Ocean Country Partnership Programme

Roadmap to Designation: The Mugli-Apsarkonda Marine Sanctuary, Karnataka, India

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UK Government

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from the British people

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Contents

1 Background 1

1.1 The Ocean Country Partnership Programme 1

1.2 Project context 2

1.3 Current status of marine biodiversity in Karnataka 2

1.4 The Mugli-Apsarkonda Marine Sanctuary 4

1.5 Aims 5

2 MPA designation and management process 6

2.1 Stakeholder engagement 7

2.2 MPA identification and designation 8

2.2.1 Site characterisation 9

2.2.2 Definition of MPA objectives 11

2.2.3 Agreement of site boundaries 11

2.2.4 Development of legislative framework 12

2.3 MPA management planning 13

2.3.1 Development of a management plan 13

2.4 MPA management 15

2.4.1 Ensuring sufficient resources 15

2.4.2 Sustaining effective stakeholder engagement 17

2.4.3 Development of a compliance and enforcement strategy 18

2.5 MPA monitoring 19

2.6 MPA assessment and reporting 20

3 References 22

Acronyms

Cefas	Centre for the Environment, Fisheries & Aquaculture Science
EJF	Environmental Justice Foundation
GCRMN	Global Coral Reef Monitoring Network
ICMBA	Important Coastal and Marine Biodiversity Area
ICT	Information Communication Technology
IFAD	International Fund for Agricultural Development
IUCN	International Union for Conservation of Nature
IUCN WCPA	International Union for Conservation of Nature. World Commission on Protected Areas
JNCC	Joint Nature Conservation Committee
METT	Management Effective Tracking Tool
MCZ	Marine Conservation Zone
MMO	Marine Management Organisation
MPA	Marine Protected Area
NGO	Non-governmental Organisation
NOAA	National Oceanic and Atmospheric Administration
OCPP	Ocean Country Partnership Programme
ODA	Official Development Assistance
PA	Protected Area
PAME	Protected Area Management Effectiveness
SAC	Special Area of Conservation
SAPA	Social Assessment for Protected and Conserved Areas
SLEED	Sustainable Livelihoods Enhancement and Diversification
WWF	World Wildlife Fund

1 Background

1.1 The Ocean Country Partnership Programme

The Ocean Country Partnership Programme (OCPP) is a UK Government-led programme, helping to tackle marine pollution at its source, create and manage marine protected areas, make seafood more sustainable and support better management, monitoring and enforcement capabilities to help crack down on illegal, unreported and unregulated fishing by helping developing countries partner with and access the UK's world-leading ocean science expertise. Under the OCPP, the UK is partnering with Official Development Assistance (ODA) eligible countries to exchange science, research, and development expertise to address marine environmental challenges across three key themes: marine pollution, marine biodiversity, and sustainable seafood. The long-term impact of the programme will be that partner countries possess the skills and expertise to effectively access, develop and harness scientific knowledge and practise; and develop and implement evidence-informed, locally relevant policy. In doing so, we will support countries to effectively tackle the challenges that threaten marine environments and the livelihoods that depend on them.

Under the marine biodiversity theme, the OCPP will support countries with developing the skills and expertise needed to establish designated, well managed and enforced Marine Protected Areas (MPAs). This work will support healthy ecosystems with thriving biodiversity and fisheries that communities rely on for food and livelihoods. The programme aims to achieve these objectives by strengthening marine science expertise, developing evidence-based policy and management tools and creating educational resources for coastal communities. MPAs can help address the twin threats of biodiversity loss and climate change. Evidence has also shown that MPAs can improve capture fisheries beyond their boundaries, supporting the creation of jobs in trades such as tourism, and improve governance and stewardship of the marine environment.

The OCPP is being delivered under the UK government's Blue Planet Fund and supported in the UK by the Joint Nature Conservation Committee (JNCC), the Centre for the Environment, Fisheries & Aquaculture Science (Cefas) and the Marine Management Organisation (MMO). These organisations have extensive experience in supporting and delivering successful MPA projects at a range of geographical scales and across a range of global settings.

Through the OCPP, the partnership was invited to provide advice to support the designation process for the Mugli-Apsarkonda Marine Sanctuary in Karnataka, India. The OCPP's support includes two reports, this Roadmap to Designation and a Stakeholder mapping report.

1.2 Project context

A formal proposal to develop policy frameworks and toolkits for assessing and monitoring marine biodiversity in the MPA was drafted by an established contact at Plymouth University and submitted to the Karnataka Forest Department, who play a key role in protected area management in the region. Following the Department's review and approval of the document, meetings were held between the Government of Karnataka, Plymouth University and members of the OCPP to discuss the provision of advice to support the designation process for the Mugli-Apsarkonda Marine Sanctuary.

