

A Workbook for Assessing Management Effectiveness of Marine Protected Areas in the Western Indian Ocean

Sue Wells and Sangeeta Mangubhai

October 2004



CONVENTION ON
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ACRONYMS AND ABBREVIATIONS

CBD	.Convention on Biological Diversity
CORDIO	.Coral Reef Degradation of the Indian Ocean
CZMC	.Coastal Zone Management Centre, Netherlands
EAME	.Eastern African Marine Ecoregion
EARO	.Eastern Africa Regional Office (IUCN)
EARP	.Eastern Africa Regional Programme (IUCN)
GEF	.Global Environment Facility
GEMPA-EA	.Group of Experts for Marine Protected Areas (Eastern Africa)
GCRMN	.Global Coral Reef Monitoring Network
ICAM	.Integrated Coastal Area Management
ICRAN	.International Coral Reef Action Network
ICZM	.Integrated Coastal Zone Management
IUCN	.The World Conservation Union
KWS	.Kenya Wildlife Services
MBREMP	.Mnazi Bay Ruvuma Estuary Marine Park
METF	.Monitoring Effectiveness Task Force
MNP	.Marine National Park
MNR	.Marine National Reserve
MOU	.Memorandum of Understanding
MPA	.Marine Protected Area
MPRU	.Marine Parks and Reserve Unit (Tanzania)
NEPAD	.New Partnership for African Development
NGO	.Non-Governmental Organisation
NOAA	.National Oceanic and Atmospheric Administration
NORAD	.Norwegian Agency for Development Co-operation
SFA	.Seychelles Fishing Authority
TCMP	.Tanzania Coastal Management Programme
TNC	.The Nature Conservancy
UNDP	.United Nations Development Programme
UNEP	.United Nations Environment Programme
UNESCO	.United Nations Educational, Scientific and Cultural Organisation
UNF	.United Nations Foundation
WCPA	.World Commission on Protected Areas
WIO	.Western Indian Ocean
WIOMSA	.Western Indian Ocean Marine Science Association
WPC	.World Parks Congress
WSSD	.World Summit on Sustainable Development
WWF	.World Wide Fund for Nature & World Wildlife Fund

PREFACE

Increasingly governments and civil society want accountability and evidence that setting aside areas of land and sea for biodiversity conservation is worthwhile. Accountability is also required at the international level. The Convention on Biological Diversity requires parties to report on the status of their protected areas and has recommended that countries should carry out management effectiveness assessments of at least 30% of their protected areas by the year 2010. There is therefore an increasing need to provide tried and tested tools for this.

The need for tools and guidelines to evaluate the ecological and managerial quality of protected areas was first recognised at the 1992 World Parks Congress in Venezuela, with the result that in 1996 IUCN set up a Management Effectiveness Task Force (METF) under the World Commission on Protected Areas (WCPA) to look at this issue. In 2000, a framework methodology was published by IUCN (Hockings et al., 2000a) to provide general guidance in the development of assessment systems for protected areas and to encourage basic standards for assessment and reporting (www.wcpa.iucn.org). This emphasises the importance of promoting a flexible approach to assessments, recognising that the general methodology will need to be adapted to each site. This is a new field and many methods are being developed and tested at present.

IUCN's global programme on improving protected area management through assessment of management effectiveness now involves many partners including the World Wide Fund for Nature (WWF), The Nature Conservancy (TNC), United Nations Educational Scientific and Cultural Organisation (UNESCO), the World Heritage Convention, and the marine component of WCPA. Specific initiatives include WCPA-Marine's manual aimed at helping Marine Protected Areas (MPAs) select and use appropriate indicators for assessing management effectiveness (<http://effectiveMPA.noaa.gov>) and a four-year UNF/UNESCO/IUCN project involving World Heritage Sites ('Enhancing Our Heritage') which includes five Eastern African pilot sites (of which two - Greater St Lucia Wetland Parks and Aldabra Special Reserve - have marine components) (www.enhancingheritage.net).

This 'workbook' was produced in order to test and adapt the WCPA methodologies for use at MPAs in the Western Indian Ocean (WIO). It is based mainly on the approach used in the World Heritage project and the WCPA/METF Framework, but reference is made to the WCPA-Marine methodology and explanations of the differences in approach are provided. It has been tested in eight MPAs in three countries in the WIO - Kenya (Kisite/Mpunguti, Mombasa, Malindi, and Watamu

Marine National Parks and Reserves, and Kiunga Marine National Reserve), Tanzania (Mafia Island and Mnazi Bay-Ruvuma Estuary Marine Parks) and Seychelles (Cousin Island Special Reserve).

The WIO Biodiversity Conservation Project initiated in February 2000 is a partnership project to assist the Contracting Parties to the Nairobi Convention to implement the Jakarta Mandate of the Convention on Biodiversity (CBD). It is coordinated by the IUCN-Eastern African Regional Programme and overseen by a Task Force with members from six WIO countries and representatives from the Western Indian Ocean Marine Science Association (WIOMSA), WWF, Wildlife Conservation Society (WCS) and the United Nations Environment Programme (UNEP). The project is primarily funded by the Norwegian Agency for Development Cooperation (NORAD). The production of the workbook addresses the third result area of the project: "establishment and management of marine protected areas" and has been carried out under the oversight of the Eastern African Group of Experts on Marine Protected Areas (GEMPA-EA), with additional financial support from the Coastal Zone Management Centre of the Netherlands. The pilot assessments were carried out with the support of the Eastern African component of the International Coral Reef Action Network (ICRAN) programme that is being implemented through UNEP, with funding from the United Nations Foundation (UNF).

The workbook is designed to allow for a dynamic process of MPA management based on the lessons learnt through piloting the first draft of the workbook in eight MPAs in Kenya, Tanzania and the Seychelles. It takes into account the management issues faced in the WIO, is cost effective and encourages self-assessment by the managers. The Workbook has a complementary website (www.wiomsa.org/mpaworkbook.htm) and CD ROM. There are plans to translate this into French and Portuguese.

The Toolkit for Managing Marine Protected Areas in the Western Indian Ocean compliments the workbook. The toolkit was designed to support MPA Managers in the WIO by providing them with a hand-on guide to a diverse array of topics, ranging from monitoring and evaluating projects, conflict resolution, threatened marine species and financial planning. This is available as a hard copy from IUCN-EARO and (www.wiomsa.org/mpatoolkit.htm).

It is intended that this Workbook will be fundamental in assisting MPA managers and practitioners in their crucial role as custodians of marine biodiversity in the WIO.

GLOSSARY OF TERMS USED

Adaptive management is the adjustment of management actions on the basis of lessons learnt over time, in order to improve performance.

Assessment is the judgment or evaluation of the achievement of protected area management against a set of standards or objectives.

Criteria (or indicators) for protected area management effectiveness are quantitative or qualitative measures that provide information about the achievement of the protected area's goals and objectives.

Goals are general descriptions that summarise the desired state of a protected area.

A **learning environment** is one that encourages and fosters the sharing of knowledge, skills and experiences, both within and outside an organisation, so that lessons learnt through conservation and management are not lost, and mistakes are not repeated.

Management effectiveness is the degree to which a protected area is achieving its goals and objectives.

Management targets are a limited number or aggregate, of an MPA's biological, social, cultural and other values that are considered to be the focus of management at the site.

A **marine protected area (MPA)** is defined by IUCN as 'any area of intertidal or subtidal terrain, together with its overlaying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part of all of the enclosed environment.'

Monitoring is a process of collecting information about one or more elements of the environment, for specific purposes, using comparable standardised monitoring methods at regular intervals over time.

Objectives are specific statements listed under goals that describe the desired outcomes of the protected area.

A **protected area** is defined by IUCN as 'an area of land and/or sea especially dedicated to protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means'.

A **standard** is the required level or quality that has to be reached; in other words it is a reference point or ideal situation against which other things can be evaluated.

1. INTRODUCTION

Kufanya kosa siyo kosa. Kosa ni kurudia kosa.

To make a mistake is not a mistake. The mistake is to repeat the mistake.

Bajuni proverb, Kenya

1.1 Why assess MPA management effectiveness?

Most countries in the Western Indian Ocean (WIO) have one or more marine protected areas (MPAs) dedicated to the protection and maintenance of biological diversity, natural resources and cultural heritage values. Of these, two (Greater St Lucia Wetlands Park and Aldabra Atoll) are listed as World Heritage sites under the World Heritage Convention, and another three (Malindi-Watamu and Kiunga-Dodori in Kenya, and Mananara-Nord in Madagascar) are listed as Biosphere Reserves under the UNESCO Man and Biosphere Programme in recognition of their global value. Experience has shown that it is not simply enough to declare or legally gazette an area as an MPA, although this is a vitally important step. The long-term success of an MPA depends on effective management combined with demonstration of its usefulness and appropriateness as a conservation and management tool within its local and national context.

