Ocean Country Partnership Programme

Supplementary Material Accompanying the Strategic Roadmap for the Implementation of Marine Protected Areas in Ghana

February 2026

GFRA

UK International Development

Partnership | Progress | Prosperity

For further information please contact:
Joint Nature Conservation Committee
Quay House
2 East Station Road
Fletton Quays
Peterborough
PE2 8YY
https://jncc.gov.uk/our-work/ocean-country-partnership-programme/
Communications@jncc.gov.uk

This report should be cited as:
Ocean Country Partnership Programme. 2026. Supplementary Material Accompanying the Strategic Roadmap for the Implementation of Marine Protected Areas in Ghana.

Authors: Stephanie Clarkson, Lindsay Grant, Christina Wood, Laura Dozier, Socrates Segbor, Baviina Safia Musah

Evidence Quality Assurance:
This report is compliant with JNCC's Evidence Quality Assurance Policy
https://jncc.gov.uk/about-jncc/corporate-information/evidence-quality-assurance/

Funding Acknowledgement:

This project was funded with UK International Development from the UK Government through the Blue Planet Fund.

Ocean Country Partnership Programme:

The Ocean Country Partnership Programme (OCPP) is a UK Government-led programme delivered under the Blue Planet Fund in Overseas Development Assistance (ODA) eligible countries. Through this programme, Cefas, JNCC and MMO provide technical assistance to support countries to tackle marine pollution, support sustainable seafood practices and establish designated, well-managed and enforced MPAs.

GFRA

UK International Development
Partnership | Progress | Prosperity

Table of Contents

Purpose

This Supplementary Material is designed to be used in conjunction with Strategic Roadmap for the Implementation of Marine Protected Areas in Ghana. It provides additional detail, technical guidance, and practical resources that build on the principles and recommendations outlined in the Strategic Roadmap.

The document is organised into a series of appendices, each addressing a specific topic relevant to Marine Protected Area (MPA) planning and implementation. These appendices complement the MPA Implementation Roadmap by offering deeper insights, step-by-step guidance, and examples that may assist practitioners, policymakers, and stakeholders in translating strategic objectives into action.

While the Strategic Roadmap should remain the primary reference for overall direction and priorities, this Supplementary Material serves as an accompanying resource to support implementation. It expands on key areas where further explanation or technical detail is beneficial, ensuring that users have access to both strategic and operational guidance.

Appendix 1: MPAs and Marine Spatial Planning (MSP)

What is Marine Spatial Planning (MSP)?

Marine Spatial Planning (MSP) is a strategic, ecosystem-based process that guides the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives. It is:

- **Ecosystem-based** – prioritising marine health and resilience.
- **Integrated** – involving multiple sectors and stakeholders.
- **Adaptive** – responsive to changing conditions and new data.
- **Participatory** – promoting inclusive, long-term planning.MSP helps reduce conflicts among ocean users, promotes sustainable use of marine resources, and supports biodiversity conservation. It is akin to land-use planning but for marine environments.

Further information on MSP is available on UNESCO, the European Commission and MSP Global 2030 webpages.

How are MPAs are integrated into MSP?

MPAs are are spatial tools for conserving marine biodiversity and ecosystems. Their integration into MSP ensures:

- Ecological connectivity across marine habitats.
- Balanced conservation and sustainable use.
- Spatial certainty for long-term protection goals.

MPAs can be embedded within MSP as:

- **Drivers of MSP** (e.g. Australia – Great Barrier Reef MPA, where conservation was used as the foundation of MSP).
- **Fully integrated components** (e.g. Sweden – Marine Spatial Plans for the Gulf of Bothnia, the Baltic Sea and Skagerrak/Kattegat, where MPAs are fully embedded in national MSP).
- **Conservation Layers within MSP zoning** (e.g. Portugal – Towards a climate resilient conservation network, where conservation has been used as a layer in MSP).
- **Strategic Environmental Assessment tools** (e.g. Spain – Strategic Environmental Assessment declaration, where MPAs have been integrated into MSP through ecosystem-based approaches)

Overview of MSP in Ghana

Ghana is advancing MSP through several initiatives:

- Draft Marine Spatial Development Framework for the Western Coastal Zone.
- Sustainable Ocean Plan under development.

- MarEcoPlan Project (2024–2027): focuses on MSP, ecosystem services, and nature-based solutions.
- MSPglobal 2.0 Pilot Project: supports capacity building and stakeholder engagement.

Key institutions involved:

- Land Use and Spatial Planning Authority (LUSPA).
- Fisheries Commission.
- Environmental Protection Agency (EPA).

Considerations for Integrating MPAs into MSP in Ghana

Opportunities

- Legal frameworks: Fisheries Act and EPA Act support MPA establishment and integration.
- Existing data tools: Ecological assessments and mapping platforms aid spatial planning. For example, SeaSketch is a comprehensive mapping tool for that enables stakeholder-driven ocean planning
- Regional cooperation: FCWC and Abidjan Convention foster shared governance and knowledge exchange.

Challenges

- Technical capacity and data gaps: Limited expertise and fragmented data hinder planning.
- Cross-sector coordination: Aligning diverse interests (fisheries, oil & gas, tourism) is complex.
- Balancing conservation and development: Requires careful zoning and stakeholder engagement.

Key Approaches to Integration

- **Strategic Environmental Assessment (SEA)**: Embeds MPAs into broader policy frameworks.
- **Zoning within MSP**: MPAs as defined zones with tailored regulations.
- **Stakeholder engagement**: Inclusive planning with communities, industry, and government.
- **Data-driven planning**: Utilises ecological, socio-economic, and spatial data for informed decisions.

Further information on approaches to setting up a successful MSP initiative is available through the MSP Global webpage.

Appendix 2: Assessing Human Activities Impacting Marine Environments

This appendix outlines practical guidance and tools to support human activity data collection, impact analysis, and sensitivity and vulnerability assessments, providing a structured approach for informed coastal and marine planning.

Human activity data gathering

Fishing:

- **Industrial Fleets**: Vessel Monitoring System (VMS) and Automatic Identification System (AIS) data can be obtained from fisheries authorities or platforms such as Global Fishing Watch and AfriGEO (e.g. data on Global Fishing Intensity)
- **Artisanal Fishing**: Undertake community participatory mapping and interviews, and request catch logs from local cooperatives.
- **Illegal, Unreported and Unregulated (IUU) fishing**: IUU reports (such as those available on IUU Fishing Risk Index), port inspections, satellite patrol data.

Shipping and Maritime Transport:

- Automatic Identification System (AIS) data can be accessed to determine shipping lanes, anchorage areas, and vessel densities.
- Data from port logs, permits, and navigational charts may also be collected to support evidence on shipping and transport activity.
- In Ghana, several institutions and organisations contribute to the collection and dissemination of AIS data, such as the ECOWAS Coastal & Marine Resources Management Centre, based at the University of Ghana. AIS may also be collected by port authorities and government agencies.