1.3 Current status of marine biodiversity in Karnataka

A synthesis of marine biodiversity evidence (McQuatters-Gollop, 2022) has highlighted that the Indian coast of Karnataka hosts a wide variety of life including marine mammals, sea turtles, commercial and non-commercial fish, mangroves, seagrasses and coral reefs and their associated communities. This rich biodiversity includes multiple species listed as Endangered, Vulnerable, or Near-threatened on the International Union for Conservation of Nature (IUCN) Red List and many more protected in India under the Indian Wildlife (Protection) Act 1972. Within the Karnataka region 10 Important Coastal and Marine Biodiversity Areas (ICMBAs) have been identified, covering a total area of 207 km^2 and include marine waters, islets, mudflats, mangroves and beaches. ICMBAs have been identified by the Wildlife Institute of India as important areas for marine and coastal biodiversity in India and globally. ICMBAs have been prioritised for immediate conservation actions and proposed to be upgraded to Protected Areas as soon as possible to enhance participation of local communities in governance. The synthesis also identified that there is a lack of quantitative sampling across all ecosystem components, with spatial-temporal and taxonomic gaps in sampling that has been undertaken. The predominant pressures identified in the synthesis for biodiversity along the Karnataka coast are climate change, coastal development, fishing and shipping. The rich marine and coastal biodiversity in Karnataka described in the marine biodiversity synthesis is summarised below:

- Mangroves: 15 species of mangroves along the Karnataka coast, with mangrove cover identified as increasing in this area (Forest Survey India, 2021). However, there is currently no details or maps of their extent, diversity or habitat change.
- **Coral reefs:** at least 14 species of coral identified around Netrani Island (Zacharia *et al.,* 2008). There is limited information on coral health and coverage in general along the Karnataka coast, however, military practices undertaken around Netrani Island has been found to damage local reefs (McQuatters-Gollop, 2022).

- **Plankton:** at least 53 phytoplankton and 136 zooplankton species (McQuatters-Gollop, 2022) along the Karnataka coast. Relatively widely surveyed but limited to generalised semi-quantitative data with no repeat time-series.
- **Seagrass:** two species of seagrass found along Karnataka coast (Mishra & Apte, 2021). Seagrass beds have not been regularly surveyed and there is limited information on their heath and extent. However, coastal development and climate change have been identified as the primary drivers for the decline of seagrass ecosystems (Mishra & Apte, 2021).
- **Seaweed:** 105 species found along Karnataka coast, with a relatively patchy and low density extent (McQuatters-Gollop, 2022). Previous survey work has been undertaken on identification of taxa, percentage cover and distribution, and associated fauna, but the location of this data poses as a significant challenge.
- **Benthic communities:** an array of benthic community species have been recorded along the Karnataka coast, including molluscs, shrimps, crabs, echinoderms, lobsters, sea cucumbers and cephalopods (McQuatters-Gollop, 2022). A year long comprehensive survey has been undertaken of the intertidal zone of 12 sandy and rocky beaches in Karnataka. However, no quantitative repeat surveys of benthic communities were located.
- **Turtles:** three species of sea turtle have been sighted in Karnataka waters: hawksbill (*Eretmochelys imbricata),* olive ridley (*Lepidochelys olivacea)* and green (*Chelonia mydas*). However, only olive ridley turtles have been reported to sporadically nest on Karnataka's beaches. Egg harvesting and coastal development remain prominent pressures on the turtles (McQuatters-Gollop, 2022). There are no continuous long-term datasets with consistent monitoring available, and knowledge gaps remain around nesting site locations, quantity of eggs/hatchlings and mortality rates.
- **Cetaceans:** at least 12 species have been recorded in the Sindhudurg-Karwar Important Marine Mammal Area (McQuatters-Gollop, 2022), with the Indian Ocean humpback dolphin and Indo-Pacific finless porpoise the most abundant cetaceans in Karnataka. The Indian Ocean humpback dolphin and Indo-Pacific finless porpoise are vulnerable to fishing, coastal development, boat traffic and tourism (Sanjeev *et al.,* 2016). There are several databases available which capture information from surveys undertaken, however the data either needs to be refined and processed for it to be useful at the more detailed scale and/or the raw data isn't currently accessible to allow a fuller picture of the population status to be formed.
- **Fish (including elasmobranchs):** at least 564 species of bony fish and 65 species of elasmobranchs have been recorded along the Karnataka coast (EMPRI, 2015). Fish species, including elasmobranchs, appear to be declining in numbers along the Karnataka coast (Hedge *et al.,* 2014). Fish

species are relatively well studied, with species lists and time-series data available for fish communities.

- **Seabirds:** at least 79 species of seabirds have been identified in mangroves in Karnataka (Vijaya Kumar & Kumara, 2014), with species diversity and abundance greatest outside of the monsoon season. Marine and coastal birds are not regularly monitored in Karnataka, but some data does exist.

1.4 The Mugli-Apsarkonda Marine Sanctuary

To protect and rehabilitate marine wildlife as well as reduce the pressure on marine biodiversity, the state government has agreed to designate Karnataka's first marine sanctuary in 2022, with the official name: the Mugli-Apsarkonda Marine Sanctuary. The Mugli-Apsarkonda Marine Sanctuary will encompass an area of 5,961 hectares and is located approximately 6 km off the coast of Honnavar, Karnataka. This marine sanctuary aims to protect an array of marine biodiversity, including just over 5,400 hectares of mangrove forest and several endangered species found within the coastal belt, such as humpback whales, spot-tail sharks and olive ridley turtles, with beaches along the coastal areas of the Kanara Circle serving as important turtle nesting grounds. The marine sanctuary will be designated under Section 18 of the Wild Life (Protection) Act, 1972.

Whilst current levels of human disturbance are considered low by the Karnataka Forest department, there is a need to better understand the current human activities active in the area outlining associated pressures and how best to protect marine ecosystems, preventing further damage and ensuring sustainable livelihoods for local communities in the future. Human density is extremely high in the region (with a population of just over 66 million in 2016 (Mudde, 2016)), with many people dependent on the ocean for their livelihoods.