Management effectiveness is the degree to which a protected area is achieving its objectives and goals.

The main aim of assessing management effectiveness is to improve performance of the MPA, through adaptive management – adjusting management actions on the basis of lessons learnt over time. Assessment should be seen as a normal and essential component of the process of MPA management.

It is not only important for looking for problems and finding solutions, but it is also a way of identifying what is working well, so that a **learning environment** is created. A learning environment is one that encourages the sharing of knowledge, skills and experiences both within and outside an organisation, so that lessons learnt are not lost and mistakes are not repeated. A learning environment does not focus on what was successful and what failed, but on the 'lessons learnt' and how others might benefit from these experiences.

Management effectiveness can be **assessed** by looking at changes in the biophysical and

socioeconomic environment as a result of the presence of the MPA, and also at the structures, activities and processes involved in management itself. Assessment should include issues within and/or beyond the control of individual managers.

Once the results of an assessment are known, management can be improved by adapting processes, making new interventions, developing more strategic plans, and improving resources. **Monitoring** programmes, which are essential for tracking progress, can also be improved or introduced; the assessment will show that these should not be limited to the biophysical and socioeconomic environment, but should include the management process itself.

There are other reasons for assessing management effectiveness. The assessment can lead to improved accountability and reporting, and can assist with planning for the future. MPA managers can use the results to improve their performance, report on their achievements, or highlight issues for which they require more support or additional funds. Policy makers, conservationists and funding agencies can use the results to highlight problems, set priorities, and promote better management policies and practices. It can also lead to the identification of new strategic partnerships and/or the improvement of existing partnerships (e.g. with stakeholders or other external agencies), to ensure the management needs of an MPA are met.

1.2 The management cycle and components of the assessment

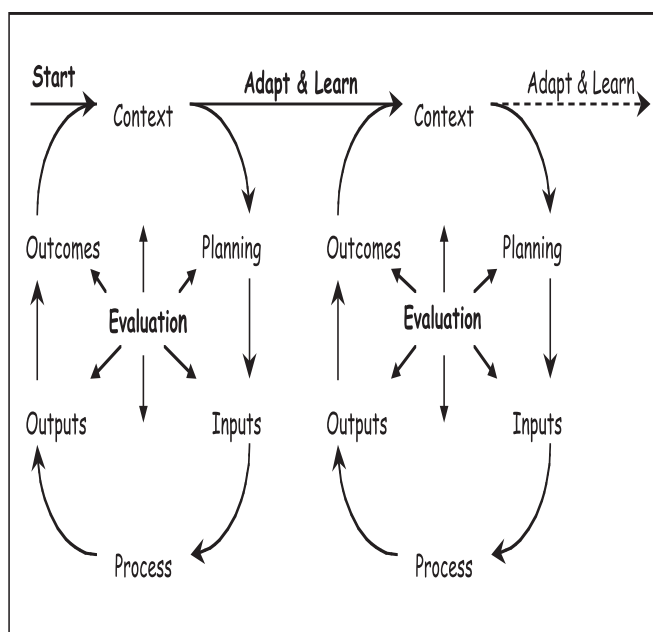
The framework for assessing management effectiveness developed by IUCN's World Commission for Protected Areas (WCPA) is based on the idea that there are six stages or elements to good management (Fig. 1). **Management:**

- begins with establishing the **context** of existing values and threats (where are we now?),
- progresses through **planning** (where do we want to be and how will we get there?), and
- allocation of resources or **inputs** (what do we need?), and
- as a result of management actions or **process** (how do we go about it?),
- eventually produces goods and services or **outputs** (what did we do and what did we produce?), that
- result in impacts or **outcomes** (what did we achieve?)

These components can be seen as different parts of a cycle. Each component should be monitored and assessed, and the results of the assessment should be used to make changes to (i.e. adapt) management actions so that the overall management of the MPA continues to improve or inappropriate interventions are amended or halted.

The six components cover the three key aspects of protected area established and management (Fig. 2).

Figure 1: The management cycle and adaptive management



Context and planning relate to the design of the MPA, inputs and process to management systems/processes, and outputs and outcomes the delivery of objectives.

How appropriate is the design?

- What is the **context** in which the MPA has been set up/is being implemented?
- How good is the **planning**?

How appropriate are the management systems and processes?

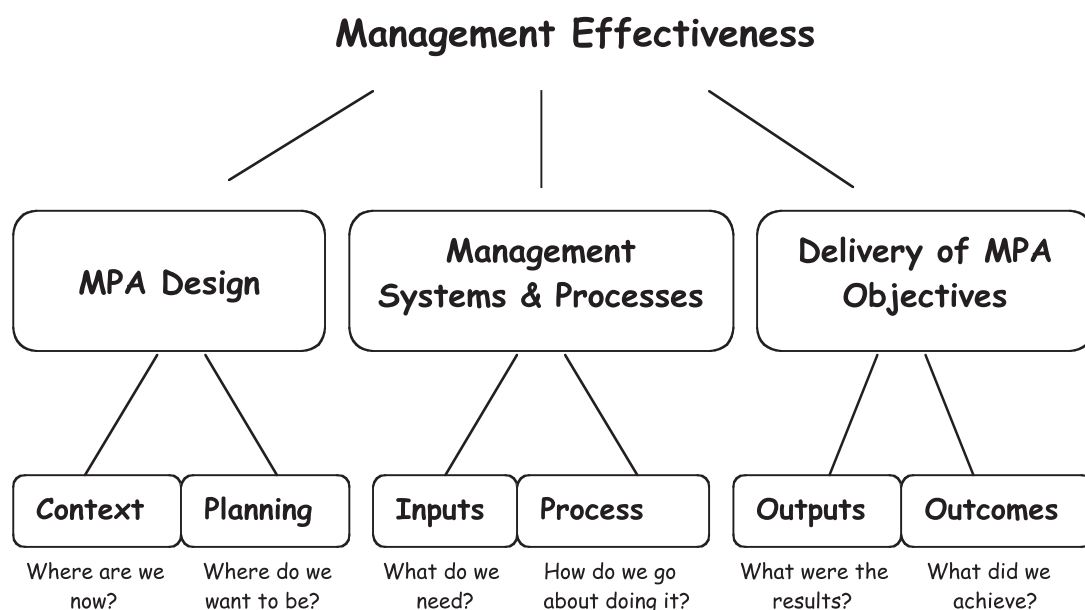
- What **inputs** are needed?
- What management **process** is being used – how is management structured and conducted and how are the management plans and work plans implemented?

Are the objectives being met?

- What activities were undertaken and what were the **outputs** or products?
- What impacts or **outcomes** were achieved?

Managing an MPA is similar in principle to managing many activities in our daily lives. We often assess these, in order to do something better or more efficiently a second time. For example, if we are making a journey by bus from Nairobi to Mombasa, or Durban to Johannesburg, we might well assess the various options in order to choose the one that is most suitable for our needs. In this analogy, we can equate the six components of management with the same components of the bus journey:

Figure 2. Key components of assessing management effectiveness



2. HOW TO CARRY OUT AN ASSESSMENT

There is no single 'right way' to carry out an assessment, although there are general principles that apply in all cases (Box 1). The method in this workbook involves filling out a series of worksheets (Appendix 1A-U) using primarily existing information about an MPA. The method is flexible and the worksheets can be adapted to different needs and circumstances at individual MPAs.

2.1 Key steps involved

There are a number of key steps in an assessment (Fig. 3). These do not have to be undertaken chronologically, but need to be well coordinated so that they feed into each other. The assessment does not have to be led by a single individual or organisation. Different people or individuals may take the lead at different stages, such as technical MPA staff, independent consultants, or a team specifically set up by the MPA.

