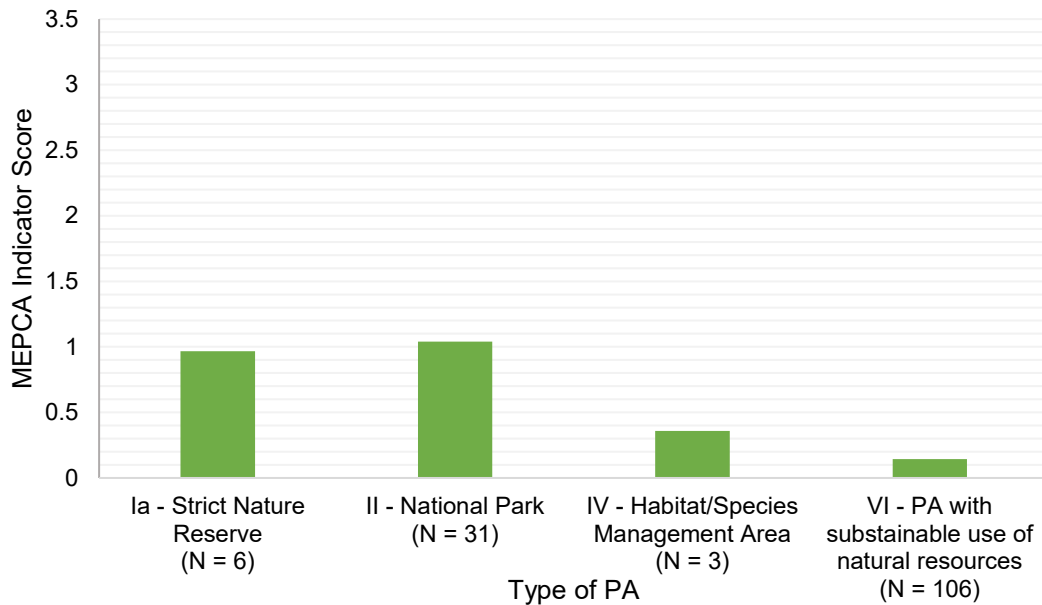


Figure A 10. The average index of PCA effectiveness using the 2020 CRPAME assessment data in the MEPCA (v0.4) indicator.

Challenges Encountered

The main challenge while trialling the CRPAME assessment data in the MEPCA indicator was the difficulties arising around translation and guidance. This was both due to working between two languages and working between a targeted PAME assessment and our broader MEPCA indicator. Following two meetings to work through our request, SINAC applied their CRPAME assessment questions and answers to our MEPCA indicator, however, unfortunately this wasn't always in a way that addressed the aims of the MEPCA indicator, i.e., the questions and answers often did not conform. SINAC's proposed scoring, reflecting how they scored the CRPAME for each answer, did not match up with the proposed MEPCA indicator scoring. This resulted in many PCAs appearing to perform extremely poorly in their PCA effectiveness, which we do not believe accurately reflected Costa Rica's PCAs. For example, SINAC's high standard for PCA achievement led to 97 PAs scoring 0 for metric f) of the MEPCA indicator, as they perceived an overall CRPAME score of < 59% to be categorised as unacceptable. It is likely that information on the PCAs is not being captured accurately in the MEPCA indicator.

Prior to SINAC trialling the indicator, SINAC asked for clarification on the definition on 'monitoring', indicating that there are different interpretations of this word. We therefore added the words 'ecological/environmental' to metric e) to clarify that the indicator addressed biological monitoring, and not monitoring of management (e.g., by PAME assessments). SINAC also requested guidance on how different levels of confidence were defined to address metric g). Although definitions were provided, these were likely too detailed for the level of evidence and information available to SINAC for each PA, and instead SINAC used e) and f) as proxies to address the metric.

Next steps

After SINAC trialled the indicator, it was clear that there were differences between how JNCC had anticipated SINAC would approach addressing each MEPCA indicator metric, and how they actually interpreted the metrics (Table A 11). This indicated that further discussions and guidance will be necessary moving forwards. In particular, Question (f), on achievement of conservation objectives, was especially challenging to answer. As there

were no suitable questions in the CRPAME assessment, SINAC used the overall CRPAME assessment scores to address this metric. However, the outcome considered factors that the question did not need to address (e.g., volunteer plans and presence of adequate IT systems), therefore potentially lowering the scores for some PCAs. From a JNCC point of view, expert opinion may have been better to address this metric, and it will be helpful to discuss this with SINAC to understand whether this was considered, and if it was, why it wasn't taken forward.

Ultimately, this case study has demonstrated how focusing on respondents mainly using their current PAME assessment to feed into a universal indicator may complicate the process rather than save respondents' time. This is because PAME assessments that have been tailored to individual countries, and governance styles cannot always be suitably translated to fit the indicator metrics.