Tourism is important to the local economy, but it is currently affecting beaches that are turtle nesting grounds. Commercial and subsistence fishing occurs in the area, and many endangered species are being caught as bycatch. Regulations will be implemented in the Marine Sanctuary to protect marine life. To raise awareness and help rehabilitate injured sea turtles and other marine animals, a marine conservation and rescue centre has also been proposed near to the Marine Sanctuary.

A range of stakeholders are present in the Karnataka region including fishermen, Government departments (e.g. the Department of Fisheries), non-governmental organisations (NGOs) (e.g. Reef Watch), village committees, and people associated with tourism. The Karnataka Forest Department will progress with official declaration of the sanctuary before engaging with local stakeholders. However, it is expected that the Marine Sanctuary will have socio-economic benefits, including enhancing livelihood options.

1.5 Aims

The key aim of this document is to share knowledge by providing a ‘roadmap’ of potential actions, with links to useful resources, that could be used when designating the Mugli-Apsarkonda Marine Sanctuary or future MPAs in India.

2 MPA designation and management process

MPA designation and management is not a rigid or linear process. The most effective processes follow a cyclical approach, allowing iteration and adaption as new evidence is discovered and evaluation is undertaken. The MPA design and management cycle is broadly represented in Figure 1.

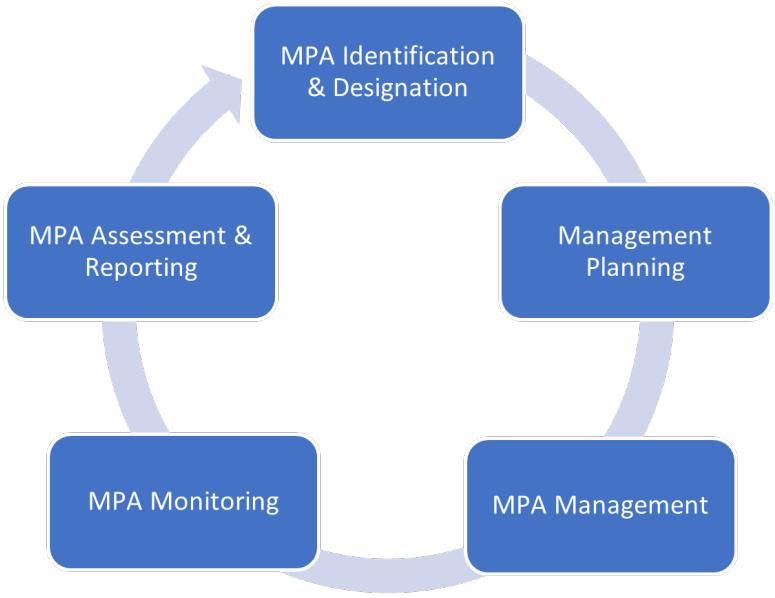

Figure 1. MPA design and management cycle.

It begins with the identification and designation of the MPA. This identifies the key values of the site (what needs to be protected), threats to these values and the objectives of the site. The management planning stage determines what needs to be done to achieve the objectives of the MPA and usually involves the development of an MPA management plan. The next stage is implementation of this management plan through the allocation of appropriate budget, staff, equipment and infrastructure. Once implementation is underway, it is important to understand whether the management actions are working. Appropriate monitoring regimes and subsequent assessment and review are essential for adaptive management to determine whether the MPA is being managed effectively and to identify and set new priorities to improve future management.

The following sections explore each of the main elements that form part of the cycle in more detail. It is important to recognise however, that each element complements and interacts with all of the others, and that the development of these separate elements often take place in tandem.

2.1 Stakeholder engagement

Stakeholders are individuals (or groups) who can affect or are affected by an organisation, strategy or project. Whilst stakeholder engagement is not identified as a specific element of the design and management cycle in Figure 1, it is important that ongoing engagement and dialogue with a range of stakeholder groups, including local communities, NGOs, local government and other agencies takes place at every stage of the process. It is considered essential for successful MPA designation and management.

Effective engagement provides a mechanism for all stakeholders to influence the decision-making process in a manner that is transparent and accountable. This will ensure that stakeholders understand the reason for the MPA designation and are therefore more likely to be supportive of management measures within it, resulting in a higher level of compliance. Understanding the potential issues that stakeholders may have with the proposal of an MPA designation along with the approach taken to engage with key stakeholders is important to address any concerns that stakeholders may have early in the process so that these can be factored into decisions made. Figure 2 below shows the key principles to achieving effective stakeholder engagement.