Tourism:

- High-use areas for tourism may be identified through tourism statistics (such as those found in the Ghana Tourism Authority reports) and direct consultation with tourism operators/staff, infrastructures (e.g. hotels, visitor centres, restaurants).

Coastal Development:

- Use Environmental Impact Assessments (EIAs) and development plans from local planning offices and governmental ministries and agencies (such as those found on the Environmental Protection Agency website).

Data limitations:

- Where official datasets are incomplete, it may be useful to supplement with participatory methods (such as through stakeholder engagements) and remote sensing.

Stakeholder Engagement:

- Use interviews, workshops, or mobile survey tools to collect qualitative and location-specific data that isn't always recorded.
- Include fisher groups, tourism businesses, port managers, local communities, and environmental NGOs.
- Make sure to engage a range of stakeholders that are involved in the coastal areas (including women's groups for example).

Impact Analysis

Tools to support evaluating ecological impact from anthropogenic activities:

- Spatial Pressure and Impact assessment tool
- Spreadsheets or databases to score and compare activities.
- Impact modelling tools such as InVEST Coastal Vulnerability Model

Sensitivity and Vulnerability Assessment

Sensitivity Assessments

Sensitivity assessment refers to the likely ecological response of a given habitat or species (i.e., a "feature") to a particular anthropogenic pressure. This relationship is unique to each feature/pressure combination.

'Sensitivity' is defined as a function of:

- Resistance (or tolerance): the likelihood or degree of ecological damage caused by the pressure.
- Resilience: the rate and ability of the habitat or species to recover once the pressure has been reduced or removed.

For example, aggregate dredging may exert pressures such as siltation, contamination, and abrasion on nearby benthic habitats. Each species or habitat may differ in its ability to resist and recover from these effects.

To carry out a sensitivity assessment:

- Identify pressures associated with each activity (e.g., from literature, expert input, or existing pressure-impact matrices).
- Score sensitivity using a qualitative or semi-quantitative scale (e.g., high, medium, low) based on empirical evidence and expert judgement.

- Document justifications and sources to ensure transparency and repeatability.

Tools:

- Marine Evidence based Sensitivity Assessment (MarESA) – A guide: Detailed guidance on the application of the MarESA approach which provides a systematic process to compile and assess the best available scientific evidence to determine each sensitivity assessment.
- Environmental Sensitivity Atlas for the Coastal Area of Ghana – Volume 1: Distribution of Environmental Sensitivity: presents an overview of environmentally sensitive assets within the coastal area of Ghana.
- Environmental Sensitivity Atlas for the Coastal Area of Ghana – Volume 2: Environmental Sensitivity Ranking: presents a detailed record of the process for the assessment of environmentally sensitive assets within the coastal area of Ghana

Vulnerability Assessments

The vulnerability assessment builds on sensitivity results by incorporating data on human activity patterns — such as their spatial extent, intensity, frequency, and temporal overlap with sensitive habitats or species.

To carry out a vulnerability assessment:

- Map the spatial and temporal distribution of pressures from human activities (e.g., fishing effort maps, shipping lanes, coastal development footprints).
- Map the distribution of habitats and species, overlaid with the sensitivity scores.
- Use GIS tools and pressures information gathered in step 1 to assess whether and where pressures and sensitive features spatially and temporally overlap.
    - Map creation can show areas where there is a potential area of overlap.
- This information will then feed into management measures.

Tools:

- The MPA-Engage Project: Vulnerability Assessment Toolbox: Includes links to vulnerability assessment guidance, methodology, reports, e-learning materials and a vulnerability assessment tool.
- See Action 2: Evaluate Climate Change Impacts and Vulnerabilities for specific climate vulnerability assessment tools.

Appendix 3: Evaluating Climate Change Impacts and Vulnerabilities

Long-term, high-resolution climate records are foundational for understanding environmental change and guiding adaptive management of coastal and marine ecosystems. These datasets enable the detection of trends such as sea-level rise, ocean acidification, coastal erosion and sediment transport, which are critical for the design and implementation of climate-resilient Marine Protected Areas (MPAs). Key examples of such records include:

- **Continuous Tide-Gauge Sea Level Measurements**: These provide essential data on relative sea-level changes, informing coastal vulnerability assessments and infrastructure planning. Data on sea level observations is available on the Global Sea Level Observing System (GLOSS)
- **pH Monitoring**: Long-term pH data help track ocean acidification, which can have profound impacts on marine biodiversity, particularly calcifying organisms.
- **Sediment Flux and Shoreline Change Measurements**: These are vital for understanding erosion and accretion dynamics, sediment budgets, and the influence of upstream land-use changes on coastal morphology. Tools such as the USGS Digital Shoreline Analysis System (DSAS) and remote sensing platforms (e.g., Sentinel-2, Landsat, and Google Earth Engine) can support shoreline change analysis and erosion monitoring.

However, along Ghana's coastline, such datasets are often incomplete, fragmented, or entirely absent. The challenges include:

- **Limited Infrastructure**: Many coastal zones lack the necessary equipment for continuous monitoring.
- **Operational Constraints**: Harsh environmental conditions, limited technical capacity, and resource constraints hinder the maintenance of long-term monitoring systems.
- **Sparse Spatial Coverage**: Existing data are often concentrated in a few locations, leaving large areas unmonitored.

While comprehensive monitoring is ideal, it is impractical to install and maintain such systems uniformly across the entire coast (Avornyo et al., 2023). Instead, a strategic, minimalist monitoring plan should be adopted, focusing on climate-sensitive habitats such as:

- Coral reefs at Greater Cape Three Points (EPA, 2020)
- Mangroves in Keta (Lah, 2021)
- Seagrass beds in Pra

This targeted approach can be complemented by systematic collection of qualitative observations from local communities. For example, fishers' reports of unusual water temperatures, shellfish die-offs, or changes in species distribution can serve as early indicators of environmental stress. These community-sourced insights can guide the deployment of in-situ sensors in areas showing signs of change. As an example, In South Africa a citizen science initiative at the Aliwal Shoal Marine Protected Area engaged local divers and community members in reef monitoring. This project demonstrated how community observations can effectively complement scientific data collection, helping to fill knowledge gaps, validate remote sensing outputs, and support adaptive, climate-smart MPA management (Smit, 2024). By blending a focused, low-cost instrument network with community-based observations, it is possible to progressively build a robust and continuously improving evidence base for conservation decision-making.

Appendix 4: Assessing Threats and Impacts Over Time

Long-term ecological and socio-environmental trends

MPA managers can uncover long-term ecological and socio-environmental trends through analysing historical data that are often obscured in short-term monitoring. This temporal knowledge is essential for several key aspects of adaptive and climate-smart MPA management which are detailed in Table 1 below.

Table 1. Key focus areas for leveraging historical data in marine conservation.