4.4 Overseas Territories: Saint Helena

PCAs and Existing PAME Assessments

The island of Saint Helena, Ascension Island and Tristan da Cunha archipelago are situated in the South Atlantic Ocean, mid-way between Africa and South America. To protect terrestrial and marine environments, 15 PCAs have been designated in Saint Helena, Ascension, and Tristan da Cunha, covering 37.7 % of land and 96.5 % of coastal and marine areas (UNEP-WCMC 2022). 12 of these PCAs are governed by a federal or national ministry or agency, while governance of the remaining three PCAs has not been reported. The PCAs are classified into several management categories, with half of the PAs classed as category IV: Habitat/Species Management Areas (Table A 12). Saint Helena, Ascension Island and Tristan da Cunha archipelago participate in the Blue Belt programme, which aims to strengthen the protection of marine environments in UK Overseas Territories.

Table A 12. IUCN PCA category and number of PCAs in Saint Helena, Ascension, and Tristan da Cunha in March 2022 (UNEP-WCMC 2022 and Marine Conservation Institute 2022).

Note: data on some PAs have not been made publicly available.

IUCN PCA category	Number of PCAs in Saint Helena, Ascension, and Tristan da Cunha	Percentage (%) of PCAs in Saint Helena, Ascension, and Tristan da Cunha
Ia Strict Nature Reserves	2	13.3
IV Habitat/Species Management Areas	6	40
V Protected Landscapes/Seascapes	1	6.6
VI Protected Area with Sustainable Use of Natural Resources	1	6.6
Not Reported	3	20
Not Applicable	1	6.6
Not Assigned	1	6.6

This case study focuses on the Saint Helena MPA, which was designated in 2016 with the primary goal 'to conserve the marine environment and its associated biodiversity, habitats, and ecosystems' (Saint Helena Government 2016). The MPA encompasses the 200 nautical mile zone around Saint Helena, covering an area of 444.92 km² and represents 28% of the

total protected marine area in Saint Helena, Ascension, and Tristan da Cunha (Saint Helena Government 2016). Saint Helena MPA is governed by the Saint Helena Government and is classified as an IUCN category VI PA: a PA with sustainable use of natural resources. Marine activities and resource use are permitted within the MPA but are carefully managed by considering sustainability and cultural values. For example, this includes ensuring tourism operators and fisheries abide by license conditions to reduce their impact. The Environmental Protection Ordinance (EPO) have legislative authority over the management plan for the MPA, which aims to meet commitments made both locally and in multi-lateral environmental agreements. The MPA management plan has several objectives for the MPA:

- To protect natural ecosystems and use natural resources sustainably;
- To conserve marine biodiversity and ecosystems, protecting in particular rare, endangered, globally significant and endemic species;
- To sustainably manage the marine natural resources of St Helena including fisheries and mineral extraction with minimum impact on species abundance, diversity and habitats;
- To manage marine tourism and construction in or near the marine environment to minimise impacts on the marine environment, especially in the face of increasing pressures with economic development;
- To safeguard benthic flora and fauna from the damaging impacts of bottom trawling;
- To protect the natural species assemblages by preventing the introduction of non-native marine species through management of marine species imports;
- To promote education, nature appreciation and scientific research on the biological, geophysical and cultural values of the marine environment.'

The MPA management plan is currently being reviewed and developed further. As an aspect of the Blue Belt Programme, Saint Helena participated in a roundtable discussion on PAME assessments in 2021 (Blue Belt Programme 2021). They also completed a PAME assessment in early 2022 using the METT-4 methodology to determine whether the site is being effectively managed and inform review of the Saint Helena MPA management plan.

Trialling the Indicator

To test the MEPCA indicator (v0.4) and inform its further development, the indicator was emailed in its Excel format to the Saint Helena Government, who were invited to answer the metrics and provide any feedback on use of the indicator.

The MEPCA indicator (v0.4) provided an index of PCA effectiveness using a formula that applied weightings to scores obtained for metrics c) to g). As the Saint Helena MPA is governed by Government, the following formula was applied:

$$\text{Index of PCA Effectiveness} = (c * 0.15) + (d * 0.25) + (e * 0.25) + ((f * g) * 0.35)$$

A colleague within the Environment, Natural Resources and Planning Portfolio (ENRP) department at Saint Helena Government answered the metrics using expert judgement from their personal knowledge and experience (Table A 13).

Table A 13. MEPCA indicator (v0.4) metrics, their answers and scoring, and the corresponding response from Saint Helena Government.

Indicator metrics v0.4	Indicator v0.4 answers and scoring	Saint Helena Government response
a) What is the governance type of the PA?	<ul style="list-style-type: none"> • Governance by Government • Shared governance • Private governance • Governance by indigenous and local communities 	Governance by Government
b) What is the type of PA?	<ul style="list-style-type: none"> • Ia Strict Nature Reserve • Ib Wilderness Area • II National Park • III Natural Monument or Feature • IV Habitat/Species Management Area • V Protected Landscape/Seascape • VI Protected Area with Sustainable Use of Natural Resources • OECM 	VI Protected Area with Sustainable Use of Natural Resources
c) Is management information documented?	2 = Yes 1 = Partially 0 = No 0 = Unknown	2 = Yes
d) Are management measures being actively implemented?	2 = Yes 1 = Partially 0 = No 0 = Unknown	1 = Partially
e) Is ecological/environmental monitoring in place?	2 = Yes 1 = Partially 0 = No 0 = Unknown	2 = Yes
f) Is the site achieving its conservation objectives?	2 = Fully 1 = Partially 0 = No 0 = Unknown	2 = Yes
g) What level of confidence is associated with achievement of conservation objectives?	3 = High 2 = Moderate 1 = Low	2 = Moderate
h) Confidence in achievement of conservation objectives.	f*g	4

The index of PCA effectiveness for the Saint Helena MPA was 2.4, representing 70.6% of the total possible score (of 3.4). Despite management measures only being partially implemented, the maximum possible score was recorded for all other metrics and the PCA was considered fully effective at achieving its conservation objectives.