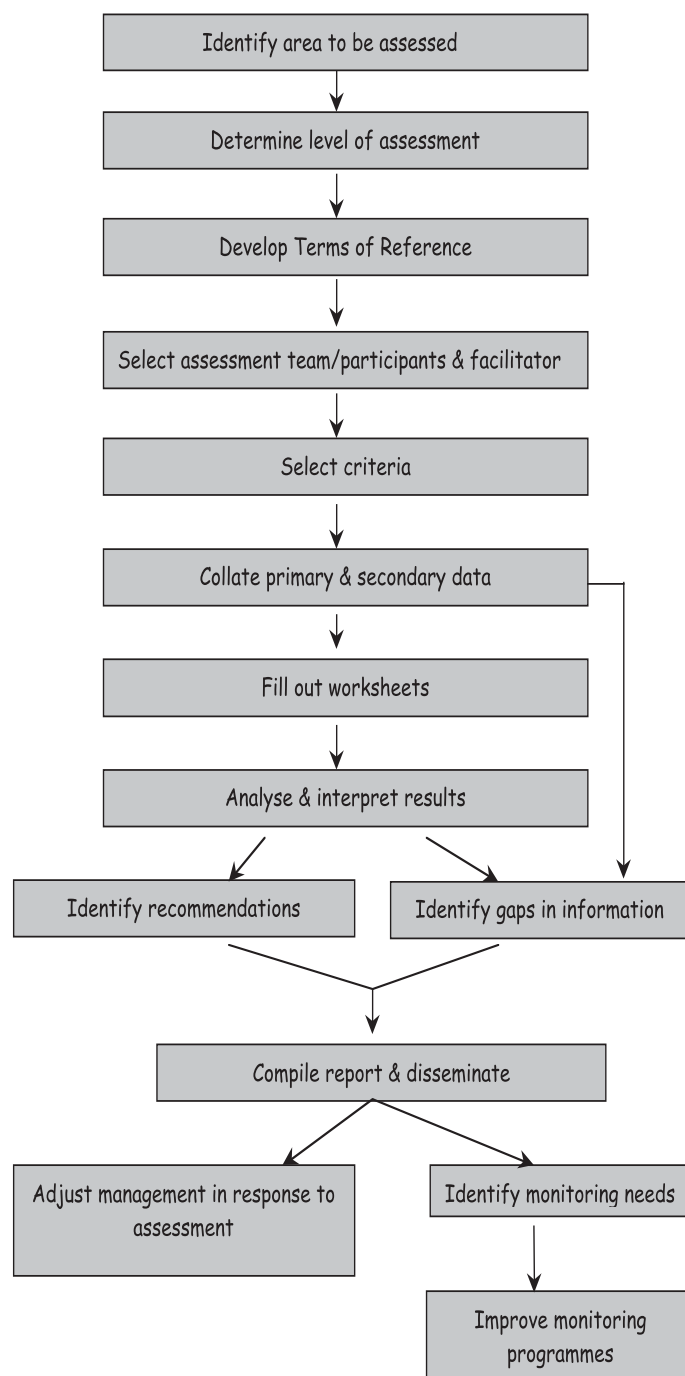
The worksheets are best completed with input from a range of stakeholders through a workshop or a series of consultative meetings. The MPA manager or a consultant can do the initial drafting but sheets should be completed in a group situation. All involved in an assessment must understand that its primary purpose is to improve management, and so they must be willing to talk about problem areas and things that are difficult. If these are covered up or omitted, the assessment will be incomplete and management interventions may not be effective. The person or organisation leading the assessment will need to maintain the quality of the information being collected, and ensure all relevant staff and stakeholders are provided the opportunity to contribute.

As pilot testing has revealed, some stakeholder groups find the worksheets too complex to understand. A questionnaire based on key worksheets has therefore been produced to ensure stakeholder involvement in such circumstances (Appendix 2).

At least two workshops or meetings will probably be needed in the course of the assessment – one with managers and those closely involved in the management of the MPA (e.g. management committee, Board, etc) and one for stakeholders. There will probably also be a need for other smaller meetings, e.g. with scientists working with the MPA. The consultation process will vary according to how the MPA is structured and run.

If systems are already in place that achieve the same purpose as some of the worksheets or components of the assessment, make use of these – it is not necessary to duplicate work. For example, in Tanzania, the Marine Parks and Reserves Unit has a system for reporting annual progress which can be adapted to provide the worksheet for assessing outputs.

Figure 3. Key steps in assessing the management effectiveness of MPAs



Note: A number of the steps can be done in parallel, rather than sequentially as shown above.

The steps involved in undertaking an assessment (Fig. 3) are as follows:

- **Determine level of assessment** - This will vary between sites depending on human and financial resources available, and the specific needs of the site (see section 2.3). At least some level of assessment should be undertaken on outcomes, because this tells you if management is having an impact on the values and objectives for which the MPA was established, and where current or future monitoring efforts may need to be directed.
- **Develop Terms of Reference (TOR) for the assessment** - These should clearly state who will be involved, timeline for the assessment, structure of the final report, and the mechanisms for incorporating the results into the MPA management system and for their dissemination. Processes for including stakeholders in the assessment should be detailed (e.g. questionnaires, interviews, public meetings, field visits, participation in assessment workshop). The assessment team (see below) may need to be identified before the TOR are finalised, so it can have an input into these.
- **Identify assessment team, participants and focal person/facilitator** - A core team should be identified to lead the assessment. This might include MPA technical staff, key stakeholders, consultants or a combination of these, the main criterion being that these individuals are very familiar with the site. It is important to identify the right facilitator to guide the assessment, as this person must be impartial and not be seen to take sides or influence the assessment process. The pros and cons of using an internal (i.e. person working at the MPA) or external facilitator should be carefully weighed; the latter may be able to bring a more objective viewpoint to the assessment. The facilitator will need to become familiar with the assessment methodology, MPA staff and stakeholder representatives before starting the process and preferably someone with previous expertise in this field should be chosen.
- **Select criteria** - Generic criteria against which MPA management effectiveness can be assessed are provided in this workbook and are discussed in section 2.2. These can be used as they are, or can be adapted to suit the local conditions at the site. Selected members of the assessment team, preferably including someone familiar with the assessment methodology, should be involved in making any necessary modifications before the assessment starts.
- **Collate primary and secondary data** - It is important to consider carefully how the data will be collected and made available. For example, if information about the MPA is scattered, one of the team members or a consultant may have to spend time collating and summarising it. This in itself is a useful output of the assessment process, and could be presented at a meeting where the worksheets could be filled in. Section 2.4 lists types or sources of information that may be useful (e.g. reports, workshops, interviews).
- **Fill out the worksheets** - This can be done in workshops with the MPA staff and stakeholders, and/or consultants. Ideally all stakeholders should have an opportunity to contribute to the worksheets if they so wish. The questionnaire can be used with groups that might have difficulty interpreting the worksheets. It is probably best used in a workshop situation, with MPA staff or other experts present who can assist with the process, but it can also be used as part of individual interviews or simply given to individual stakeholders for completion. The implementation team must then transfer the results of the questionnaires to the worksheets. If the worksheets are completed in an electronic format, teams will be able to analyse their data quickly and improve the sharing and accessing of information.
- **Analyse and interpret results** - The completed worksheets are then analysed, summarised and interpreted by the group(s). It is important that all the stakeholder groups contribute to this step, providing their own perspective and insight into the data interpretation.
- **Identify recommendations and gaps** - Clear recommendations should be made for each of the components assessed, and gaps and monitoring needs should be identified. For management to be considered adaptive recommendations should be prioritised and, where possible, a management agency and/or stakeholder should be identified to implement each recommendation.
- **Compile report and disseminate to stakeholders** - The report should be compiled and disseminated as soon as practical following the completion of the assessment. It should be made available to all staff and key decision makers in the agency and to all stakeholders, including communities, government agencies, private sector, etc as will have been identified in the assessment itself. This will enable recommendations to be followed up and adjustments to be made to management. It may be necessary to simplify or translate the assessment report into local languages for a wider distribution to stakeholders.

- **After the assessment** – Management should be modified according to recommendations resulting from the assessment process. Mechanisms to ensure that recommendations are implemented, within appropriate timeframes, should be built into management processes. This will help to ensure that the assessment does not become a waste of time and resources.



Box 1. General guidelines for assessing MPA Management Effectiveness. Modified from Hockings et al. (2000).

- Assessments should be **participatory** at all stages, and should include all interested stakeholders who have a genuine and demonstrated interest in the management and/or use of the MPA. This ensures the quality and credibility of the results, and may generate support for future management activities.
- Assessments should be **open** and **transparent**. The findings should be readily accessible to all interested parties in a way that is appropriate to their needs. This may require translation of written materials into local languages.
- The **management objectives** and **criteria** for judging performance should be clearly **defined** and understood by all involved in the assessment.
- **Assessments** of management effectiveness should **focus** on the most **important issues** (including threats and opportunities) affecting or potentially affecting the achievement of management objectives.
- Consideration should be given to the **range of factors** (i.e. context, planning, inputs, process, outputs and outcomes) that contribute to management. Outcome-based evaluations are particularly meaningful for assessing the overall management effectiveness of MPAs.
- **Criteria** for assessment should relate to **social, environmental** and **management** issues, both within and outside the boundaries of the MPA.
- **Assessments** should be based on good **biophysical** and **socioeconomic science**; both **qualitative** and **quantitative** data may be used but in either case methods should be rigorous and replicable, and result in sound data and evidence.
- Clear **recommendations** for improving management should be given in the final report, including prioritisation of conservation and management efforts needed; these should be fed back into decision-making processes for the MPA to ensure that management is improved.
- The **final assessment** report should identify **strengths** and **weaknesses**, and should divide issues between those that are **within** and **outside** an MPA manager's control.
- **Critical gaps** in information and any **limitations** in the assessment should be clearly identified in the final report.
- Assessments should be carried out on a **periodic basis** to show **change over time** (hopefully an improvement in management effectiveness).