Focus area	Purpose	Example
Detecting emerging threats	Long-term datasets can reveal subtle but significant changes, such as the gradual rise in sea surface temperatures, shifts in species distributions, the introduction of invasive species and shoreline extent changes.	In South Africa, long-term monitoring has been instrumental in identifying climate-driven changes in marine biodiversity and informing adaptive responses within MPAs (Adams and Kowalski, 2021)
Evaluating management effectiveness	Historical baselines allow managers to assess whether conservation interventions, such as no-take zones or seasonal closures, are achieving their intended outcomes.	The Strategic Adaptive Management (SAM) approach used in East and Southern Africa, including Kenya, emphasizes using historical and current data to evaluate and refine MPA strategies in collaboration with local stakeholders (O'Leary, 2020)
Understanding cumulative impacts	Historical data help disentangle the complex interactions of multiple stressors, such as overfishing, pollution, and climate change, by showing how these pressures have evolved and interacted over time.	A global review highlights that integrating cumulative effects into MPA planning remains a challenge, but is essential for effective long-term conservation (Murray et al., 2025).
Forecasting future scenarios	By analysing past trends, managers can model potential future conditions under different climate and development scenarios.	Cumulative impacts on global marine ecosystems could more than double by mid-century, underscoring the need for proactive planning based on robust historical data (Halpern et al., 2025).
Supporting evidence-based decision-making	Historical data provide a scientifically grounded foundation for policy adjustments, resource allocation, and stakeholder engagement.	In Africa, a continent-wide review emphasised the need for continuous research and adaptive management that leverages both historical insights and emerging scientific tools to address evolving threats (Chukwuka et al., 2025)

Cumulative threat maps/matrices

The table below provides information and links to guidance on how to create cumulative threat maps/matrices in the context of ocean conservation through management.

Title	Focus	Overview
JPI Oceans – A Common Handbook: Cumulative Effects Assessment in the Marine Environment	Cumulative Effects Assessment (CEA)	Step-by-step guidance on assessing multiple stressors, integrating data, and applying ecosystem models for marine planning.
Linking Threat Maps with Management to Guide Conservation Investment (Tulloch et al., 2020)	Threat Mapping & Management Linkage	Framework for rebuilding cumulative impact maps by stressor type and aligning them with appropriate conservation tools
Cumulative Impact Mapping and Vulnerability of Marine Ecosystems (Fisheries and Oceans Canada (DFO), 2024)	Spatial vulnerability & impact mapping	Semi-quantitative method for mapping cumulative impacts using spatial data, habitat vulnerability, and human activity layers.

Appendix 5: Tools and Frameworks for Strengthening MPA Management

Using SWOT Analysis to Inform National MPA Management Strategies

A SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) is a strategic planning tool used to assess internal and external factors that influence the effectiveness of Marine Protected Area (MPA) management. It supports the development of targeted, adaptive strategies by identifying areas of advantage, vulnerability, and potential.

How to conduct a SWOT analysis in MPA planning?

1. **Define the Scope** - Focus the analysis on the national MPA system or a specific management objective (e.g. enforcement, climate resilience, stakeholder engagement).
2. **Engage Stakeholders** - Involve government agencies, local communities, NGOs, scientists, and private sector actors to ensure diverse perspectives.
3. **Facilitate a Structured Workshop** - Use participatory methods to gather and categorize inputs into the four SWOT categories. Tools like impact-feasibility matrices can help prioritize issues.
4. **Analyse and Synthesise** - Identify strategic matches (e.g. using strengths to seize opportunities) and address critical gaps (e.g. weaknesses that expose the system to threats).
5. **Integrate into the Management Strategies** - Translate SWOT findings into strategic objectives, action plans, and monitoring indicators.

Resources to Support MPA Management

Marine Protected Area (MPA) Management requires a structured, inclusive, and evidence-based approach. The process typically involves setting national conservation goals, aligning site-level action plans, establishing governance and legal frameworks, and ensuring stakeholder participation. Resources in Table 2 below provide practical guidance, frameworks, and case studies to support governments, planners, and practitioners in designing and implementing effective national MPA strategies.

Table 2. Key resources for Marine Protected Area (MPA) planning and management.

Title	Focus	Overview
How is Your MPA Managed? A Guidebook for MPA Management Planning (NOAA)	Site-to-national level MPA planning	A step-by-step guide for developing MPA management plans, adaptable to national contexts. Includes worksheets, stakeholder engagement tools, and planning templates.
Planning and Implementing MPAs (FAO)	Legal, institutional, and policy frameworks	Guidance on integrating MPAs into national marine governance systems, with emphasis on enabling conditions, intersectoral coordination, and adaptive implementation.

Title	Focus	Overview
Guidelines for Establishing Marine Protected Areas (IUCN)	Global standards and principles	Foundational guidance on MPA planning, zoning, and governance, including ecological and socio-economic considerations.
A BLUEprint for MPAs (Blue Marine Foundation)	Community-driven and national MPA planning	A practical framework for planning MPAs at multiple scales, including stakeholder engagement, financing, and adaptive management.

Identifying and prioritising indicators within the national MPA Policy or Strategy

1. Identify SMART Indicators

SMART indicators are:

Specific – clearly linked to defined objectives

Measurable – quantifiable or verifiable through data

Achievable – realistic given available resources and capacity

Relevant – aligned with MPA goals and priorities

Time-bound – associated with a timeframe for review

Indicators should be selected to monitor both:

Implementation (e.g., number of patrols, stakeholder meetings held)

Outcomes (e.g., improved coral cover, reduced illegal fishing)

Approach:

1. Start with the MPA's objectives and theory of change.
2. Use a results chain to link actions to expected outcomes.
3. Engage stakeholders to ensure indicators reflect shared priorities and local knowledge.
4. Include a mix of ecological, socio-economic, and governance indicators.

2. Prioritise Indicators Based on Relevance, Feasibility, and Value

Given limited resources, not all indicators can be monitored equally. Prioritisation ensures focus on the most meaningful and actionable metrics.

Criteria for Prioritisation:

- **Relevance**: Does the indicator directly support MPA objectives?
- **Feasibility**: Can data be collected reliably and affordably?
- **Value**: Will the indicator provide insights that inform management decisions?

Approach:

- Use a scoring matrix or impact-feasibility grid to rank indicators.
- Involve stakeholders in the prioritisation process to ensure transparency and legitimacy.
- Reassess priorities periodically as conditions and capacities evolve.

Further information on developing biodiversity indicators is available on the Biodiversity Indicators Parnership webpage and within the Biodiversity Indicator Development Framework (summarised in Figure 1 below).