Challenges Encountered

No challenges were expressed by the Government of Saint Helena in using v0.4 of the indicator; the Excel spreadsheet was considered quick and simple, and the guidance helpful and logical. Having only recently completed the METT-4 PAME assessment, the Government of Saint Helena found the indicator quick to fill in, potentially because their understanding on management effectiveness of the PCA was at the forefront of their mind. It should be noted, however, that only one person from the Government of Saint Helena addressed the metrics, which potentially biased the results to one person's views and opinions.

Next Steps

To minimise any bias and subjectivity, clear guidance should be developed in v0.5 of the indicator, to ensure that a range of people's views are considered when addressing the metrics. For each PCA being assessed, views from more than one person from the relevant management authority and as many different stakeholders as possible (e.g., fishers and NGOs) should be considered. This is particularly important when answering metric f) about whether the site is achieving its goals and objectives, as people may have different views based on their respective knowledge and experiences with the PCA.

Given that the Government of Saint Helena found the indicator quick and simple to fill in having recently completed a METT-4 PAME assessment, the indicator guidance could recommend that the indicator is filled in as a quick 'add-on' when completing a more detailed PAME assessment. This would improve consistency between the PAME responses and indicator responses and could ensure that indicator metrics are answered more reliably, as issues are addressed in finer detail during PAME assessments. When a variety of stakeholders are involved in completing a PAME assessment, completing the MEPCA indicator at the same time would also be an easy method to account for a range of people's views.

4.5 Overseas Territories: British Indian Ocean Territory (BIOT)

PCAs and Existing PAME Assessments

BIOT, also known as the Chagos archipelago, is a group of seven atolls and 58 islands situated in the Indian Ocean, south of the Maldives. It is administered by the BIOT Administration. The BIOT Commissioner designated one large MPA, covering 640,000 km², in 2010 as an IUCN category Ib 'no-take' MPA to protect the high biodiversity and near-pristine coral reefs. The MPA is managed by the BIOT Administration. Diego Garcia, the largest island, hosts a joint UK-US military facility with about 3,000 temporary personnel. Low-level recreational fishing is permitted in the MPA, which particularly occurs around Diego Garcia, but commercial fishing and extractive activities are prohibited. The BIOT Administration have developed 11 conservation and environmental priorities for the BIOT MPA:

- Combating Illegal, Unregulated and Unreported (IUU) fishing in BIOT;
- Managing the impact of Fish Aggregating Devices and Lost and Abandoned Fishing Gear;
- Ensuring that visiting vessels do not harm BIOT's unique environment;

- Eradicating invasive rats which threaten native seabird populations, and impact the delicate balance of BIOT's ecosystem;
- Sustainably managing the recreational fishing allowed in the Territory;
- Protecting BIOT from invasive flora and fauna;
- Ensuring the highest possible level of environmental protocols within the Territory;
- Developing new methods for managing waste and combating plastic pollution;
- Understanding and mitigating against the effects of global climate change where possible;
- Understanding more about BIOT's unique terrestrial environment;
- Studying our key species and habitats to ensure we are providing the best protection and stewardship.

BIOT is part of the Blue Belt programme, which aims to strengthen the protection of marine environments in UK Overseas Territories. As an aspect of the programme, BIOT participated in a roundtable discussion on PAME assessments in 2021 (Blue Belt Programme 2021). During this discussion, the BIOT Administration noted that a PA effectiveness tracking tool would be useful in years to come and will be incorporated into plans (Blue Belt Programme 2021). It is therefore likely that the BIOT Administration will complete PAME assessments in future.

Trialling the Indicator

To test the MEPCA indicator (v0.4) and inform its further development, the indicator was emailed in its Excel format to the BIOT Administration, who were invited to answer the metrics and provide any feedback.

The MEPCA indicator (v0.4) provided an index of PCA effectiveness using a formula that applied weightings to scores obtained for metrics c) to g). The following formula was applied:

$$\text{Index of PCA Effectiveness} = (c * 0.15) + (d * 0.25) + (e * 0.25) + ((f * g) * 0.35)$$

Three personnel, the Deputy Administrator, Environment Office and Chief Scientific Advisor, from within the BIOT Administration answered the metrics using expert judgement from their personal knowledge and experience (Table A 14).

Table A 14. MEPCA indicator (v0.4) metrics, possible answers and scoring, and the corresponding response from BIOT Administration.