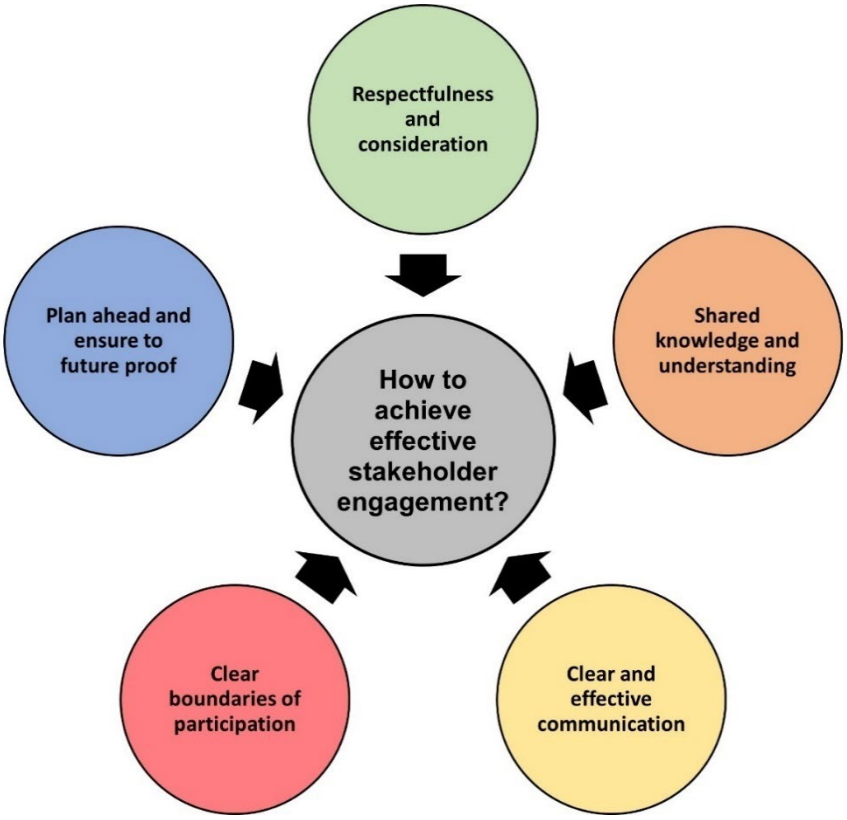

Figure 2. Principles of effective stakeholder engagement.

Stakeholder mapping is an initial process that can be used to identify stakeholders, grouping them according to their levels of participation, interest, and influence in the project; and determining how best to involve and communicate with each of these stakeholder groups throughout. Stakeholder mapping aims to provide recommendations on stakeholder engagement opportunities, to raise awareness, increase levels of interest and ensure support for plans and decisions made. It is during this process that it can be identified and agreed who will be involved in, and responsible for, delivering particular elements relating to the MPA design and management cycle. OCPP has conducted an initial stakeholder mapping exercise for the Mugli-Apsarkonda Marine Sanctuary.

Additional resources on stakeholder mapping and engagement can be found below:

- The MPA Fisheries Management Toolkit provides a resource for those involved in, and affected by, fisheries management decision-making. This toolkit lays out the key elements to consider in establishing a participatory approach to implementing management in MPAs, including developing active stakeholder participation in MPA Management. Whilst the MPA Fisheries Management Toolkit was designed for application in UK waters the general topics and information are transferable internationally.
- The BiodivERsA Stakeholder Engagement Handbook is designed to assist research teams identify relevant stakeholders to engage with in order to enhance the impact of their work.
- WWF/NOAA Stakeholder Engagement describes participatory approaches for the planning and development of marine protected areas
- OSPAR guidance highlights good practice for communicating with stakeholders on the establishment and management of marine protected areas.

2.2 MPA identification and designation

Desired outcomes:

- The Mugli-Apsarkonda Marine Sanctuary is identified based on local knowledge and scientific data, with clear goals and informed by stakeholder participation.
- The Mugli-Apsarkonda Marine Sanctuary has defined boundaries and is legally gazetted.

The first stage of the MPA design and management cycle is identifying where and why an MPA needs to be identified, what the objectives for the MPA are (i.e. what it hopes to achieve) and understanding the legislative mechanisms for designation. It is at this stage that existing evidence will be collated and analysed to characterise the site from a biological, social, cultural and economic perspective. This will inform the development of the overarching aims and subsequently identify the boundaries

of the MPA. All of these steps are interconnected and may take place concurrently, however the individual elements are described in more detail below.

2.2.1 Site characterisation

Before determining the boundaries and management needs of the site, it is important to understand the biophysical, social, cultural and economic context of the area in order to identify what the key values of the site are i.e., what needs to be protected (for example, important habitats or species) and the threats to them that will need to be managed (for example, human activities within or adjacent to the site). The first step is therefore to characterise the site to include the biophysical, social, cultural, economic and governance context:

Biophysical:

- Collation and evaluation of available information on key species, habitats and ecological processes within the site. Where possible, this should consider the presence of a variety of different habitats, including any rare or unique habitats or important habitats such as nursery or breeding areas; rare or endangered species; connectivity of the site with other protected areas; current condition of the habitats and species and the level of threats / pressures on them including cumulative impacts of activities and climate change considerations.
- The inclusion of local ecological knowledge is key to this process and should be used in combination with scientific survey data. It is particularly important in sites where scientific data may be lacking. This local ecological knowledge can be gained through participatory mapping with local stakeholders to enhance understanding of the marine biodiversity and ecosystems within the site.

Social and economic:

- Collation and evaluation of information on the baseline social, cultural and economic context of the site, for example:
  - Importance of the area for both the local and wider communities. This includes understanding the social, cultural and economic importance of the site.
  - Extractive and non-extractive uses of the site; activities outside of the site that might impact the species/habitats within it should also be considered as well as the potential drivers for any damaging activities (if relevant).
  - Mapping resource use and threats (for example through participatory mapping exercises with resource users).