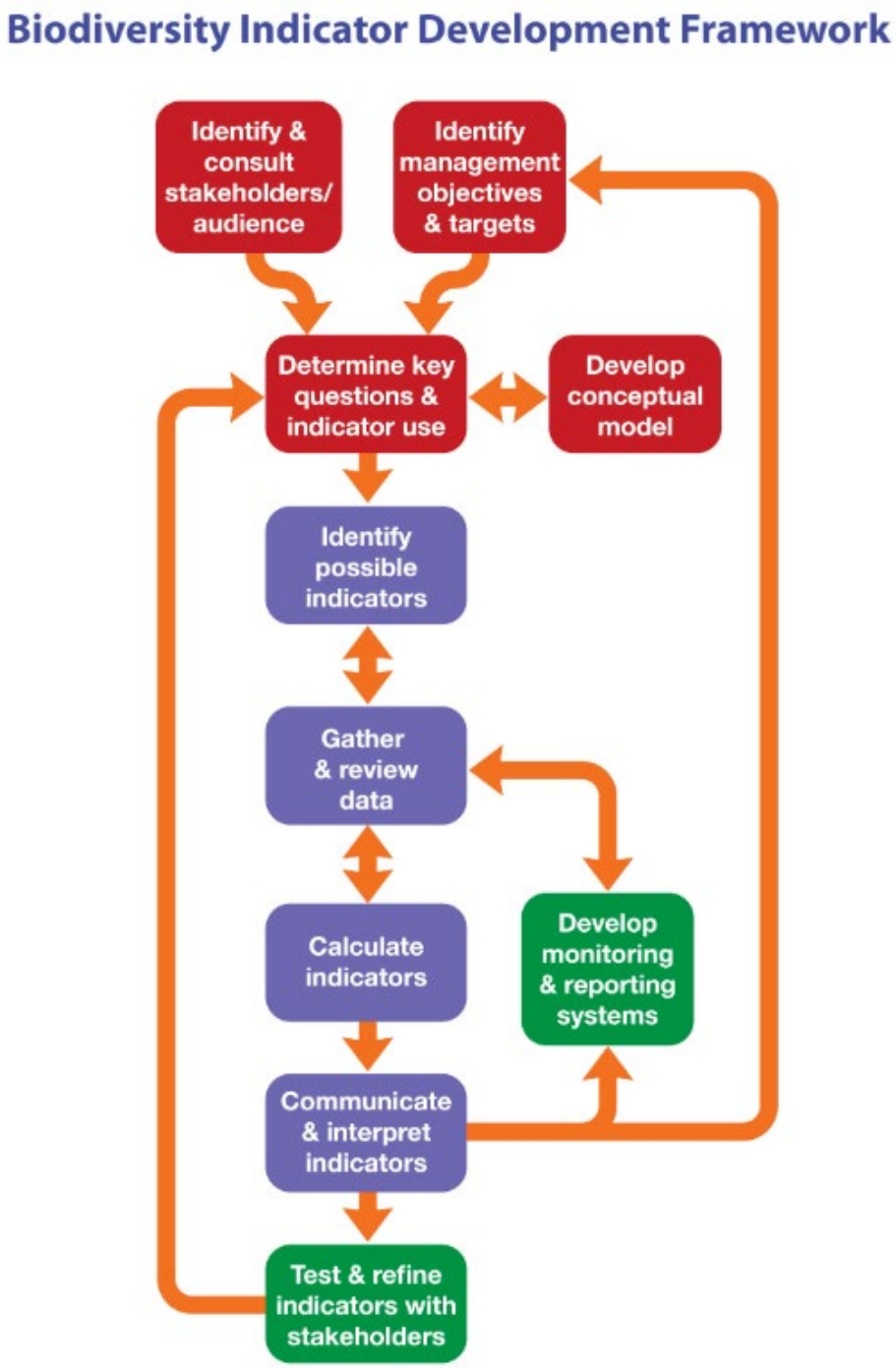

Figure 11. The Biodiversity Indicator Development Framework. A tool developed by UNEP-WCMC and partners to guide the creation of biodiversity indicators across contexts and scales. It is structured around three themes: Purpose (red: aligning indicators with user needs), Production (purple: generating indicators), and Permanence (green: ensuring long-term sustainability).

Appendix 6: Creating Local Co-Management Structures

Table 3 below outlines recommended training areas designed to build the capacity of local stakeholders and strengthen co-management structures for Marine Protected Areas (MPAs).

Table 3. Recommended training areas to support co-management structures for Marine Protected Areas (MPAs)

Training Area	Overview	Purpose	Audience	Cost
Participatory Governance & Co-Management	Introduces co-management models (e.g., shared, delegated), legal and policy frameworks, stakeholder mapping, and decision-making processes.	Builds shared understanding of governance structures, roles, and responsibilities.	Community leaders, government reps, NGOs, MPA managers	**Moderate** (Requires expert facilitation and tailored materials)
Conflict Resolution & Negotiation	Covers conflict analysis, mediation techniques, negotiation strategies, and tools for managing disputes and building consensus.	Helps manage tensions and power imbalances, building collaboration and trust.	All co-management stakeholders, especially facilitators and community reps	**Low** – Moderate (Can be delivered in short workshops with local facilitators)
Inclusive Engagement & Social Equity	Explores gender equity, disability inclusion, Indigenous rights, intersectionality, and culturally responsive engagement practices.	Ensures all voices are heard and respected, improving legitimacy and social justice.	Community reps, NGOs, social scientists, facilitators	**Moderate** – High (May require specialist trainers and inclusive materials)
Marine Ecology & MPA Science	Provides foundational knowledge on marine ecosystems, biodiversity, ecosystem services, and climate change impacts on marine environments.	Equips stakeholders with ecological understanding to inform sustainable decisions.	Local communities, youth groups, MPA staff, educators	**Low** (Often available through local experts or NGOs)
Communication & Stakeholder Engagement	Focuses on effective communication strategies, participatory tools (e.g., mapping, storytelling), and digital engagement platforms.	Enhances transparency, trust, and meaningful participation in co-management processes.	Communications officers, community liaisons, local leaders	**Low** – Moderate (Cost depends on tools used and whether digital platforms are included)

Training Area	Overview	Purpose	Audience	Cost
Leadership & Organisational Development	Develops leadership skills, team dynamics, strategic planning, and organisational strengthening for local governance bodies.	Builds local capacity to lead, sustain, and adapt co-management structures.	Emerging leaders, community organisations, local authorities	**Moderate** (Often involves multi-day workshops and coaching)
Monitoring, Evaluation & Learning (MEL)	Teaches participatory MEL design, data collection methods, indicators, and adaptive learning approaches for continuous improvement.	Supports evidence-based decision-making and accountability in MPA management.	MPA managers, researchers, community monitors	**Moderate** (Requires technical input and data tools)

Appendix 7: Developing and Applying MPA Conservation Advice

This Appendix provides globally recognised frameworks and best-practice guidance for developing and applying Marine Protected Area (MPA) conservation advice. These resources support managers and policymakers in setting clear objectives, embedding equity principles, and aligning with international standards to ensure effective and inclusive conservation outcomes. Table 4 below summarises several key resources and their focus areas, offering practical tools and benchmarks for producing robust, evidence-based conservation advice.

Table 4. Globally relevant resources for producing MPA conservation advice

Resource & Publisher	Overview
Applying IUCN's Global Conservation Standards to MPAs (International Union for Conservation of Nature (IUCN), World Commission on Protected Areas (WCPA)	A synthesis of the IUCN Green List Standard and relevant IUCN Resolutions, providing a global benchmark for fair and effective MPA design and management.
The MPA Guide (Developed by a global consortium including IUCN, UNEP-WCMC, Oregon State University, and Marine Conservation Institute)	A science-based framework that categorizes MPAs by Stage of Establishment, Level of Protection, Enabling Conditions, and Expected Outcomes.
Guidelines for applying the IUCN protected area management **categories to marine protected areas** (IUCN World Commission on Protected Areas (WCPA))	Authoritative guidance on applying IUCN protected area management categories to MPAs, including governance types and implementation advice.