Indicator metrics v0.4	Indicator v0.4 answers and scoring	Response from the BIOT Administration
a) What is the governance type of the PA?	<ul style="list-style-type: none"> • Governance by Government • Shared governance • Private governance • Governance by indigenous and local communities 	Governance by Government
b) What is the type of PA?	<ul style="list-style-type: none"> • Ia Strict Nature Reserve • Ib Wilderness Area • II National Park • III Natural Monument or Feature • IV Habitat/Species Management Area • V Protected Landscape/Seascape • VI Protected Area with Sustainable Use of Natural Resources • OECM 	Ib Wilderness Area
c) Is management information documented?	2 = Yes 1 = Partially 0 = No 0 = Unknown	2 = Yes
d) Are management measures being actively implemented?	2 = Yes 1 = Partially 0 = No 0 = Unknown	2 = Yes
e) Is ecological/environmental monitoring in place?	2 = Yes 1 = Partial 0 = None 0 = Unknown	1 = Partial
f) Is the site achieving its conservation objectives?	2 = Fully 1 = Partially 0 = No 0 = Unknown	1 = Partially

Indicator metrics v0.4	Indicator v0.4 answers and scoring	Response from the BIOT Administration
g) What level of confidence is associated with achievement of conservation objectives?	3 = High 2 = Moderate 1 = Low	3 = High
h) Confidence in achievement of conservation objectives.	f*g	3

The index of PCA effectiveness for the BIOT MPA was 2.1, representing 61.8% of the total possible score (of 3.4). Management measures were considered as actively being implemented, and although ecological/environmental monitoring was only partially in place, the BIOT Administration had high confidence that the site was partially achieving its conservation objectives.

Challenges Encountered

The BIOT Administration completed the indicator spreadsheet quickly but expressed that they struggled with the metrics and felt that some of the scores were somewhat arguable. They noted that most of BIOT is uninhabited and so there are minimal human impacts, and management is 'pretty hands off'. They expressed that any achievement of conservation objectives is therefore likely due to the lack of human activities, rather than effective (active) management. The Chief Scientific Advisor expressed concerns that large MPAs are unlikely to ever score the highest score as they tend to face impacts such as Illegal, Unreported and Unrelated (IUU) fishing, and that 'partially' achieving conservation objectives (metric f)) undermined the value of such sites. These concerns should be fully considered in v0.5 of the MEPCA indicator.

Next Steps

The level of human activities occurring in the site and whether active management is required to achieve conservation objectives, could be included in the indicator by altering metric d). For example, the wording could be changed from 'Are management measures being actively implemented?' to 'Are management measures being activity implemented, if needed, for the site to achieve its conservation objectives?'. This changes the focus from having any form of management in place, to having management that addresses the PA's conservation objectives – which should relate to the level of human activities occurring in the site. Further consideration is also required on whether large sites should be treated slightly differently to small sites. For example, for metric f), larger PAs could be given a higher score for partially achieving their conservation objectives. However, treating large and small sites differently could create more concerns and questions. A cut-off point in size would have to be established between small and large PCAs which would be considered arbitrary. Not all large PCAs will have less resources (per area) than small PCAs, and so inaccurate assumptions could be made. Small and large PCAs also have the same overall goal of achieving their conservation objectives – the goals of which may already differ and be tailored to the PCA's size.

4.6 Scotland

PCAs and PAME Assessments

Scotland, which forms part of the United Kingdom, is a country with an extensive network of terrestrial and marine protected areas. The marine environment in Scotland has a total of 245 MPAs within its Exclusive Economic Zone (as of 2022), covering a total of 37% of Scotland's seas¹. A total of 231 of Scotland's PAs are established for conservation purposes, with the 14 additional sites listed either as Other Effective Area- based Conservation Measures (OECMs, demonstration and research MPAs or historic MPAs (Table A 15). The administration and management of Scotland's MPAs is conducted by Marine Scotland, a subsidiary body of the Scottish Government. Advice on the conservation of Scotland's seas is provided by Nature Scot and JNCC; both independent statutory advisors on nature conservation matters to the Scottish Government.

Table A 15. IUCN PCA categories for MPAs in Scotland.

IUCN PCA category	Number of MPAs in Scotland
Marine protected areas (IUCN Cat 1a-VI) ⁴	230
Demonstration & Research MPA (Fair Isles).	1
Historic MPAs	8
OECMs	5

The aim of this case study was to test the applicability of v0.51 of the MEPCA indicator to assess Other Effective Area-based Conservation Measures (OECMs) in Scotland's seas. As set out under the CBD, the primary objective of areas recognised as OECMs does not necessarily need to be conservation, but the management in place must result in the achievement of long term and effective *in-situ* conservation benefits to biodiversity. Scotland, in coordination with the OSPAR Commission, has recommended five OECMs in their waters, which were all created with the primary aim of protecting fish stocks such as sandeel (*Ammodytes marinus*, *Ammodytes tobianus*) or seabed habitats for the purposes of protecting juvenile commercially important fish stocks (Table A 16), with biodiversity conservation benefits representing a secondary outcome.

Table A 16. List of OECMs recognised in Scottish waters (2022).