2.2 Criteria for assessment

As it is not possible, practical or necessary to monitor and assess everything that takes place in an MPA, this method involves selecting criteria, based on the natural, social and cultural values of the area, against which management effectiveness is assessed.

Generic criteria for each component of the management cycle are given in Chapter 3 with suggestions as to the type of information needed for their assessment. Criteria might be 'level of government support for the MPA', or 'level of stakeholder involvement'. Note that the criteria are generic: some may not be relevant in certain sites; others may need modification to suit the specific biophysical and socio-cultural environment of an MPA; or additional criteria may be necessary.

2.3 How detailed should the assessment be?

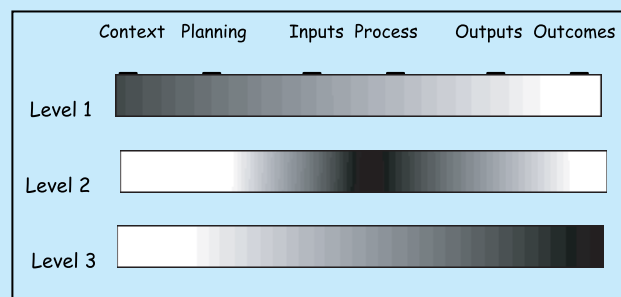
The scale and type of assessment will depend on the needs of the MPA, as well as its financial and human resources. WCPA has proposed three levels or approaches to assessment, each requiring different amounts of data collection and financial input (Box 2).

- **Level 1** – This type of assessment makes use of readily available information, and focuses on the context of the MPA along with the appropriateness of planning, inputs and processes of management. It relies largely on literature research, informed opinions of site managers and/or independent assessors, takes a short period of time and costs little. Issues are broadly covered, but depth of analysis is generally low. This approach is often useful for prioritisation of issues and improving management itself, but tells you little about the achievement of management objectives.
- **Level 2** – This uses the approach taken in Level 1 but additional data are collected to assess outputs and outcomes. It will therefore take rather longer, cost more and result in greater detail than Level 1. The method in this workbook reflects this level.
- **Level 3** – This is a detailed analysis of all components of the management cycle. Level 3 assessments thus take longer, but will give more detailed information on which to base recommendations for adaptive management. This approach allows you to determine whether you have achieved the

management objectives for your MPA. This level requires significantly more time and funding. To carry out an assessment at this level of detail, the MPA ideally should have a management plan, baseline data (a benchmark) at the time that it was established, and have been in operation for a period of time (2 years is suggested).

Box 2. Three levels of assessment for measuring MPA management effectiveness; darker shading indicates the main focus of the assessment.

Source: Hockings et al. (2000).



2.4 Data gathering for the assessment

The types of information needed for each of the six components of the management cycle and suggestions as to how this information can be obtained are given in the relevant sections in chapter 3. The following is a general list of useful sources:

- The proposal or justification for designation of the MPA,
- Management plan, annual and other work plans,
- Annual or other reports to the management agency, donors etc.,
- Administration documentation – financial (budgets, statements) personnel lists, equipment inventories and maintenance schedules,
- Patrol logbooks,
- Technical and scientific reports, surveys & inventories,
- Results of monitoring programmes,
- Legislation and policy documents,
- Mid-term reviews and evaluations of donor-funded projects,
- Interviews with MPA personnel and stakeholders,
- Workshops and meetings convened specifically for the assessment e.g. to compile the threat assessment worksheet etc. These may be for stakeholders, for MPA personnel in general, for manager level, for researchers and scientists, for local communities,
- Other general literature.

It is important to make good use of all existing sources of information. This means that MPA data, reports and other forms of information should be carefully stored and filed in a way that makes them accessible for

assessments.

When extracting information, make sure that you record the source or 'reference' so readers and others using the assessment results later will know where the information came from. It is also important to distinguish between **quantitative data**, **qualitative information** and **opinion**. All will play an important role in an assessment but the interpretation may differ according to the sources.

Quantitative data are collected through a monitoring programme or as part of a research study, and in most instances are numerical. Monitoring programmes involve the collection of data at regular intervals to allow comparison over time (see section 3.6.5). An example of a monitoring programme is the measurement of coral cover and fish species abundance at regular intervals to determine changes in coral reef health. Research studies may or may not include monitoring, but ecological research usually involves the collection of quantitative data, using statistically sound methods, so that if required the study can be repeated and the same results obtained. Both monitoring programmes and research studies should be carefully designed to allow accurate interpretation of the results and statistical analysis if necessary.

Qualitative information can be obtained from a wide range of sources, and is descriptive rather than numerical. In some cases (e.g. presence/absence data) it will be verifiable but in other cases it will be subjective, and its validity may be dependent on the



observations and interpretation skills of the recorder. Useful qualitative data for an assessment might include whale sightings, observations of unusual events, or descriptive material about a site that helps to show changes over time.

Opinion and perception – it is very important to obtain the opinions and perceptions of stakeholders and MPA personnel about management of the MPA. These will vary according to the interests, experiences, and other characteristics of the individual providing the information. This is why it is important to ensure that the worksheets are preferably completed as a group exercise and that they are then reviewed by a wide range of stakeholders. For example, an assessment at Kisite Marine Park in Kenya, showed that although MPA personnel thought that local fishers did not support the MPA, the fishers in fact had considerable respect for the role that it plays.

It is also important to distinguish between information that has been collected over a long time period and that thus reflects trends in an issue or a very permanent situation; and information that has been collected at a single point in time and that may reflect only the status of a parameter at that point. For many of the worksheets it is therefore important to note the **period** over which data was available. This is particularly important for the worksheets on **outputs** (e.g. if the numbers of visitors to the MPA is an indicator, it is important to provide both the actual numbers and the years/months/weeks that the figures relate to) and on **outcomes** (e.g. if turtle populations are an indicator, and the results of a monitoring programme are presented, the dates when the information was collected should be given).

There are a variety of ways to obtain and present the information for an assessment. Some issues are best assessed using a simple descriptive, or qualitative, format. For others, it is possible to develop ranking or numerical rating systems (i.e. a semi-quantitative approach), and in some cases a quantitative method, using data collected through a monitoring programme, may be possible. Depending on how rigorous the method is, comparisons between repeated assessments should be possible.

2.5 Other resources and methodologies

This workbook is only one of a number of tools now available to assist protected areas in assessing their management effectiveness. The following may be particularly useful:

2.5.1. Score Card to Assess Progress in Achieving Management Effectiveness Goals for Marine Protected Areas

The World Bank has developed a 'Score Card' which permits a relatively quick and inexpensive overview of the progress made in an MPA, and can be completed in a single meeting of staff and stakeholders, if reference materials and resources are readily available (Staub and Hatzios, 2003). It is considered a **level 1** assessment (see above) and as such focuses more on the **context of an MPA, planning, inputs and processes** of management, rather than outputs or outcomes. While this is a useful tool for tracking how well an MPA is progressing, it should not replace more rigorous methods of assessing management effectiveness that can guide adaptive management. The Score Card is available online www.mpascorecard.net

2.5.2. How is your MPA doing? A Guidebook of natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness.

This guidebook, by WCPA-Marine, is largely oriented to **outputs** and **outcomes** and focuses on the development and use of **indicators** for these two components of an assessment (Pomeroy et al., 2004). Outcomes are divided into three categories - biophysical, socioeconomic and governance, and performance indicators are provided for goals and objectives listed under each category.

It should be noted here that the term 'criterion' is used in this methodology in a similar way to the term 'indicator' in the WCPA-Marine methodology. Many of the criteria used here are similar or identical to indicators proposed by WCPA-Marine. As these two methodologies are tested further, it should become possible to harmonise the terminology as well as the indicators/criteria themselves.

2.5.3. The World Heritage Management Effectiveness Workbook

This workbook has been developed as part of the four-year UNESCO/IUCN Project to develop and test a method for assessing management effectiveness of World Heritage Sites (Hockings et al., 2004). It covers all components of the management cycle and can be considered a **Level 2** assessment, involving the collection of data to assess outputs and outcomes. The workbook for MPAs in the WIO is based on this approach, and uses adaptations of the worksheets designed for World Heritage Sites.

3. THE WORKSHEETS

In this chapter, a general explanation of the worksheets is given for each of the six components of the management cycle. Templates for the worksheets are provided in Appendix 1. Sample completed worksheets are given in Appendix 3. Table 1 shows the worksheets suggested for each of the assessment components, but it should be noted that not all of them will be relevant to every MPA.

3.1 Context

The review of **context** looks at the biological, social, cultural and economic values of an MPA, its current status, threats, and vulnerability, as well as factors that may appear external to the MPA but which are very important, such as the legislative framework and policy environment that govern its management. When assessing context, we are asking **where are we now?** A context review is not an analysis of management as such, but understanding the context of an MPA is fundamental to making wise management decisions that are relevant, applicable to the local situation and most needed.