Best practice recommendations for developing conservation advice

1. **Set clear, measurable objectives aligned with global targets**
   - Define conservation objectives that are specific, measurable, achievable, relevant, and time-bound (SMART).
   - Ensure objectives contribute to international commitments such as:
     - 30x30 target (protect 30% of the ocean by 2030)
     - UN SDG 14 (Life Below Water)
     - CBD Kunming-Montreal Global Biodiversity Framework
   - Link objectives to ecological outcomes (e.g., habitat recovery, species protection) and social benefits.
2. **Embed Governance and Equity Principles**
   - Involve Indigenous peoples, local communities, and stakeholders in decision-making.
   - Ensure transparent processes and fair distribution of benefits and responsibilities.

- Recognize and respect customary rights and cultural values in advice development.

- A guidebook for assessing and improving social equity in marine conservation has been developed by IUCN and provides practical tools and methodologies for evaluating equity considerations, identifying gaps, and integrating inclusive practices into marine conservation planning and management (Andrachuk *et al.,* 2025).

3. **Base Advice on Evidence and Context**

- Use scientific data, socio-economic information, and local knowledge to inform recommendations.
- Apply frameworks like The MPA Guide to:
  - Identify the Stage of Establishment (e.g., proposed, implemented)
  - Define the Level of Protection (fully, highly, lightly protected)
  - Assess Enabling Conditions (legal authority, funding, enforcement capacity)
- Ensure advice is realistic, actionable, and linked to expected outcomes.

4. **Incorporate Adaptive Management and Monitoring**

- Include monitoring plans to track ecological and social performance.
- Build in feedback loops for adjusting measures based on results.
- Plan for climate change resilience and emerging threats (e.g., invasive species, new industries).

5. **Align with Global Frameworks and Standards**

- Assign the correct IUCN management category and governance type for clarity and consistency.
- Ensure advice supports national and international reporting obligations under CBD and SDGs.
- Integrate IUCN best practice principles (effectiveness, equity, connectivity, resilience) into all recommendations.

Appendix 8: Reviewing baseline data and identify monitoring gaps

Data Management:

Effective data management ensures that any data collected or used for MPA implementation are accurate and reliable; accessible and reusable for future research and decision-making; secure and preserved over time; compliant with national, international and funder requirements and legislation where necessary. A data lifecycle (Figure 2) includes the following stages (a project may focus on all or parts of the data life cycle):

1. **Planning** – defining objectives, roles, and standards.
2. **Creating** – collecting raw data using calibrated instruments and standardised protocols.
3. **Processing** – Clean, validate and format data.
4. **Documenting** – Create metadata and contextual information.
5. **Preserving** – Archive data securely for long term access.
6. **Sharing** – Make data available to stakeholders and repositories.
7. **Reusing** – Enable future analysis, synthesis, and reporting.

Figure 22. The data life cycle. Taken from (British Ecological Society, 2014)

More information on effective data management, including checklists, can be found in the following resources:

- A Guide to Data Management in Ecology and Evolution
- Managing and Sharing Data

Appendix 9: Developing Ecological and Socioeconomic Monitoring Goals

SMART and OITT goal setting:

Goals can be developed and defined using the SMART framework – Specific, Measurable, Achievable, Relevant, and Time-bounds – to ensure they are clear and align with the broader project aims. For example, a SMART goal could be: Estimate ghost crab (*Ocypode Africana*) distribution on beaches under different management regimes within a local authority during spring and summer over three years.

The SMART Framework (Aldridge and Colvin, 2024):

- **Specific** - Clearly identify what is to be monitored, whether biotic or abiotic, and the direction of change towards the desired state (e.g. increase or decrease). Ensure the goals/objective is mutually exclusive and does not overlap with other monitoring goals/objectives.
- **Measurable** - the goals/objective can be clearly quantified whether through direct sampling or using a recognised proxy.
- **Achievable** - consider the spatial and temporal context to ensure the desired state is realistic for the feature, and there are sufficient resources to implement the necessary monitoring.
- **Relevant** - the monitoring goals/objective allows analysis to comment on changes to the feature and aligns with the MPA's goals and legal obligations.
- **Time-bound** - set clear time scales for monitoring and use regular monitoring as a trigger to re-evaluate progress and management of the MPA.

However, SMART objectives can be challenging to apply in ecological contexts, especially when systems are poorly understood. To address this, the SMART-OITT framework can be used, which breaks goals into four components (Figure 3):

1. **Outcome** – why monitoring is needed
2. **Indicator** – What aspect of biodiversity will be measured
3. **Target** and method – How it will be measured
4. **Timeframe** and location – When and where monitoring will occur

The steps are flexible and interrelated, helping to define robust and context-sensitive goals (Marion et al., 2024).