Governance:

- Consideration of existing government policy and legislation of relevance to the area and any existing management measures that are in place; identification of any gaps in legislation or policy.
- Consideration of who needs to be engaged in the process and how they will be engaged (e.g. key stakeholders, local communities) through a stakeholder mapping process.

The above information could be provided in a summary report to summarise the available evidence and make recommendations for MPA establishment.

Current Status:

Evaluation of key ecological information has been considered through the desk-based study by Dr Abigail McQuatters-Gollop (McQuatters-Gollop, 2022); this is a synthesis of ecology in the region, using species lists and quantitative data on fish, sea birds, sea turtles and marine mammals to characterise the site. Consideration of who needs to be engaged in the process and how they will be engaged is being considered through the initial stakeholder mapping exercise completed by the OCPP.

Useful resources:

Participatory mapping:

- Good practices in participatory mapping: a review prepared for the International Fund for Agricultural Development (IFAD).

Social, cultural and economic assessments:

- Socioeconomic Monitoring Guidelines for Coastal Managers in South Asia: a simplified set of guidelines outlining a practical monitoring protocol for socioeconomic assessments.
- The Social Assessment for Protected Areas methodology (SAPA): detailed guidance for assessing the social impacts — positive and negative — of protected areas (PAs). It describes the relatively simple and low-cost Social Assessment for Protected and Conserved Areas (SAPA) methodology, which is intended for use at site level.
- Sustainable Livelihoods Enhancement and Diversification (SLED): A Manual for Practitioners: a set of guidelines for development and conservation practitioners whose task it is to assist people in enhancing and diversifying their livelihoods.

Government policy and legislation:

- Guidelines for Marine Protected Areas (Section 2 – Developing the legal framework).

2.2.2 Definition of MPA objectives

The goals and objectives of the MPA should be clearly defined before starting the management planning process. These will have distinct implications for the design and management of the MPA, for example, where to locate it, its size and the types of restrictions that may be appropriate. For the site to be globally recognised as an MPA, conserving nature must be the primary objective of the site; this could be conservation of the wider marine environment or conservation of specified habitats, species or ecological processes. Secondary objectives can relate to other aspects, for example sustainable management of fisheries, enhancing the value of the site for tourism or use of the area as an important reference area for scientific research and education. The objectives of the MPA should be agreed in collaboration with key stakeholders, who can be identified and refined during the planning phase.

Current Status:

We understand that Mugli-Apsarkonda will be a Marine Sanctuary (i.e. no extractive activities will be allowed to take place). We also understand that the Marine Sanctuary will take a whole site approach, as opposed to protecting single habitats or species. No further actions are required.

2.2.3 Agreement of site boundaries

The site boundary should be determined based on the information above in collaboration with key stakeholders. It is recommended that the proposed boundary of the Mugli-Apsarkonda Marine Sanctuary be reviewed to ensure that it is appropriate and will enable the site's objectives to be achieved. Where possible, this should take the following ecological design principles into consideration.

The MPA:

- Is in the right location and is the right shape and size to support the full range of habitats and ecosystem processes and to sustain viable populations of the key species in the long-term.
- Includes habitats and species of unique conservation value, in particular those with important ecosystem roles and those that are unique, rare, threatened or endangered.
- Is sufficiently connected to other habitats or ecosystems to protect ecological linkages and connectivity pathways for the key species.
- Considers climate change, for example considering whether the site includes any blue carbon habitats (e.g. mangroves or seagrass) or potential climate refugia.
- Considers existing threats, including those outside of the site boundaries and takes a precautionary approach to potential future threats.

Social design principles:

- Inclusion of social, cultural and economic objectives.
- Recognition of pre-existing rights and human extractive and non-extractive uses.
- Consideration of equitable distribution of costs and benefits to different social groups.

It is important that the site boundaries are unambiguous, published and known to all local users. The site boundary should therefore be as simple as possible. Where possible, ensuring straight line boundaries will make it easier for users of the marine environment to know where the MPA is, assisting with compliance and enforcement of the site. The boundaries should be effectively communicated to all stakeholders including local marine resource users as well as regionally, nationally and internationally (e.g. through maps published online and inclusion in the World Database on Protected Areas). Examples of good practice in drawing MPA boundaries include:

- Using a minimum number of straight lines.
- Ensuring a compact site shape.
- Incorporating a margin to enhance protection of key habitats and species from external threats.
- Ensuring to work and effectively communicate with agencies and stakeholders.

Current Status:

We understand that the boundaries of the site have already been identified and will be made final when the MPA notification process is completed.

Useful resources:

- Marine Conservation Zone Project – Ecological Network Guidance (Section 6.3 – MCZ boundaries).
- UK Guidance on Defining Boundaries for Marine SACs for Annex I Habitat Sites Fully Detached from the Coast.
- OSPAR Guidance on developing an ecologically coherent MPA network.

2.2.4 Development of legislative framework

Before an MPA can be established, it may be necessary to review and revise existing legislation and/or develop new legislation. It is important that any legislation clearly states that conservation should be the primary objective of the MPA.

Current Status:

We understand that the Mugli-Apsarkonda Marine Sanctuary will be designated under the Wildlife (Protection) Act 1972 and that preliminary notification is in progress. No further actions are required.