It is useful to complete the context review first because it provides the background for determining the level of detail required for the assessment. It uses existing qualitative information and can be done relatively quickly. **Four** sets of **criteria** are used:

- Significance & Values
- Threats
- National Context
- Engagement of Stakeholders

3.1.1. Significance and values

Fundamental to the assessment is a good understanding of why the MPA was set up. What is its significance and what are its key values? Was it established because of large populations of nesting marine turtles? Or because of rich coral reefs or because there are known fish nursery areas? Such key parameters are referred to in this method as **Management Targets**, as they are the important attributes or **values** management will largely focus on.

A first step in an assessment is to define the MPA values - i.e. the key attributes for which the MPA was established and why it is locally, nationally, or globally important. Values can be divided into three types (Table 2):

- **Biodiversity** values: e.g. unique or threatened species or ecosystems, biological diversity;
- Other **natural** values such as geological or representative ecological processes; and
- **Socio-economic and cultural** values.

Table 1. Worksheets for the assessment

Assessment component	Worksheets	Reference
	MPA Overview	Appendix 1.A
Context	Management Targets	Appendix 1.B
	Threats (Sources and Stresses)	Appendix 1.C
	Review of National Context	Appendix 1.D
	Assessment of Stakeholder Engagement	Appendix 1.E
	Stakeholder Engagement Summary	Appendix 1.F
Planning	List of Planning Documents	Appendix 1.G
	Adequacy of Management Plan (and other plans if relevant)	Appendix 1.H
	Design Assessment	Appendix 1.I
	Assessment of Resources (Inputs)	Appendix 1.J
Inputs	Resources (Inputs) Summary	Appendix 1.K
	Assessment of Resources (Inputs)	Appendix 1.L
	Assessment of Capacity	Appendix 1.M
	Assessment of Management Processes	Appendix 1.N
Process	Assessment of Capacity	Appendix 1.O
	Assessment of Management Plan Implementation	Appendix 1.P
Outputs	Management Plan Implementation Summary	Appendix 1.Q
	Assessment of Biodiversity Objectives	Appendix 1.R
Outcomes	Assessment of Socio-economic and Cultural Objectives	Appendix 1.S
	Ranking of Current Threats	Appendix 1.T
	Current Threat-Target Summary	Appendix 1.U

Information on the values of an MPA will be found in the proposals and reports that were used to establish the MPA, in the management plan if there is one, through interviews with experts and stakeholders and scientific data studies and reports – from satellite imagery to site-specific biological inventories and rapid ecological surveys. Using this information, a values table can be assembled. This list may include other key attributes that were not specifically noted or known when the MPA was first gazetted.

An MPA will have many values and it would be difficult to assess the extent to which all are being maintained effectively. In this method, it is suggested that a few key values – referred to as **management targets** - are selected for the assessment. Management targets should, as far as possible, capture all the biological,

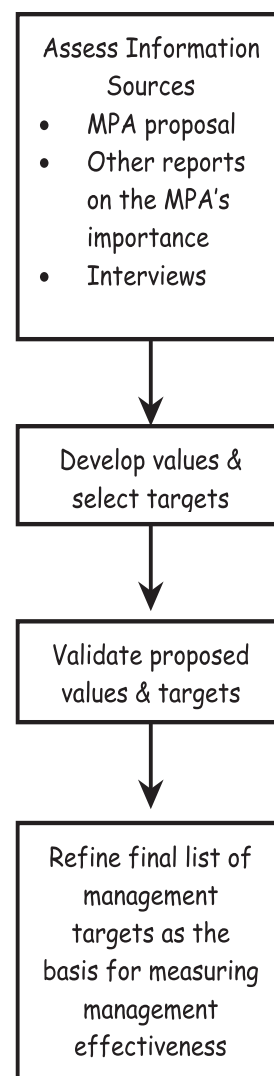
social and cultural values but be limited in number so that they can be acted on efficiently and reflect the management capacity at the MPA.

The management targets should closely reflect the objectives of the MPA. The objectives are often very generally worded and the reason for selecting management targets is to ensure that the objectives are reflected on and that it is clear what they mean in relation to the actual situation of the MPA. For example, if there is an objective to ‘protect biodiversity’ at least some of the management targets should be biodiversity ones; if there is an objective to ‘promote environmental education’, at least one of the management targets should be related to environmental education.

Where there are good baseline data for an MPA and capacity for detailed monitoring programmes, it may be possible to set a numerical or quantitative target. For example, one of the management objectives for Cousin Island Special Reserve in Seychelles is *“To maintain viable populations of endemic land birds, and internationally important breeding seabird population on the island”*. The birds are well studied and so it was possible to set the following management targets:

- Maintain viable population of Seychelles Warbler at over 300
- Maintain viable population of Seychelles Fody at over 1000
- Maintain viable population of Seychelles Magpie-robin at over 25
- Maintain breeding seabird population at current level

Recommended process to define targets



However, if this is not possible, descriptive qualitative targets should be set.

The template for the worksheet has columns for the MPAs and related management targets. There is also a column to explain why each management target has been chosen (i.e. the values of the MPA that relate to that target) and a column to identify the extent to which information on each target is available (this is useful when outcomes are assessed). Examples of values of MPAs are given in Table 2. An example of a completed Management Targets Worksheet is given in Appendix 3. **Once the management targets have been defined, the same list should be used for other worksheets (e.g. assessment of threats, assessment of outcomes).**

3.1.2 Identifying threats – stresses and sources

Threats to the MPA must be identified correctly, so that resources are appropriately used. For example if destructive fishing is not a threat to an MPA, spending resources on raising the level of awareness about this issue will not be useful. Some threats may be difficult for the manager to address, particularly those coming

from outside the MPA (e.g. fishing outside the boundary, poor catchment management, or pollution resulting from shipping, urban run-off, sewage discharge etc), and it is useful for the manager to know about these.

Threats to MPAs are often multiple with complex causes and consequences which need to be well understood for an effective assessment. There are two parts to a threat:

- the **stress(es)** to the management target and
- the **source(s)** of each stress.

‘**Stresses**’ are the types of destruction or degradation affecting the MPA, such as sedimentation, loss of coral or mangrove habitat, or alteration of age structure in the populations of a species. **Note that these are problems with the ecology or function of the management target, not the human activity itself.**

‘**Sources**’ are the natural events or human activities that cause the stress. For example, conversion of forests in a watershed to agricultural land (source) causes sedimentation (stress) to a river and adjacent coastal ecosystems. Similarly, the killing of sea turtles and the consumption of their eggs (sources) alter the age structure or reduce reproductive output (stresses) of a turtle population.

Table 2. Examples of values of MPAs

Biodiversity values	Other natural values	Socio-economic & cultural values
<ul style="list-style-type: none"> ▪ Endemic threatened or non-threatened species; ▪ Globally threatened species on the IUCN Red List; ▪ Regionally (e.g. listed on the Nairobi Convention) or nationally threatened species; ▪ Habitats and ecosystems unique to the country; ▪ Habitats and ecosystems for which the country holds a significant portion of the world total. ▪ Critical areas (e.g. feeding, nesting or breeding grounds) for the life-cycle of threatened species; ▪ Species-rich habitats & ecosystems; ▪ Nationally representative habitats & ecosystems 	Significant <u>geological</u> features may include: <ul style="list-style-type: none"> ▪ raised atoll; ▪ seamount; ▪ unique landscapes and features; ▪ specific reef formations; ▪ parabolic dune systems; ▪ transition zones for particular habitats; ▪ coastal barrier lakes; ▪ island ecosystems; ▪ offshore banks. 	<u>Cultural</u> values may include: <ul style="list-style-type: none"> ▪ traditional fishing grounds; ▪ sacred sites or species; ▪ archaeological sites ▪ historical area or event
	Significant <u>ecological</u> processes may include: <ul style="list-style-type: none"> ▪ convergence zones for major oceanic currents; ▪ upwelling areas; ▪ source areas for recruitment. 	<u>Socio-economic values</u> may include: <ul style="list-style-type: none"> ▪ improved livelihoods ▪ sustainable fisheries ▪ education ▪ research ▪ tourism and recreation ▪ aesthetics.

Separating **stresses** and their **sources** is important for several reasons:

- 1) By examining stresses caused by human activity, we can more carefully analyse the effects such practices have on the ecology and long-term integrity of the management targets. For example, simply stating "deforestation of mangroves" as a threat fails to highlight the various problems such as loss of habitat, increased sedimentation, and reduction in fish/invertebrate nursery areas that affects a site's management targets.
- 2) Separating stresses and sources can help managers to find more precise strategies and interventions to remove the sources. If the sources cannot be eliminated, it may be possible to take action to reduce their negative impact/s, to ensure that MPA values can persist in the presence of continuing human use.
- 3) Because sources can create multiple stresses, the separate identification and assessment of these stresses enables site managers to prioritise their management activities to address those sources that cause most damage. Management efforts should focus on the most critical stress-source combinations that have the greatest negative impact on the management targets at an MPA.