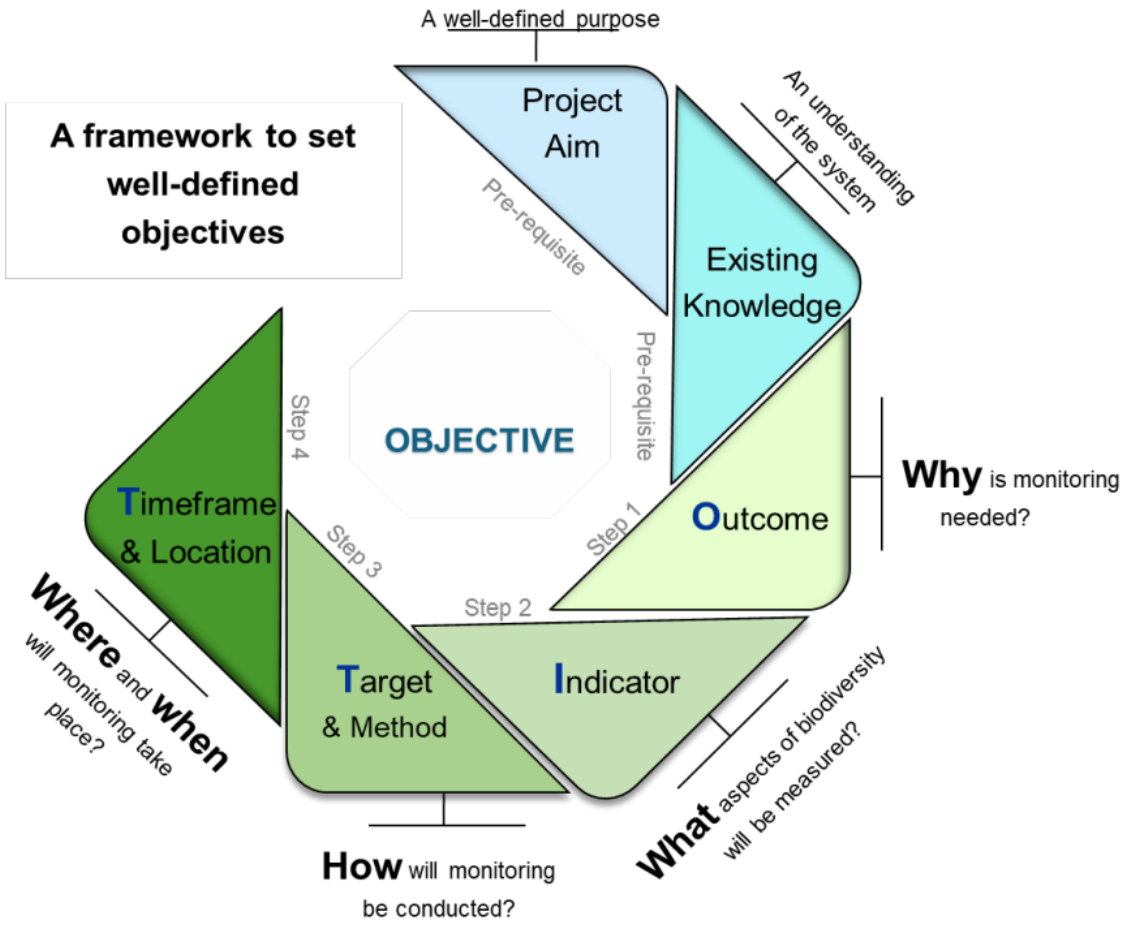

Figure 3. Overall framework allowing to set well-defined monitoring objectives. Stakeholders interested in setting monitoring objectives need to consider project aim, current knowledge, why, what, how, where and when, and what aspects of monitoring need to be considered. Taken from (Marion et al., 2024).

Appendix 10: Developing standardised reporting protocols

Standardised reporting protocols are essential for credible and comparable assessments of Marine Protected Area features. Table 5 outlines a simple framework for screening data based on confidence, quality, and age to support robust decision-making.

Table 5. Example of a simple table to help assess confidence in data and whether to include the data in reporting of e.g., a feature's condition (based on JNCC, 2019).

Confidence level	Screening (in / out)	Quality of evidence	Age of evidence
High	Evidence is reliable – screen in	Data records were collected using approved methods and interpreted by an appropriate specialist with quality standards applied and documented. Photographic evidence has time/location stamps and has undergone validation and interpretation by an appropriate specialist.	Data less than 6 years old Species of Conservation Interest (SOCI) (or features with high temporal variability): 5 or more records (samples not individual species) ≤6 years old, with ID carried out by a specialist.
Moderate	Evidence is reliable – screen in	Data records have been collected by documented methods and interpreted by an appropriate specialist but limited evidence on quality standards applied. Limited information in the methods used for data interpretation, particularly for records collected in a linear fashion such as video tows or diver observation records.	Data between 6-12 years old SOCI (or features with high temporal variability): at least five records with some being 6-12 years or identified by non-specialists.
Moderate	Evidence may be reliable – possibly screen in	Limited information on how data were collected, verified, or interpreted; data identified by non-specialists. Data based on local knowledge or anecdotal information with no supplementary verification.	Data more than 12 years old
Low	Evidence is unreliable – screen out	Quality of data unknown. If the quality of data, i.e., survey methods, analysis processes and Quality Assurance procedures, are unknown it is only in exceptional circumstances that this evidence would be included within a condition assessment.	If the quality of the data is unknown, then regardless of age it must be considered low in confidence.

Appendix 11: Establishing a National MPA Data Repository

Creating a national MPA data repository is critical for effective marine conservation planning and reporting. Table 6 section highlights leading examples of repositories and platforms that support data sharing, transparency, and integration across scales.

Table 6. Examples of MPA-related data repositories and data sharing mechanisms: (Please note this list is not exhaustive)

Host	Type	Link	Description
Marine Conservation Institute	Data repository and sharing mechanism.	The Marine Protection Atlas	MPAtlas uses The MPA Guide's science-based framework to identify marine protected areas Stage of Establishment and Level of Protection, which are linked to expected conservation outcomes. MPAtlas shows how much of the ocean is currently fully or highly protected, highlights where MPAs are not yet implemented on the water, and much more through interactive maps and dashboards. By focusing on the quality, in addition to the quantity, of marine protection, MPAtlas supports international progress toward effective marine conservation.
CCAMLR	Data repository	CCAMLR MPA Information Repository	The CCAMLR (Commission for the Conservation of Antarctic Marine Living Resources) MPA Information Repository (CMIR) supports the submission, hosting, analysis and reporting of Marine Protected Area (MPA) project data in line with the requirements of the Scientific Committee and the reporting obligations of Members and the Secretariat contained in relevant conservation measures and Research and Monitoring Plans (RMPs).
JNCC	Data sharing mechanism	Resource Hub Interactive Mapper	JNCC's Resource Hub acts as a central location for downloading spatial datasets and metadate related to UK MPAs, including shapefiles. The interactive mapper is a web-based GIS tool that allows users to visually explore the location, extent, and details of UK MPAs, with layers and filters for different site types and designations (gazettements).
OSPAR	Data sharing mechanism	OSPAR MPA Wed Tool	This is an interactive platform for exploring MPAs designated (gazetted) under the OSPAR Convention. It provides spatial data, site-level information, and downloadable datasets across the North-East Atlantic, with filtering options by country, region, and MPA type.

Host	Type	Link	Description
UNEP-WCMC	Data repository and sharing mechanism.	World Database in Protected Areas WDPA) - Africa	This is a global repository that includes African terrestrial and marine protected areas. Data is downloadable and viewable via platforms like Protected Planet and Data Basin, with regular updates and metadata.
PANGAEA	Data repository	PANGAEA	The information system PANGAEA is operated as an Open Access library aimed at archiving, publishing, and distributing georeferenced data from earth system research.
Department of Forestry, Fisheries, and the Environment: Oceans and Coastal Research (DFFE:OCR)		South Africa Marine Information Management System (MIMS)	The Marine Information Management System (MIMS) is an open repository that archives and publishes collections and subsets of marine related datasets for the Department of Forestry, Fisheries and the Environment: Oceans and Coastal Research (DFFE:OCR), South Africa. It hosts the Southern African Data Centre for Oceanography (SADCO) historical data archives.

Appendix 12: Conducting regular evaluations using the Management Effectiveness Tracking Tool (METT)

Regular evaluations are essential for adaptive and accountable MPA management. Table 7 highlights the METT and other widely used tools that help track management inputs, processes, and outcomes, supporting evidence-based improvements.

Table 7. Different tools available for assessing the management effectiveness of an MPA.