2.3 MPA management planning

The second stage of the MPA design and management cycle is to determine what needs to be done to achieve the agreed objectives of the MPA. This should involve the development of an MPA management plan. The management planning process ensures that management decisions are based on a clear understanding of the MPA, its purpose and the important values and resources associated with it.

Desired outcomes:

- The Mugli-Apsarkonda Marine Sanctuary has clearly stated goals and processes to define allowed uses and associated regulations or rules to control impact.
- The Mugli-Apsarkonda Marine Sanctuary has a Management Plan that was developed in collaboration with key stakeholders.

2.3.1 Development of a management plan

Once the design phase is complete, it is important to develop a well-defined management framework for the MPA which will increase certainty and predictability for users of the marine environment in the form of an MPA Management Plan. A Management Plan is the main tool to guide managers, people using the marine environment and other interested parties on how a MPA should be managed today and in the future. It is a long-term strategy (reviewed and updated at regular intervals) that provides a clear explanation of the management goals and objectives. It ensures that management decisions are based on a clear understanding of the MPA, its purpose, and the important resources and values associated with it, which results in more effective and efficient protection. It is essential that the Management Plan is developed in collaboration with all key stakeholders who will have been identified during the stakeholder mapping exercise.

As part of the management planning process, it will be important to consider what actions need to be taken to achieve the MPA's goals and objectives including a consideration of ecological, social, cultural, economic and governance aspects. This may include activities to reduce threats to the key species from human activities or to restore degraded habitats, establishment of processes for on-going engagement with stakeholders to ensure they can play an active role in MPA management, education and awareness-raising with local communities, activities to enhance benefits to local

communities from the MPA (e.g. alternative livelihoods), monitoring and research and compliance and enforcement as well as a consideration of the resources and capacity needed to effectively manage the MPA.

The management planning process should include the following steps:

- Define the process including identifying the available capacity, resources and funds to develop the management plan and determining who will lead the management planning process and how different stakeholders will be involved.
- Collate and review all information collected as part of the site characterisation process. This should include reviewing the key values of the MPA (for example, the key habitats and species that the MPA will protect) and associated social and cultural ecosystem service values to ensure all those identified during the design stage are being considered in a management context.
- Consider and prioritise the threats to the MPA's values and associated ecosystem services that were identified during the identification and characterisation stages.
- Review, refine and agree the MPA's goals and objectives.
- Consider what actions need to be taken to mitigate the threats and achieve the MPA's goals and objectives including a consideration of ecological, socio-economic and governance aspects. This may include:
  - Setting-out the governance and administrative structures for management and enforcement, including responsibilities and consideration of the resources and capacity needed to effectively manage the MPA.
  - Establishment of processes for on-going engagement with stakeholders to ensure they can play an active role in MPA management.
  - Management activities to reduce threats to the key species from human activities or to restore degraded habitats.
  - Education and awareness-raising with local communities.
  - Activities to provide benefits to local communities from the MPA (e.g. alternative livelihoods).
  - Monitoring and research.
  - Compliance and enforcement.
- Agree the process for reviewing and evaluating the success of management actions.
- Draft the management plan.
- Public consultation on the draft management plan.
- Approval and publication of the final management plan.

Current Status:

We understand that a Management Plan has not yet been developed for the Mugli-Apsarkonda Marine Sanctuary. We also understand that there is Coastal Regulation Zone in the region, which should also be considered in the MPA management planning process.

Useful resources:

- Online training on MPA management, including guidance on management planning and writing an MPA management plan is available on the Marine Management Organisation's Learning Management System. To access the site, you can register by contacting MMO.Training@marinemanagement.org.uk
- Guidelines for Management Planning of Protected Areas.
- Protected Area Governance and Management: Marine Protected Area Management.

2.4 MPA management

The third stage of the MPA design and management cycle is to implement the Management Plan and manage the MPA. This will ensure that the MPA has activities and uses that are compatible with the conservation aims and objectives. Management activities aim to control or mitigate impacts associated with human activities (for example, fisheries, recreation, tourism, shipping) or to address pressures (for example, illegal fishing or declining water quality). Management also ensures that there is adequate resourcing including budget and staff capacity.

Desired outcomes:

- The Mugli-Apsarkonda Marine Sanctuary has a defined management body to implement the Management Plan.
- The Mugli-Apsarkonda Marine Sanctuary has an established process for involving stakeholders in management decision-making.
- The Mugli-Apsarkonda Marine Sanctuary has a system in place to promote compliance and enforcement and a plan for regular surveillance (e.g. by patrols, remote surveillance, or an offense reporting system) that addresses any MPA-specific challenges.

2.4.1 Ensuring sufficient resources

Once the management planning work has been completed, it is essential to ensure that there are sufficient resources to manage the MPA in terms of budget, people, equipment and infrastructure. The MPA management team should have an appropriately sized and skilled workforce. Training needs should be periodically

reviewed to enable staff to refresh skills and learn new ones. Management should also ensure that any infrastructure is operational, appropriately located, and that any required equipment is well maintained and operational. One of the main challenges for MPAs is securing sufficient, sustainable funding. Most MPAs are reliant on domestic government budgets and international donor assistance. Government budgets are however often insufficient to cover total costs of MPA management and donor funding usually only covers specific projects such as MPA designation but doesn't generally support the ongoing, long-term expenses of MPA management. So, it is important to consider other longer-term sources of finance. These might include:

- User fees collected from resource users such as tourists.
- Conservation trust funds.
- Blue bonds.
- Payments for ecosystem services.