OECM	Type	Size (km ²)	Feature(s) protected
Blue Ling West of Scotland	Fisheries closure	5,899.1	<i>Molva dypterygia</i>
Closed Area Sea Fisheries Order 2012 No. 2571	Fisheries closure	105.3	<i>Modiolus modiolus</i> beds
East Coast of Scotland (Sandeels) Closure	Fisheries closure	21,352.1	<i>Rissa tridactyla</i> <i>Ammodytes marinus</i> <i>Ammodytes tobianus</i>

⁴ 35 Nature Conservation MPAs (NCMPAs), 58 Special Areas of Conservation (SACs), 56 Special Protection Areas (SPAs), 56 Sites of Special Scientific Interest (SSSIs), 16 Ramsar sites, 9 sites of unknown designation.

OECM	Type	Size (km ²)	Feature(s) protected
Rosemary Bank (Blue Ling)	Fisheries closure	8,954.9	Molva dypterygia
West Rockall Mound	Fisheries closure	5,125.0	A6.1 Deep-sea rock and artificial hard substrata A6.2 Deep-sea mixed substrata A6.4 Deep-sea muddy sand A6.5 Deep-sea mud

The Scottish Fair Isles³ site designated as a “Demonstration & Research MPA” (DR MPA) was also tested with the MEPCA indicator. In Scotland, DR MPAs are designated for the purpose of demonstrating or carrying out research on sustainable methods of marine management or exploitation in Scottish territorial waters, with their purpose not being restricted to nature conservation. Though formally classified as a PA, the DR MPA management approach aligns with the objectives of an OECM, with both designations allowing for management purposes beyond nature conservation.

Trialling the Indicator

Working with the organisation Marine Scotland, who oversee the management of MPAs in the country, a presentation on use of v0.51 indicator was given and copies of the v0.51 excel document were emailed out for assessments to be completed on the five OECMs and one DR MPA. The MEPCA indicator assessments were completed by the Scotland team using expert knowledge and information gathered through undertaking similar evaluations in the form of OSPAR management status assessments (Section 2.2). Feedback on the functionality and applicability of the indicator was also requested, for use in further developments of the MEPCA indicator.

All OECM sites used in the Scotland study were classified by Marine Scotland as “governed by government” in metric a) of the MEPCA indicator. The weighting formula for to their scores was therefore applied as:

$$\text{Index of PCA Effectiveness} = (c * 0.15) + (d * 0.25) + (e*0.25) + ((f * g)*0.35)$$

The Fair Isle DR MPA was assessed as being a “shared governance” site between community and government. As per definitions of governance in v0.5 of the indicator, even if community plays a role in the management and oversight of the PCA, the government commitment to the site will mean that the score weighting applied is the same as for a solely “governed by government” area.

For area categorisation in metric b), OECMs were clear to classify within the options. The DR MPA was selected as conforming to the category of “Protected Area with Sustainable Use of Natural Resources” (Category VI, IUCN index).

For metrics c) – g), all OECM sites received the same scores for each individual metric (Table A 17), and overall, each received a score of 22% of maximum total (0.75 out of 3.4). The only metrics where no/unknown (0) was not inputted were for d) and e), regarding the implementation of management measures and ecological/environmental monitoring provision respectively. Additional provided by the Marine Scotland team for these scores indicated that no management documentation existed for these OECMs. For metric f), where 0 was given for sites, it was unknown if evidence existed that indicated if conservation outcomes were being achieved.

Table A 17. MEPCA indicator score for all OECMs as reviewed by Marine Scotland.

Indicator metrics v0.51	Indicator v0.51 answers and scoring	Outcome for all Scottish OECMS
a) What is the governance type of the PA?	<ul style="list-style-type: none"> • Governance by Government • Shared governance • Private governance • Governance by indigenous and local communities • Unknown • Other 	Governance by Government
b) What is the type of PA?	<ul style="list-style-type: none"> • Ia Strict Nature Reserve • Ib Wilderness Area • II National Park • III Natural Monument or Feature • IV Habitat/Species Management Area • V Protected Landscape/Seascape • VI Protected Area with Sustainable Use of Natural Resources • OECM • Other 	OECM
c) Is management information documented?	2 = Yes 1 = Partially 0 = No 0 = Unknown	0 (No/unknown)
d) Are management measures being actively implemented, if needed, for the site to achieve its conservation objectives?	2 = Yes 1 = Partially 0 = No 0 = Unknown	2 (Yes)
e) Is ecological/environmental monitoring in place?	2 = Yes 1 = Partial 0 = None 0 = Unknown	1 (Partial)
f) Is the site achieving its	2 = Fully 1 = Partially	0 (No/unknown)

Indicator metrics v0.51	Indicator v0.51 answers and scoring	Outcome for all Scottish OECMS
conservation objectives?	0 = No 0 = Unknown	
g) What level of confidence is associated with achievement of conservation objectives?	3 = High 2 = Moderate 1 = Low 0 = Not applicable	0 (Not applicable)
h) Confidence in achievement of conservation objectives.	f*g	0
Index of PCA effectiveness		0.75 (22%)

For the DR MPA, responses (Table A 18) to metrics c) – g) were accompanied by explanations from the Marine Scotland team and Nature Scot site manager, including links to management plans and associated research institutions. Where scores were 0 it was made clear that the age of the DR MPA (which was only designated in 2021) is the reason for low scoring. The consensus was that the overall score of 44% of maximum total (1.5 out of 3.4) would improve in subsequent years if the area was retested. The Nature Scot DR MPA manager noted that the MEPCA indicator was easy to fill and add contextual comments as needed.