When filling out the worksheet, all stresses that impair the integrity of each management target should be identified and listed in column 2. Column 3 is used to give a qualitative description of their severity. This list should be based on an understanding of what that target needs to persist in the long-term. For example, a coral reef may need appropriate pH, turbidity and nutrient levels, controlled rates of harvesting of fish and invertebrates, and connectivity with adjacent source reef areas to function adequately. All sources of each stress are then listed in column 4, with a qualitative

description of the extent to which they actually cause the stress in column 5. In column 6 it should be noted whether the 'source' is a regular or continuing event, or an occasional one. This is important to note since some threats may result in continuous low level stress to a species or habitat (e.g. disturbance of wildlife by visitors) whereas others may cause a high level of damage but occur only very rarely (e.g. an oil spill). Existing documents and reports, such as management plans and proposals for the MPA, as well as workshops and meetings, should be used to obtain the information.

Some threats may be external and beyond the control of individual managers, (e.g., air pollution, climate change or poor watershed management) but nevertheless should be listed.

Table 3 provides an example of a completed threats worksheet, illustrating a management target (corals) affected by more than one stress, and a stress (low visitor numbers) caused by more than one source. This example also shows the importance of ensuring careful alignment of the horizontal rows, so that sources are lined up against the relevant stresses.

Equally, in addition to considering current threats, it is important to consider potential threats i.e. sources of stress that are not currently taking place but which are on the horizon and that may significantly affect the integrity of an MPA and have important implications for management.

For example, an MPA might be located on or adjacent to a natural gas or oil field; if exploitation of this resource has not started, the threat from this activity would be only 'potential'. Similarly, there may be a proposal for the development of a large aquaculture facility adjacent to an MPA, which could have major implications for water quality in the MPA. We are often in a position to predict potential threats and so their identification should be part of the assessment. A list of potential threats can be drawn up by considering

Table 3. Sample completed threats worksheet

Management target	Stresses	Severity of stress	Source	Relative contribution of source to stress	Regular or occasional threat
Coral reef fish	Decline in fish abundance	Low in Park and Reserve but potential for increase in Reserve	Overfishing	Main cause of fish decline	Regular (daily, but increases in NE monsoon)
Corals	Bleaching	High in localised areas	Global warming	Main source	Occasional (1982, 1998)
	Broken corals	Medium in localised areas	Anchoring of boats	Small contribution	Regular (3-4 times/week)
Ecotourism	Low visitor numbers	Varies seasonally and with socio-political situation	National travel bans for foreigners	High contribution in 2003	Occasional (but not predictable)
			Competition with better known, more accessible MPAs	Low level all the time	Ongoing

social, political, cultural, legal and demographic trends at the site. The likelihood of their occurrence should be weighed against the need for management action.

Assessment of potential threats can lead to much discussion of issues that may not be a high priority for current management. These should therefore only be included where they clearly add value to the assessment, and it should be clearly noted that they are potential, not existing, threats. Efforts should focus on current threats or those likely to become a problem or cause concern for the MPA within the next 5 to 10 years. Focus on 'real' threats e.g. if there is nothing in the area to cause air pollution, do not list it.

3.1.3 Review of national context

Five criteria have been identified to assist with this part of the assessment: **legislation, government policy, international conservation conventions, government support and the relationship between the MPA and the national protected area agency.** The worksheet involves a qualitative review of the strengths and weaknesses of each, using questions to guide the assessment.

National legislation, such as that for fisheries, must be fully understood, as much of this will be applicable within the MPA, in addition to specific MPA regulations. It is similarly important to understand relevant national policies and the extent to which they are supportive of management approaches that are being taken in or proposed for an MPA. For example, in Tanzania, the participatory approach is fundamental to natural resource management policy (and is enshrined in the MPA legislation) whereas this approach is in the early stages of being introduced in Kenya. National-level policies can thus have a big impact on the effectiveness of an MPA and the ability of a manager or stakeholders to influence management processes. It is also useful to know whether the government is supportive of an MPA and the degree to which legislation is helping to maintain MPA values. The assessment of the criterion relating to international conventions provides an opportunity for MPA personnel and stakeholders to learn about and understand their relevance. Some guidance for assessment of this criterion is given in Appendix 4. It is recommended that only those treaties and agreements directly relevant to the MPA are considered; it is not necessary to review all environmental conventions.

The review is best carried out at a workshop, preferably with knowledgeable representatives from the national protected area agency, the necessary data having been collected earlier. Information sources will include copies of legislation, the management plan and a range of general literature and reports.

An example of a completed Review of National Context Worksheet is given in Appendix 3.

3.1.4 Engagement of stakeholders

Effective management almost always requires strategic partnerships and engagement with the individuals, groups or organisations who influence an MPA's values and/or are dependent on an MPA's resources. Stakeholders can be defined as the **'people, groups, communities and organisations who use and depend on the MPA, whose activities affect it, or who have an interest in these activities, including government agencies, NGOs, local users, universities and researchers'.**

The identification of the stakeholders and partners, an understanding of their relationship to an MPA and its resources, and consideration of their level of engagement in the MPA, particularly in regard to management, are important parts of the context review. The worksheet helps to identify who uses the area, who will benefit from its protection, and who can assist with management. It should also consider whether the current partners involved in management are appropriate, and whether others should be involved.



This part of the assessment can be undertaken for the MPA as a whole, or for each management target depending on the size and complexity of the MPA and the number of stakeholders:

- In most cases, it is probably adequate to do a single stakeholder engagement worksheet for the MPA as a whole. In this case, the summary worksheet is not needed.
- For larger, more complex MPAs with plenty of experience, stakeholder engagement can be assessed for **each management target**. The reason for this is that different stakeholder groups may have different levels of engagement with different management targets. The results are summarised in the summary worksheet and scored for each target and each stakeholder. This gives an overall rating for the engagement of stakeholders.

The first step is to identify the main stakeholder groups. This will have been done in some cases when the management plan was prepared or the MPA first established. In other cases, it may be necessary to do this as part of the assessment. Once this has been done, the worksheet suggests that stakeholder engagement is assessed in several ways as follows:

Relationship of stakeholders to an MPA

- **Economic dependency:** How and to what degree are the stakeholders dependent on a management target for their economic well-being?
- **Negative and positive impacts:** What is the nature and extent of the negative and positive impacts of a stakeholder on a management target?
- **Willingness to engage:** How do the stakeholders participate in management of a management target? Under what terms or conditions are they willing to participate?
- **Political/social influence:** What political or cultural leverage or influence do stakeholders have in the management of a management target?
- **Organisation of stakeholders:** How and to what degree are stakeholder groups organised in relation to the management of the MPA?

Involvement of stakeholders in management

- **Opportunities to contribute to management:** Describe the nature and extent to which stakeholders contribute to decision-making and their level of authority. This includes both formal opportunities (e.g. representation on Advisory Committees, assisting with enforcement and collection of fees) and more informal opportunities (e.g. local people providing guiding services for visitors, hoteliers providing facilities for MPA meetings and workshops)
- **Level of stakeholder engagement:** Describe the actual engagement of stakeholders/partners in the management of a specific management target.

The worksheet should preferably be completed during a group meeting of the stakeholders. The questionnaire (Appendix 2) will be particularly useful for this component of the assessment in some situations, for example with local fishers.

On the completed worksheets, make sure that an explanation is provided for the judgments that are made. An example of a completed worksheet is given in Appendix 3.

3.2 Planning

The component on **Planning** focuses on **where do we want to be and how are we going to get there?** There are two main criteria for assessing Planning:

- status and adequacy of management plans and other types of plan; and
- adequacy of the design of the MPA in relation to the management targets and MPA capacity



3.2.1. Adequacy of management and other plans

The first step is to identify the key planning documents that have been developed for the MPA, such as an overall management plan, strategic plans, zoning plans, and specific functional plans (e.g. fire plan, tourism plan). These can be listed on the first worksheet provided for this section (Appendix 1).

For sites with an overall management plan, four principles are used for the assessment:

1. The plan should provide a good decision-making framework

This requires: (i) a clear vision of the desired future for the MPA; (ii) a set of strategies and actions, but also flexibility so that these can be adjusted as circumstances change over the life of the plan; (iii) clear guidance that can assist managers in dealing with issues and opportunities that arise during the life of the plan; and (iv) a basis for monitoring the implementation of the plan as well as progress towards the desired future.

2. The plan should be appropriate given the context of the MPA

It should place the management of the MPA in the relevant environmental, social and economic contexts. Where possible, planning decisions should be integrated into a broader planning framework.

3. The plan should be adequate in terms of content

The content should be based on adequate and relevant information and address the real needs and interests of relevant stakeholders in relation to the desired future for the MPA.