Current Status:

We understand that the Mugli-Apsarkonda Marine Sanctuary will be managed by the Karnataka Forest Department. Wildlife areas including Wildlife Sanctuaries are administered by a Wildlife wing within the Forest Department comprising a range of staff who are exclusively in charge of the wildlife areas. The Wildlife wing is headed by Principal Chief Conservator of Forests, Wildlife and Chief Wildlife Warden. In addition to the wildlife unit, the Forest Department has a number of functional units such as Working Plan, Research, Training, Evaluation, Vigilance, ICT cell, and Mobile Squads.

Useful resources:

General MPA management:

- Marine Protected Area Management: guidance on all aspects of MPA management.

Sustainable financing mechanisms:

- A range of resources for the sustainable financing of MPAs are available on the Open Communications for the Ocean website.
- Marine Protected Areas Economics, Management and Effective Policy Mixes: provides guidance on effective design and management of MPAs (Chapter 3) and sustainable financing of MPAs (Chapter 4).
- The Ocean Finance Handbook: core reading and an ongoing reference with practical examples.
- Investing in Nature: useful resource (although focussed on Europe), with specific case studies and examples of different blended finance structures, financial mechanisms, and initiatives.

2.4.2 Sustaining effective stakeholder engagement

As described in Section 2.1 above, it is important that engagement and dialogue with stakeholders continues into the MPA management phase. Stakeholder engagement is one of the most important factors affecting MPA success. Management of an MPA has consequences for a wide range of stakeholders, with environmental, social and economic impacts. In addition, management of an MPA usually requires the management authority to try to change the behaviour of marine resource users to minimise human impacts to marine habitats and species. For example, trying to encourage fishers to use different fishing methods or educating tourists not to get too close to marine wildlife. Stakeholder engagement improves transparency in decision-making helping to build trust in the MPA management authorities. It can also reduce conflict and mistrust amongst different stakeholder groups, helping to create a sense of ownership over outcomes. This sense of ownership can motivate stakeholders to change their behaviour and thus works alongside enforcement measures to help improve compliance with the MPA rules and regulations.

There is no one engagement methodology that fits all stakeholders and all MPA management processes. Perceptions and concerns differ across stakeholder groups and the need to understand these from multiple perspectives is important. The development of a stakeholder engagement plan is an essential step in making sure that the engagement methods used are tailored to the local situation so that it will have the desired outcome.

A stakeholder engagement plan helps to target engagement activities more effectively. It helps to define the level of engagement needed and therefore what methods are most appropriate. Methods can range from development of communications materials to public meetings, formal consultations, stakeholder workshops or the establishment of advisory groups. The stakeholder engagement plan should define the purpose of the engagement activities, identify the key stakeholders and provide a clear outline of when and how to engage with them. It enables consideration of the likely costs (time and money), so that engagement activities can be tailored to the resources available. This can help ensure all stakeholders can have an opportunity to participate at the most relevant stage, and if resources are limited, activities are focused on the important and influential stakeholders. The stakeholder plan can be used for a number of different functions, for example:

- Planning stakeholder engagement events to ensure that the right stakeholders are included and to agree on the specific techniques to use during the event.
- Planning consultation processes for new legislation, policies or management activities.

- Developing communications materials to share announcements on progress or the publication of new reports.
- Introducing new team members to the different stakeholders.

Useful resources:

Please see the resources on stakeholder mapping and engagement listed in Section 2.1 above.

2.4.3 Development of a compliance and enforcement strategy

Once the Mugli-Apsarkonda Marine Sanctuary has been designated, it will be essential to ensure that any individuals or users interacting with the MPA do so in accordance with the legislation.

Enforcement of regulations should be regarded as the last resort, and measures to promote voluntary compliance should be the first step. Non-compliance commonly occurs when people do not understand (or have not been told) the reasons for restrictions. It is therefore very important to work proactively with stakeholders and user groups to communicate the rules and regulations and raise awareness of why these rules and regulations exist. This will help to develop a culture of compliance, amongst the majority of users, so that limited resources can be focussed on any high-impact non-compliant behaviours. Methods used to assess compliance can include real-time surveillance through routine patrols by dedicated law enforcement officers. The emergence of new technology (such as satellite imagery) can help to enhance effectiveness of surveillance in remote marine areas.

Enforcement then consists of the actions taken against those who violate the rules and regulations and can include criminal penalties, civil penalties, catch or vessel seizures and permit sanctions. The existence of a sound legal framework is essential to be able to prosecute those who violate the regulations. The actions that will be taken to ensure compliance with the MPA regulations can be set out in a Compliance and Enforcement Strategy.

Current Status:

Under the Wild Life (Protection) Act, 1972 it is illegal to destroy, exploit or remove any wildlife from a sanctuary or destroy or damage the habitat of any wild animal by any act whatsoever except in accordance with a permit granted by the Chief Wildlife Warden. Section 50 of Act gives authorised officers including the Chief Wildlife Warden, any forest officer or any police officer the powers to stop and search any person, vehicle or vessel if they have reasonable grounds for believing that any person has committed an offence against the Act. Anyone who contravenes any

provisions of the Act is guilty of an offence and on conviction can be imprisoned, given a fine or both.