Table A 18. MEPCA indicator scores for the Fair Isles DR MPA, assessed by Nature Scot and reviewed by Marine Scotland.

Indicator metrics v0.51	Indicator v0.51 answers and scoring	Fair Isles DR MPA
a) What is the governance type of the PA?	<ul style="list-style-type: none"> • Governance by Government • Shared governance • Private governance • Governance by indigenous and local communities • Unknown • Other 	Shared governance
b) What is the type of PA?	<ul style="list-style-type: none"> • Ia Strict Nature Reserve • Ib Wilderness Area • II National Park • III Natural Monument or Feature • IV Habitat/Species Management Area • V Protected Landscape/Seascape 	VI Protected Area with Sustainable Use of Natural Resources

Indicator metrics v0.51	Indicator v0.51 answers and scoring	Fair Isles DR MPA
	<ul style="list-style-type: none"> • VI Protected Area with Sustainable Use of Natural Resources • OECM • Other 	
c) Is management information documented?	2 = Yes 1 = Partially 0 = No 0 = Unknown	2 (Yes)
d) Are management measures being actively implemented, if needed, for the site to achieve its conservation objectives?	2 = Yes 1 = Partially 0 = No 0 = Unknown	0 (No/unknown)
e) Is ecological/environmental monitoring in place?	2 = Yes 1 = Partial 0 = None 0 = Unknown	2 (Yes) 1 (Partial)
f) Is the site achieving its conservation objectives?	2 = Fully 1 = Partially 0 = No 0 = Unknown	1 (Partial)
g) What level of confidence is associated with achievement of conservation objectives?	3 = High 2 = Moderate 1 = Low 0 = Not applicable	2 (High)
h) Confidence in achievement of conservation objectives.	f*g	2
Index of PC effectiveness	-	1.5 (44%)

Challenges Encountered

Some difficulties were encountered in getting indicator feedback. For the DR MPA the area manager fully understood the indicator and was able to express all answers for the PA, additionally providing comments and feedback to metric scores given. The Scotland OECM results had very little feedback provided alongside the scores, so it was unknown if any alterations to the indicator would be preferred. This indicates that it may be beneficial to have further discussions with the Marine Scotland team to ensure that answers were fully understood. Further discussions with the NatureScot team on the OECM outcomes would be beneficial.

Next Steps

While OECMs were specifically sought out to be tested against the MEPCA indicator in this case study, further work with authorities responsible for their regulation and/or management would be useful to further develop and test the MEPCA indicator in terms of its applicability to OECMs across both marine and terrestrial environments.

4.7 Australia

PCAs and Existing PAME Assessments

Australia has 11,149 PCAs in total, covering 20.36% of terrestrial and inland waters and 44.34% of marine and coastal areas (UNEP-WCMC 2022). These PCAs have a range of difference governance structures, but over two thirds of PCAs are governed by sub-national ministries or agencies (Table A 19). The three most common types of PCAs include Category IV Habitat/Species management areas, Category 1a Strict Nature Reserves, and Category III National Monuments or Features (Table A 20) in accordance with IUCN PA categories.

Table A 19. Number of PCAs according to different governance types in Australia in November 2022 (UNEP-WCMC 2022).

PCA Governance type	Number of PCAs in Australia	Percentage of PCAs in Australia (%)
Sub-national ministry or agency	7,584	68.0
Joint governance	1,811	16.2
Individual landowners	1,456	13.1
Not reported	81	0.7
Non-profit organisations	77	0.7
Indigenous peoples	77	0.7
Federal or national ministry or agency	63	0.6

Table A 20. Type and number of IUCN PCAs in Australia in November 2022 (UNEP-WCMC 2022).

IUCN PCA category	Number of PCAs in Australia	Percentage of PCAs in Australia (%)
Category Ia Strict Nature Reserves	2,544	22.8
Category Ib Wilderness Areas	77	0.7
Category II National Parks	1,157	10.4
Category III National Monuments or Features	2,402	21.5
Category IV Habitat/Species Management Areas	2,858	25.6
Category V Protected Landscapes/Seascapes	366	3.28
Category VI Protected Areas with Sustainable use of Natural Resources	1,461	13.1
Not reported	71	0.64
Not applicable	19	0.17
Not assigned	194	1.74

The aim of this case study was to test the MEPCA indicator on community led PCAs to assess its applicability. Australia has many community-led PCAs, including 81 Indigenous Protected Areas (IPAs) covering over 85,000,000 hectares (NIAA 2022). IPAs can be both terrestrial and marine. They are managed by indigenous groups, according to the traditional owners' objectives and through voluntary agreements with the Australian Government. Most IPAs are classed as Category V Protected Landscapes/Seascapes or Category VI Protected Areas with Sustainable use of Natural Resources (NIAA 2022). IPAs are supported by funding agreements and may additionally be supported by income-generating activities, the private sector, charities and other organisations. They aim to deliver social, cultural and economic benefits for local indigenous communities by balancing conservation with other sustainable uses (NIAA 2022).