4. The plan should be designed for effective implementation

It should provide a programmed and prioritised set of actions for achieving the desired future for the area.

The criteria for assessing the extent to which the plan meets the principles listed above are set out in the Adequacy of the MPA Management Plan Worksheet (Appendix 1.H). A qualitative rating system is used. MPA personnel and those who are familiar with the plan and use it regularly should complete this worksheet. An example of a completed worksheet is given in Appendix 3. A similar assessment could be carried out for other planning documents for the MPA, if considered appropriate. If there is no management plan, those involved in the assessment should consider whether there are other plans or documents that provide clear and explicit management directions for

the site. If yes, the nature, origin and status of these management directions should be described, using or adapting the principles and criteria listed above.

3.2.2. Adequacy of design of MPA

Evaluating the design of an MPA involves assessing how the decisions that have been made about various factors (its size, location, position of boundaries, zoning, ecological representation, and links/connectivity with other MPAs) affect its later management. An assessment may show that key areas for biodiversity (e.g. nursery or spawning areas or coral reefs that are particularly resilient to coral bleaching) lie just outside the boundaries of the MPA, and it may be feasible to alter these. New threats may also necessitate a change in design – for example, increasing shipping traffic in the vicinity of Aldabra Atoll led to an extension of the shipping exclusion zone around the protected area.

Some design elements (e.g. location, outer boundaries) will have been determined prior to declaration of the MPA and may have been guided by factors other than achievement of the objectives, such as availability of areas for designation, and social, political and economic conditions at the time. An assessment may thus find that an MPA is poorly located, or inappropriate in size or shape to achieve its objectives. For example, many MPAs are probably too small to ensure adequate protection of their management targets. This will often be difficult to alter, but such issues are worth addressing as over time changes can be made. For example, Mozambique increased the size of Bazaruto Archipelago National Park from 600 to 1430 sq km to provide greater protection for its dugong population. When surveys in Moheli Marine Park in the Union of the



Comoros showed that the no-take areas were not appropriately located to protect fish populations, discussions were held with stakeholders and the boundaries changed. Even though many of these factors will have been beyond the control of the people who selected the MPA, it is nevertheless important to understand these limitations for management.

The assessment method examines site design in relation to its impact on ecological integrity (i.e. the biodiversity objectives), community well-being (socio-economic objectives) and the ease of management (governance issues such as legal status, access and boundaries) of the MPA. In each case, qualitative information on the strengths and weaknesses of aspects of MPA design is collected, using a set of guiding notes (provided in Appendix 1.J. - Table 3) to make sure that relevant issues are considered. The assessment can take place at a workshop with input from MPA managers, local community representatives, scientists and other experts. Each component of the worksheet should be discussed and a summary of conclusions recorded. Any issues in dispute should be noted.

Information from this assessment can be used in a number of ways:

- to identify ways in which management effectiveness could be improved through changes to the design;
- where the design cannot be changed, there may be compensatory changes to the way in which the area is managed to ameliorate problems;
- to identify issues where agreements with MPA neighbours may be useful for improving management.



3.3 Inputs

Assessment of **Inputs** focuses on **what do we need** in terms of resources such as staff, funds, equipment and infrastructure. It requires an assessment of resources available and whether use of these resources is optimal. This part of the assessment can help to show where reallocations are needed, if it is found that the current situation does not reflect the priorities identified in the management plan. For example, if the assessment shows that 20% of the budget is allocated to natural resource management, 10% to visitor management, 30% to enforcement and compliance, and 40% to education and awareness activities, but the management plan sets different priorities, adjustments may be required. Realistic estimates of resource needs can also strengthen funding proposals.

Although the concept of an assessment of inputs is relatively simple, it can be difficult to assess needs and adequacy of existing inputs in relation to each objective which is the preferred method. Inputs to an MPA are rarely allocated on a 'functional basis' and indeed this is often difficult to do. For example, a boat might be used for several management activities (patrolling, monitoring, research etc) and it could be difficult to decide what 'proportion' of the boat is used for any one of these. Estimations can be made however, and some project management systems now require this, as it is a very useful approach if feasible.

This part of the assessment should also look at the inputs provided through, or potentially available from, partnerships and collaboration with different stakeholders. In most MPAs in the WIO, no single agency can provide all the necessary inputs and there are often in-kind contributions or other forms of support from stakeholders or partners. These might include a tourist operator providing vessel support for patrols; a local or international NGO providing additional financial resources or staff to support activities such as education and awareness-raising, species conservation, or the development of management plans; or a scientific institution providing technical assistance for carrying out research and monitoring.

This assessment is best done by MPA staff, but the results should be reviewed by other stakeholders. The information required should be available through existing budgeting and reporting systems, and can be found in budgets, financial statements, asset registers, staff profiles etc. The assessment ideally consists of two steps:

- assessing the inputs needed for management
- assessing the adequacy of actual or current inputs available

3.3.1. Assessing staffing requirements and adequacy

The input assessment helps managers to understand whether there is sufficient staff capacity at an MPA to implement tasks outlined in the management plan. An assessment of capacity can lead to more focused training of MPA staff to ensure they have sufficient knowledge and skills to complete tasks allocated to them. For example, monitoring coral reefs and the interpretation of the data requires specialised skills which MPA staff may lack. In this case, a more strategic approach may be to form a partnership with a local research institution. If poor communication between MPA staff and local communities is identified as a problem, there may be a need for training, or exchange visits with an MPA where this is not a problem, or allocating more time to activities such as participation in community meetings. A Worksheet is provided to guide the assessment of capacity. However, since most MPA personnel have posts that cover implementation of more than one target, it may be difficult to assess needs and adequacy in this way. An assessment can be initiated by listing all personnel with information about their skills and training in relation to their jobs, which should be related to the management targets. Strengths, weaknesses and recommendations for improved capacity (through training, moving individuals to positions they are best qualified for etc) can then be made by comparing the list with the worksheet. For most management targets, a team of people will be required; for example, for protecting turtles, it is necessary to have enforcement staff but also personnel with skills for monitoring, research and perhaps guiding tourists.

3.3.2. Assessing financial inputs

Sometimes the activities in the management plan have been costed and this provides an estimate of the financial inputs required. In other cases, a separate long-term financial plan or business plan is produced; for example both Quirimbas National Park in Mozambique, and Masoala National Park in Madagascar have done business plans. The financial plan is usually for 5-10 years, ideally complementing the management plan. The term 'integrated strategic and financial planning' is sometimes used for the combined process of developing a long-term management and financial plan. A financial plan should show how the finances will be aligned to the MPA objectives, evaluate the costs of operating the MPA, identify potential cost reductions, and ensure that the management plan is feasible. It will also look at the different sources of income, project these and assess the probability of receiving them. Funding sources should be matched with activities according to the type and duration of funding needed. Managing a newly gazetted MPA is expensive, requiring funds for

equipment and infrastructure, baseline assessments, training and research, which may best be met through a donor. Subsequent management costs are lower, involving recurrent operational and administrative support, patrolling, maintenance of equipment, monitoring, community outreach and education.

Although difficult, estimating costs is a key component of the financial planning of the MPA. It should involve administrative staff, technical staff and others involved in conservation activities, and the central management agency. There are two kinds of costs:

Management or programmatic activities (e.g. surveys, monitoring, patrolling). In well-established MPAs, figures for on-going or recurrent activities should be readily available from the accountant. For occasional activities, it is worth looking at previous budgets to see if costs have been estimated before. Quotes should be obtained for new equipment and for work that may need to be contracted out. The cost of the time of the MPA manager and support staff spent on an activity should be factored in, as well as that of those directly involved.

Administration (known as overheads, fixed costs, indirect costs or operating costs), e.g. maintenance of infrastructure and equipment, personnel, and utilities. These costs should be estimated by the administrative personnel, with the manager. Administration (or a certain component of it) is sometimes expressed as a % of the overall budget and it is generally considered reasonable to charge 10-15%.

Further advice on estimating financial inputs is given in Macleod et al. (2001), with examples of spreadsheets.