Useful resources:

- Training materials are available on MPA management through the Marine Management Organisation's (MMO's) Learning Management system. To access the site, you can register by contacting MMO.Training@marinemanagement.org.uk
- Legal tools for strengthening marine protected area enforcement.

2.5 MPA monitoring

The fourth stage of the MPA design and management cycle is to undertake long-term monitoring. Monitoring should include ecological as well as social, cultural and economic aspects. Ecological monitoring provides information on the condition of marine resources within the MPA, and monitoring of the social, cultural and economic aspects will provide information on people and how they benefit or are affected by the establishment of the MPA. Monitoring provides the evidence that managers need to inform decision-making and policy development, which can support improving the management effectiveness of the MPA.

Desired outcomes:

- The Mugli-Apsarkonda Marine Sanctuary has a plan for long-term monitoring including collection of ecological, social, cultural and economic data.

As near to site designation as possible, it is important to establish the current ecological status of the protected habitats and species, as well as social and economic importance of the area. Baseline data at the time of designation can be used as a benchmark to assess changes in the future as a result of management actions. However, further data may also need to be collected to establish or better understand the baseline this wasn't available at designation.

Monitoring of the ecological status, social and economic impacts will then need to be conducted at regular intervals, to allow detection of changes and trends over time. It also provides the evidence managers need to inform their decision-making and policy development, resulting in more effective MPA management. Ecological monitoring provides information on the specific habitats and species protected within the MPA, whilst the social and economic monitoring will provide information on resources and how stakeholders are benefitting or are affected by the establishment of the MPA.

This stage will involve agreeing a suite of biodiversity, economic and social indicators that can be used to track progress towards the MPA's objectives. A Monitoring and Research Plan that clearly sets out the process for obtaining the

datasets needed to inform these indicators should then be developed. Considering current data availability and resources are critical to ensuring a realistic approach. This phase can be scalable, starting with a core group of indicators and building upon success in the future.

Capacity building for field staff is another important consideration as are data management and metadata recording. Collaboration with local NGOs and researchers may be useful to support monitoring activities.

Current Status:

A comprehensive literature review (McQuatters-Gollop, 2022) of all the research on the marine aquatic flora and fauna in the three districts has been undertaken to form the baseline ecological data.

Useful resources:

- Global Coral Reef Monitoring Network (GCRMN): Caribbean guidelines for coral reef biophysical monitoring.
- Manual for mangrove monitoring in the Pacific Islands region.
- Protocols for the measurement, monitoring and reporting of structure, biomass and carbon stocks in mangrove forests.
- Guidelines for the long term Monitoring programmes for marine turtles nesting beaches and standardized monitoring methods for nesting beaches, feeding and wintering areas.
- Environmental Justice Foundation (EJF): Nesting turtle monitoring.

For useful resources relating to social, cultural and economic monitoring, please see Section 2.1 above.

2.6 MPA assessment and reporting

The final stage of the MPA design and management cycle is assessment and review. It is important to understand whether the management actions are working and achieving what they set out to do and that the MPA is being effectively managed. This helps to document achievements and to identify and set new priorities to improve future management. It also helps to ensure accountability and transparency as part of an adaptive management approach.

Desired outcomes:

- The Mugli-Apsarkonda Marine Sanctuary has regular evaluation of management effectiveness to inform adaptive management.

A Protected Area Management Effectiveness (PAME) evaluation helps to measure and understand the impact of management actions on the MPA's values and tracks

progress towards achievement of the MPA's goals and objectives. The term management effectiveness reflects three main themes:

1. Design issues.
2. Adequacy and appropriateness of management systems and processes.
3. Delivery of MPA objectives including conservation of values.

The results of a PAME evaluation will help MPA managers to document achievements, identify and set new priorities to improve future management and enable effective resource allocation, as part of an adaptive management approach. In addition, a PAME evaluation can help to build support and trust by sharing information about management achievements with the community and other stakeholders. International reporting on the management of protected areas is also becoming increasingly common. For example, PAME is embedded within the Convention on Biological Diversity and contracting parties are required to report on it.

Evaluation should be carried out on a regular basis, for example every 2–5 years, although this is dependent on the MPA and its objectives: some elements may be assessed at different intervals depending on their need. A PAME evaluation is generally achieved by the assessment of a series of criteria (represented by carefully selected indicators) against agreed objectives or standards. A good example of a tool developed for PAME is the Management Effectiveness Tracking Tool, specifically the latest version (METT-4). A link to further guidance on this tool is provided in the resource section below.

Useful resources:

- PAME evaluation methods – Management evaluation in protected areas – a global study.
- Management Effective Tracking Tool (METT-4) guidance.
- How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness.
- Blue Belt Programme Training: Module 5.5 – Marine Protected Area Management Effectiveness. Available on the MMO Learning Management system (sign-in required).
- Strengthening Protected Area Management Effectiveness - a four-part webinar series, part of the IUCN WCPA Vital Sites: The Journey to Marseille series of online events. The sessions covered (with links to recordings):
  - Exploration of the different approaches and tools used in PAME around the world: https://vimeo.com/440937322.
  - Closing the loop – ensuring management effectiveness assessments lead to better conservation outcomes: https://vimeo.com/441945318.
  - The IUCN Green List – a standard for conservation of protected and conserved areas: https://vimeo.com/443057895.
  - Understanding management effectiveness at regional and global scales: https://vimeo.com/444358405.

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