The Department of Climate Change, Energy, the Environment and Water is a department of the Australian Government that lead Australia's response to climate change and sustainable energy use, and protect the environment, heritage and water. This includes leading work on Australia's PCAs.

Trialling the Indicator

To test the MEPCA indicator (v0.5) on its applicability to community led PCAs, the indicator was emailed in its Excel format to representatives from the Department of Climate Change, Energy, the Environment and Water. Representatives were asked to email the indicator to IPA managers to test the indicator and gather feedback. Prior to sending the spreadsheet to IPA managers, representatives from the department suggested altering the wording of possible responses to metric c): Is management information documented?

Representatives explained that the Australia Government's IPA funding agreements require IPA managers to have the following two sets of management documentation in place:

- An IPA Plan of Management and a Monitoring, Evaluation, Reporting and Improvement (MERI) Plan; and
- Annual work/project plans, with half and full year reports against each annual work/project plan.

However, the Australian Government does not currently make the documents publicly available. Only about one-third of IPA providers make their plans of management publicly available, and only a limited number make their annual work plans/reports publicly available. Many IPA managers would therefore be unable to provide a clear response to metric c), as they have management documentation in use (a 'Yes' response) but the documentation is not publicly available (a 'Partially' or 'No' response).

Many IPA managers do not make management plans and reports publicly available because they contain sensitive cultural information. Some plans may identify sacred places or traditional decision-making processes that should not be shared widely. Plans may contain images of people, paintings and landmarks, and there is concern that images may be copied and used if the plan is available online. When a person passes away, there is often a cultural requirement that their image is removed from use for a number of years, which would be difficult to ensure if an image of the person is publicly available.

These valuable insights were used to develop the indicator from v0.5 to v0.51, by removing the need for management documentation to be made publicly available in metric c). This involved altering possible response 'The site has management documentation that is in use and publicly available' to 'The site has management documentation that is in use' and altering 'The site has no associated management documentation that is in use or publicly available' to 'The site has no associated management documentation that is in use'.

For IPA managers to test v0.51 of the MEPCA indicator directly, representatives from the Department of Climate Change, Energy, the Environment and Water emailed the indicator in its Excel format to IPA managers and invited IPA managers to fill in the spreadsheet and share any feedback. IPA managers used expert judgement from their personal knowledge and experience of each site, to complete the indicator (Table A 21).

The MEPCA indicator provided an index of PCA effectiveness using a formula that applied weightings to scores obtained for metrics c) to g). As the Australian PCAs used in this case study were community-led, the following formula was applied:

$$\text{Index of PCA Effectiveness} = (c * 0.10) + (d * 0.30) + (e * 0.25) + ((f * g) * 0.35)$$

Table A 21. MEPCA indicator (v0.51) metrics, possible responses and scoring, and the corresponding response from IPA managers.

Indicator metrics v0.51	Indicator v0.51 answers and scoring	Response for Anangu Tjutaku IPA	Response for Karajarri IPA	Response for Minyumai IPA	Response for Ngururrpa IPA
a) What is the governance type of the PA?	<ul style="list-style-type: none"> • Governance by Government • Shared governance • Private governance • Governance by indigenous and local communities • Unknown • Other 	Governance by indigenous and local communities	Governance by indigenous and local communities	Governance by indigenous and local communities	Governance by indigenous and local communities
b) What is the type of PA?	<ul style="list-style-type: none"> • Ia Strict Nature Reserve • Ib Wilderness Area • II National Park • III Natural Monument or Feature • IV Habitat/Species Management Area • V Protected Landscape/Seascape • VI Protected Area with Sustainable Use of Natural Resources • OECM • Other 	VI Protected Area with Sustainable Use of Natural Resources	VI Protected Area with Sustainable Use of Natural Resources II National Park	IV Habitat/Species Management Area	VI Protected Area with Sustainable Use of Natural Resources

Indicator metrics v0.51	Indicator v0.51 answers and scoring	Response for Anangu Tjutaku IPA	Response for Karajarri IPA	Response for Minyumai IPA	Response for Ngururrpa IPA
c) Is management information documented?	2 = Yes 1 = Partially 0 = No 0 = Unknown	2 = Yes	2 = Yes	2 = Yes	2 = Yes
d) Are management measures being actively implemented, if needed, for the site to achieve its conservation objectives?	2 = Yes 1 = Partially 0 = No 0 = Unknown	2 = Yes	2 = Yes	1 = Partially	2 = Yes
e) Is ecological/environmental monitoring in place?	2 = Yes 1 = Partial 0 = None 0 = Unknown	1 = Partial	2 = Yes	1 = Partial	2 = Yes
f) Is the site achieving its conservation objectives?	2 = Fully 1 = Partially 0 = No 0 = Unknown	1 = Partially	2 = Fully	1 = Partially	1 = Partially
g) What level of confidence is associated with achievement of conservation objectives?	3 = High 2 = Moderate 1 = Low 0 = Not applicable	1 = Low	2 = Moderate	2 = Moderate	3 = High