Tool	Type	Purpose	Scale	Depth	Resource
IMET (Integrated Management Effectiveness Tool)	In-depth assessment	Combines planning, governance, and outcomes with participatory workshops	Africa, Caribbean, expanding globally	High – integrates context, planning, governance, and outcomes	High – 3–4 day workshops, trained facilitators, software
IUCN Green List	Certification standard	Rigorous evaluation of well-managed protected areas	Global	Very High – 4 components, 17 criteria, 50 indicators	Very High – rigorous evaluation and peer review
MEPCA (Management Effectiveness of Protected and Conserved Areas)	Questionnaire-based	Tailored for marine areas under OSPAR Convention	North-East Atlantic	Moderate – questionnaire-based	Medium – requires data collation and stakeholder input
METT (Management Effectiveness Tracking Tool)	Rapid assessment	Site-level tracking of management inputs, processes, and outputs	Global	Moderate – covers 6 elements of WCPA framework	Low to Medium – Excel-based, minimal training
RAPPAM (Rapid Assessment and Prioritization of Protected Area Management)	System-level assessment	Evaluates threats, pressures, and management context across multiple sites	Global	Moderate – includes threats, pressures, and management context	Medium – requires facilitation and stakeholder input

Tool	Type	Purpose	Scale	Depth	Resource
SAMSA (Self-Assessment and MPA Scorecard Approach)	Simplified checklist	Quick diagnostic for site-level management	Various regions, especially low-capacity contexts	Low to Moderate – checklist-style	Low – self-assessment by managers
R-METT (Ramsar Management Effectiveness Tracking Tool)	Rapid assessment	Site-level, evaluates management effectiveness of Ramsar Sites	Global (wetlands under Ramsar Convention	Moderate – based on METT with Ramsar-specific elements	Low to Medium – Excel-based, minimal training

Appendix 13: Developing decision frameworks that link specific assessment outcomes to management responses

Effective Marine Protected Area (MPA) management requires not only monitoring and assessment but also clear pathways for translating results into action. Decision frameworks provide this critical link by ensuring that observed changes in ecological, social, or governance indicators trigger appropriate and timely management responses. Without such frameworks, assessments risk becoming passive exercises rather than drivers of adaptive management.

One widely used approach is the **DPSIR framework** (Drivers–Pressures–State–Impact–Response), which organises information into a cause-effect chain.

- **Drivers** represent underlying forces such as economic demand or policy changes.
- **Pressures** are direct stressors on ecosystems, like fishing intensity or pollution.
- **State** refers to the condition of the environment or resource.
- **Impacts** capture the consequences for biodiversity and human well-being.
- **Responses** are management actions designed to mitigate pressures or restore conditions.

By mapping these relationships, managers can identify leverage points for intervention and prioritize actions based on the root causes of observed changes. For example, if assessments reveal declining fish stocks (State) due to overfishing (Pressure), responses might include stricter enforcement, gear restrictions, or alternative livelihood programs targeting the underlying driver.

Decision frameworks should be integrated into national MPA strategies and linked to monitoring indicators. This ensures that:

- **Thresholds and triggers** for action are clearly defined.
- **Responsibilities** for implementing responses are assigned.
- **Feedback loops** allow for continuous learning and adjustment.

Figure 4 below illustrates the DPSIR conceptual framework applied to the fishing sector, showing how responses can act at different levels of the cause-effect chain.

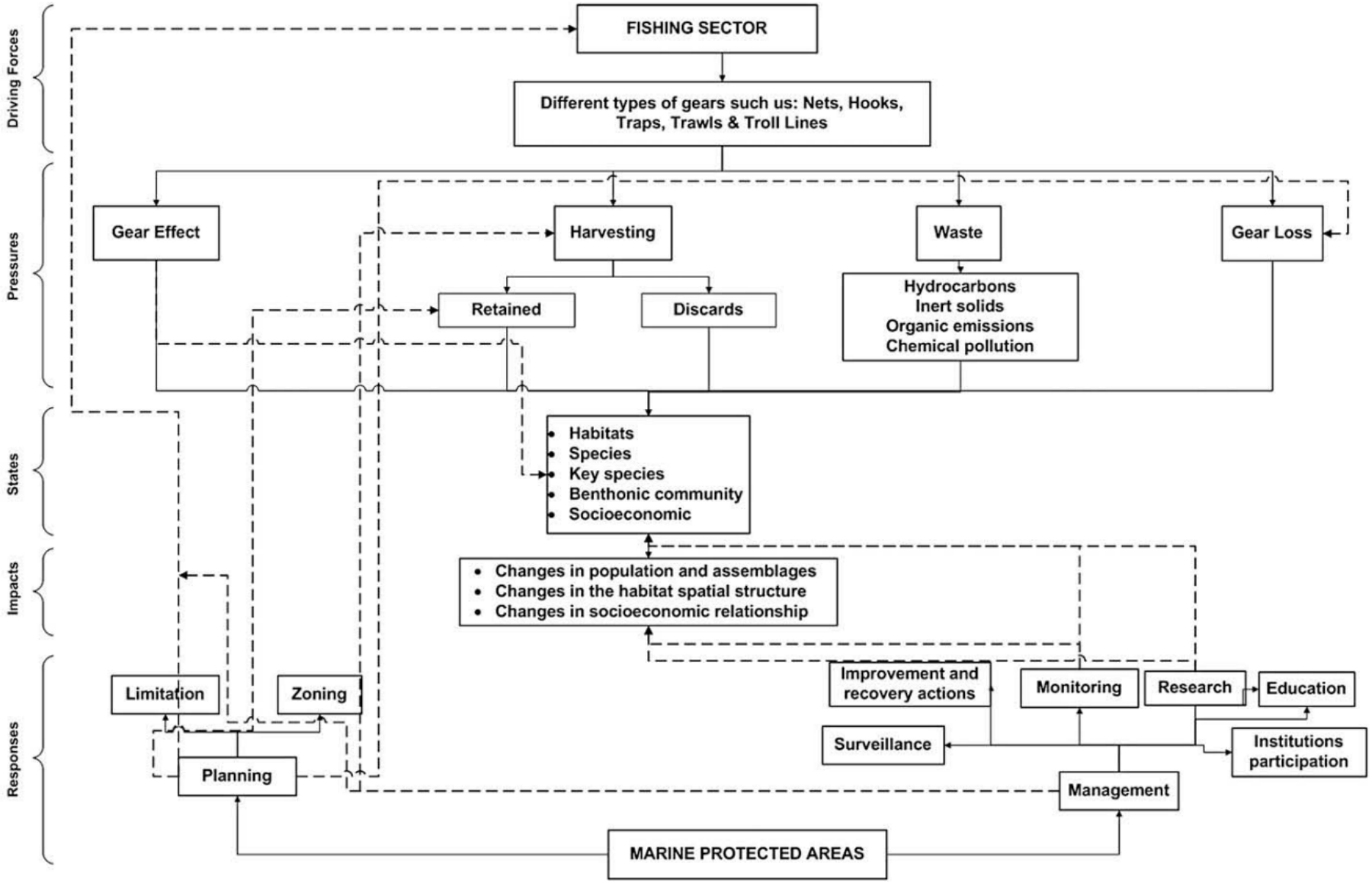

Figure 4. DPSIR conceptual framework for the fishing sector. Rows represent the cause-effect relations from the driving forces to the responses. Lined rows represent the level at which responses can act. Taken from Ojeda-Martinez *et al*. (2008).

Appendix 14: MPAs and Condition Assessments

Maintaining an accurate and current understanding of the condition of a Marine Protected Area (MPA) and the features within it, e.g., coral reefs, is essential for determining whether the MPA is achieving its conservation goals. One way to support this is through undertaking Condition Assessments, which can provide evidence-led insights into the status of features within the MPA.

When assessing the condition of a feature, the following aspects should be considered:

- The extent and distribution of the feature
- The supporting ecological processes associated with the feature
- The structure and function of the feature

Regular updates to the understanding of feature condition are important for informing management approaches that effectively support the MPA's conservation goals.

Interpretation of a features condition may change over time due to new evidence or changes in human activity. This could occur for a number of reasons such as where direct evidence is lacking, and spatial data can be used to infer feature condition. If a damaging activity overlaps with a sensitive feature, it may be assessed as being in unfavourable condition, with low confidence. If management measures are later introduced and recovery time has elapsed, the feature may be reassessed as favourable. It could also be that a damaging activity was previously thought to overlap with the feature's extent, leading to an unfavourable condition assessment. New evidence may show that this overlap no longer exists, and the feature is no longer exposed to damaging pressures. If this has been the case for a sufficient period, the feature may have recovered and could now be assessed as being in favourable condition. It could also be that a feature was initially assessed as being in favourable condition due to the absence of known pressures. However, new survey imagery may reveal physical damage, such as fishing nets snagged on coral structures and visible breakage. This would prompt a reassessment of unfavourable condition.

A robust Condition Assessment process should include:

- A comprehensive audit of all available evidence for the MPA site and its features. This includes an assessment of whether the data is relevant to features within the MPA and available to use within the Condition Assessment.
- An evaluation of the confidence level associated with the data. More information on data confidence is available in Appendix 10.
- An understanding of the human activities occurring within ad adjacent to the MPA
- Identification of direct evidence of feature condition (for example, observed recovery in coral extent or presence of coral rubble indicating degradation).
- Where direct evidence is lacking, a Vulnerability Assessment may be necessary to infer condition. This is often required in data-limited contexts. Information on vulnerability Assessments can be found in Appendix 2.

References

Adams, R.J., Kowalski, P., 2021. State of Marine Protected Area Management Effectiveness in South Africa. WWF South Africa.

Aldridge, C.A., Colvin, M.E., 2024. Writing SMART objectives for natural resource and environmental management. Ecol Sol and Evidence 5, e12313. https://doi.org/10.1002/2688-8319.12313

Andrachuk, M., Bennett, N.J., Blythe, J., Claudet, J., Dawson, N., Finkbeiner, E., Fitzpatrick, J., Franks, P., Gill, D.A., Gurney, G.G., Jack-Kadioglu, T., Jupiter, S., Lau, J., Lopes, P.F.M., Mahajan, S., Muhl, E-K., Naggea, J., Roumbedakis, K., Selim, S., Singh, G.G., Strand, M., Sullivan-Wiley, K. and Villasante, S. (2025) Guidebook for assessing and improving social equity in marine conservation. Version 1.0. Commission on Environmental, Economic and Social Policy, IUCN, Gland, Switzerland. 105p.

Avornyo, S., Appeaning Addo, K., Teatini, P., Minderhoud, P., Woillez, M.-N., Jayson-Quashigah, P.-N., Mahu, E., 2023. A scoping review of coastal vulnerability, subsidence and sea level rise in Ghana: Assessments, knowledge gaps and management implications. Quaternary Science Advances 12, 100108. https://doi.org/10.1016/j.qsa.2023.100108

British Ecological Society, 2014. A Guide to Data Managment in Ecology and Evolution [WWW Document]. URL https://www.britishecologicalsociety.org/wp-content/uploads/Publ_Data-Management-Booklet.pdf (accessed 10.23.25).

Chukwuka, A.V., Adegboyegun, A.D., Adeogun, A.O., 2025. Marine protected areas of Africa: current challenges and future opportunities in conservation. Aquat Sci 87, 61. https://doi.org/10.1007/s00027-025-01188-w

EPA, 2020. Potential Ecologically or Biologically Significant Marine Areas of Ghana: Marine Area Off Cape Three Pointts, Ghana, West Africa.

Fisheries and Oceans Canada (DFO), 2024. Cumulative Impact Mapping and Vulnerability of Canadian Marine Ecosystems to Anthropogenic Activities and Stressors.

Halpern, B., Frazier, M., O'Hara, C., Vargas-Fonseca, O.A., Lombard, A.T., 2025. Cumulative impacts to global marine ecosystems projected to more than double by mid-century | Science. Science 389, 1216–1219.

JNCC. 2019. Assessing scientific confidence in the presence and extent of features within Special Areas of Conservation. JNCC Report No. 683. Available from: https://data.jncc.gov.uk/data/723cec60-558d-43b0-88b5-74f38ea437b0/E-Assessing-scientific-confidence-in-presence-and-extent.pdf

Lah, G., S., 2021. Exploring the Trends and Impacts of Climate Change-Induced Coastal Hazards in Keta, Ghana: Existing Adaptation strategies and Possibilities of Nature-Based Solutions (MPHIL). University of Ghana.

Marion, S., du Plessis, N., Coogan, C., Wright, E., Harris, M., 2024. Setting biodiversity monitoring objectives (Guidance report). JNCC, Peterborough JNCC Report 780.

Murray, C.C., Dunham, A., Rubidge, E., Francis, F.T., Hunter, K.L., Hannah, L.C., 2025. Safeguarding marine protected areas from cumulative effects: a review of methods, best practices, and applications. Environmental Management 75, 3010–3024. https://doi.org/10.1007/s00267-025-02146-w

O'Leary, J., 2020. Strategic Adaptive Management of MPAs - towards inclusive and evidence-based MPA management | PANORAMA [WWW Document]. Panorama Solutions. URL https://panorama.solutions/en/solution/strategic-adaptive-management-mpas-towards-inclusive-and-evidence-based-mpa-management (accessed 11.14.25).

Smit, K., 2024. Piloting a citizen science approach for reef monitoring to improve conservation of coral reefs in South Africa: Final Evaluation Report.

Tulloch, V.J.D., Turschwell, M.P., Giffin, A.L., Halpern, B.S., Connolly, R., Griffiths, L., Frazer, M., Brown, C.J., 2020. Linking threat maps with management to guide conservation investment. Biological Conservation 245, 108527. https://doi.org/10.1016/j.biocon.2020.108527

Ocean Country Partnership Programme

The Ocean Country Partnership Programme (OCPP) is a UK Government-led programme delivered under the Blue Planet Fund in Overseas Development Assistance (ODA) eligible countries. Through this programme, Cefas, JNCC and MMO will provide technical assistance to support countries to tackle marine pollution, support sustainable seafood practices and establish designated, well-managed and enforced MPAs.