Indicator metrics v0.51	Indicator v0.51 answers and scoring	Response for Anangu Tjutaku IPA	Response for Karajarri IPA	Response for Minyumai IPA	Response for Ngururrpa IPA
h) Confidence in achievement of conservation objectives.	f*g	1	4	2	3
Index of PCA effectiveness		1.4 41%	2.7 79%	1.45 42%	2.35 69%

The index of PCA effectiveness ranged from 1.45 to 2.7 and averaged 2 among the four IPAs. The approach to PA management documentation and implementation of measures appeared relatively consistent among the four IPAs, which all have documentation and measures in place. Ecological/environmental monitoring was partially or fully in place across all IPAs, and all IPAs were partially or fully achieving their conservation objectives. However, the level of confidence associated with achievement of conservation objectives ranged between low and high. These findings reveal that even if management documentation is not made publicly available, the four IPAs were still considered to be partially or fully achieving their conservation objectives or outcomes. Making management information publicly available is therefore not a necessity of successful PCA management, confirming the need to remove the words 'publicly available' from metric c).

This index of PCA effectiveness would have ranged from 1.4 to 2.7 and averaged 2 had the Government-led formula had been applied instead of the Community-led formula. The impact of using different weightings for Government-led and Community-led PCAs therefore had only a minor effect on the overall score of the IPAs used in this case study, as scoring were the same for metric c) and d) for all IPAs except Minyumi.

Challenges Encountered

Several challenges were encountered when IPA managers tested v0.51 of the MEPCA indicator. One IPA manager selected two types of PCA for metric b), which JNCC had not previously considered. Two categories were chosen because some IPAs adopt multiple IUCN PA categories. This is because some IPAs are multi-tenure so a section of the IPA may be located on indigenous owned/controlled lands, while another section may be located on other tenures such as national parks (where the relevant state/territory government has put in place *Shared Governance* arrangements). Most IPAs are Category VI PAs as they allow sustainable use of natural resources, which is consistent with communities being located within or nearby an IPA. However, some IPAs are assigned PA categories II, III, IV and/or V over at least part of the IPA.

Some IPA managers commented that while they had a strong interest in management effectiveness, they didn't have enough time to read the JNCC report and consider the indicator properly. This reflects the fact that many IPA managers are in remote small communities and often work at day and night on IPA issues, as well as other unrelated issues.

Some IPA managers were unsure whether to answer the metrics d) and e) on management measures and monitoring with a 'Yes' or a 'Partial' response. The representative at the Department of Climate Change, Energy, the Environment and Water informed JNCC that many IPAs are extremely large (i.e., millions of hectares in size), with only 5 to 10 IPA managers (indigenous rangers, or equivalent roles) in place. Monitoring and management actions are therefore often triaged under traditional owners' directions, and according to critical environmental problems (e.g., major infestations of a weed of national significance). While ideally more management and monitoring would be in place at IPAs, if six or more of the most crucial environmental issues are being adequately addressed or monitored, then IPA managers would be more likely to state that 'Yes' adequate management and monitoring was in place.

All four IPA managers applied the 'Government-led' formulas to the metrics in the spreadsheet, instead of applying the 'Community-led' formulas, which JNCC then corrected. This highlighted that it is currently unclear which formula should be applied when users complete the spreadsheet themselves.

Next Steps

To develop the indicator further, the indicator spreadsheet should be updated to ensure that users only select one response option from metrics c) – g). More than one option could be granted to metric b), since PCAs may fall into more than one category of PCA type. Conditional formatting should also be added, to ensure that the correct formula is applied to calculate the index of PCA effectiveness according to the PCA governance type, i.e., Government-led or Community-led.

Clear and concise guidance should also be developed to fully inform the users completing the spreadsheet, minimise any uncertainty, and ensure the spreadsheet is completed consistently. Ensuring the guidance can be read in a short timeframe will be important so that users feel they have enough time to read and consider the guidance effectively before completing the spreadsheet. To clarify which response should be completed for metrics, the guidance document should inform users that the answers should be based on best evidence or their knowledge and understanding. For example, whether users answer 'Yes' or 'Partial' for metrics c) and d), depends on what the managers consider as 'adequate' for their particular PCA.

The MEPCA indicator should be tested on sites in additional countries to further develop its global applicability to community led PCAs.

5 Management Effectiveness of Protected & Conserved Areas (MEPCA) Indicator Workshop Report

To further develop the MEPCA indicator (v0.52 to v0.6), JNCC worked with the CBD Secretariat to invite participants to a virtual workshop held on two separate occasions to maximise global attendance (31st October and 2nd November 2022). A summary of the report can be found in Section 3.3.3 of Volume I of this report. See a link to the full report below:

- [Management Effectiveness of Protected & Conserved Areas \(MEPCA\) Indicator Workshop Report \(.pdf\)](#)

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