3.3.3. Assessing equipment and infrastructure requirements and adequacy

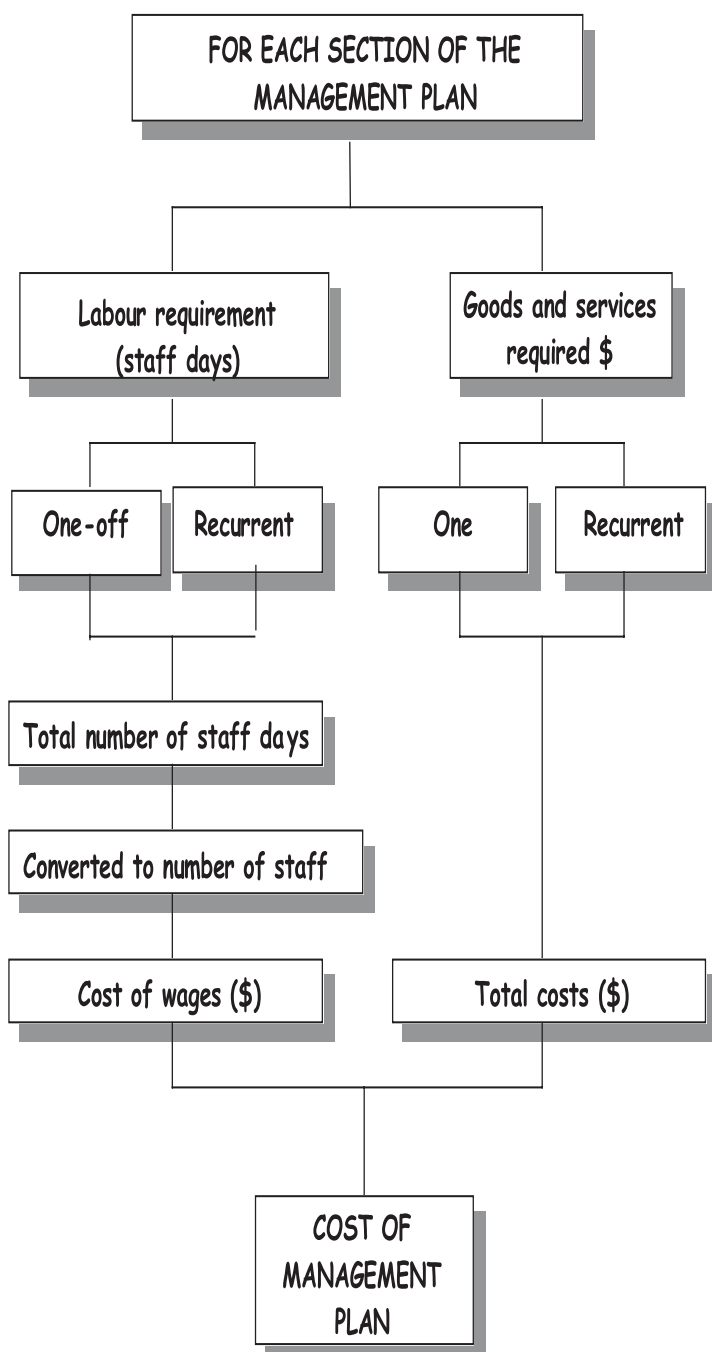
Most MPAs will have stock inventories which provide the baseline information on what is available. A comparison of such documents against a list of needs identified by looking at the proposed activities in the management plan can provide a good estimate of adequacy of equipment and infrastructure.

Care should be taken not to overestimate needs. It is tempting to seek the 'biggest and best' of everything, particularly if costs are being met by a donor. For example, the type of boat or vessel required for patrols, research and other aspects of MPA management, and its maintenance cost need careful consideration. Equipment, such as a boat, which cannot be serviced or maintained easily, or which is too costly to look after is not appropriate although a large, fast boat is often what the MPA staff would like! Equally, needs must be realistic.

3.3.4. Summarising input requirements and assessing adequacy

Ideally this would be done in reasonable detail, to provide the basis of a financial strategy. One method is to work out the requirements in terms of staff, equipment, infrastructure and funding for carrying out all the strategies and actions detailed in an MPA management plan. Figure 4 outlines one method of doing this, based on an assessment carried out at a World Heritage Site in Australia. The worksheet for this, with a summary worksheet, is provided in Appendix 1K/L, and further information on this approach can be found in the workbook for the World Heritage methodology (Hockings et al., 2004).

Figure 4. A method for calculating the cost of implementing a management plan. Source: Hockings et al. (2000).



These worksheets in particular may need adaptation to the local situation at each MPA. If a detailed financial analysis is not possible, a qualitative assessment can be done, and a worksheet is provided for this in Appendix 1.J/K/L

3.4 Process

An assessment of management **process** focuses on the question **how do we go about it**, referring to the manner in which management is carried out. It aims to answer the following questions:

- Are the best systems and standards of management being followed, given the context and constraints under which MPA managers are operating?
- Are agreed policies and procedures being followed?
- How and in which areas can management practices be improved?

This assessment involves looking at issues such as day-to-day management, annual work plans, capacity building and communication. It helps to identify whether the staff have the capacity (i.e. skills, knowledge and training) to carry out their designated tasks, how well the management plan or annual work plans are being implemented and the extent to which capacity building and training is needed. It also identifies how well actions in the management plan or yearly work plans are being implemented and why particular tasks were not completed. For example, perhaps managers and their staff were too ambitious, or lacked capacity to complete different tasks, or priorities changed, inadequate funds were allocated, or the local situation changed.

The worksheet can be used as it is, assessing performance against the generic standards proposed. However, if there are sufficient time and resources, this assessment should be used to develop specific standards for best management practices for the MPA. While this may seem a lengthy process, once standards are developed they can be used and modified in consecutive years in response to management changes.

3.4.1. Developing standards for the MPA

Standards for MPA management are descriptions of the **best management practices** that can be reasonably expected. For example, a standard for visitor management might be *"to ensure all visitor facilities are maintained and repaired regularly to ensure visitor safety and enjoyment"*. Standards should be ambitious,

defining the way management should be conducted in the absence of constraints arising from lack of funding, staff numbers, and staff skills, to allow room for modification and improvement.

The steps involved in identifying standards are:

1. Managers to identify key issues relating to management processes and collect relevant data.
2. Managers' workshop to establish standards. The Worksheet can be used as a guide and adapted as required. Standards should be set in relation to management targets/ objectives as well as agency policies, regional standards, etc.
3. Site meeting to discuss worksheet and agree on final standards with a wide range of stakeholders.

Standards for management can be developed from a number of sources including:

- management agency policies;
- provisions in MPA plans;
- best practice guidelines;
- MPA staff; and
- local partners and stakeholder groups.

It is not necessary or practical to define standards for every aspect of management and priority should be given to those aspects considered to be most important to MPA managers, staff and key partners and stakeholders. Once standards for the MPA have been developed, the worksheet proposed for this assessment can be adapted. IUCN's Ecosystem, Parks and People project has proposed a draft set of minimum standards for protected areas management in general, which may provide some guidance (Table 4); note that these standards do not represent an "official" consensus, but are the result of a broad series of consultative workshops, including the 5th World Parks Congress in 2003 (Carabias et al., 2004).

Table 4. Proposed Minimum Standards for Protected Area Management.

1. Legal Certainty and Management Plan

- **Legal certainty:**
- In accordance with national legislation;
- Geographical extent and boundaries clearly established;
 - A general zoning scheme in place;
 - Resource use and other activities clearly and authoritatively regulated;
- Management category is clearly stated in all relevant legislation.

• **Management plan:**

- Describes outstanding biological and other features of the area;
- Contains detailed zoning;
- Contains regulation of activities;
- Contains description of programs, actions and goals;
- Has been analyzed and discussed with primary stakeholders;
- Approved by the relevant legal authorities;
- Officially published;
- Disseminated to all relevant stakeholders.
- Provides procedures for inter-institutional coordination
- Inter-institutional mechanisms with clear regulatory framework which includes different government sectors from national and local levels; and
- Regional development plans are in place for the influence zone of the protected area

2. Ecological Parameters

- **Size** is adequate to fulfill stated conservation objectives related to:
 - Landscapes;
 - Species;
 - Environmental parameters;
 - Environmental services;
 - Ecosystem function; and
 - Unique natural features and events (e.g. endemic species, migratory congregations).
- Ecosystems are maintained in good condition (with identified indicators):
- The landscapes, ecosystems, species and/or environmental services that are targets of protected are of significant value at the country or regional level.

3. Human Resources

- Responsible officer (director) in charge of coordinating all activities in place;
- Necessary personnel for law enforcement;
- Personnel are sufficiently trained to undertake their assigned tasks and duties, including interface with stakeholders and conflict resolution;
- Salaries are adequate, within national standards, and scaled to responsibilities;
- Staff are sufficiently high within the government hierarchy to be able to interact effectively with other government authorities;
- A staff training programme is in place.

4. Infrastructure and Equipment

- Administration offices;
- Field stations;
- Visitors' Centre with easy access, low maintenance requirements and use of modern museum display techniques;

- Signage in place covering prohibitions, regulations, safety information, and general information about the protected area and its features; and
- Interpretative trails;
- Sufficient equipment for personnel to fulfil objectives (e.g. computers, land and water vehicles, safety equipment, uniforms, communication links.)

5. Financial Resources

- Salaries of officer in charge and staff are covered by national government;
- Basic operation expenses are covered by national government;
- Complementary activities are financed by sufficient alternative funding sources (e.g. special funds, grants, endowments, funding campaigns);
- Charges for admittance, permits, and concessions are returned to management of the area.

6. Monitoring and Evaluation

- Monitoring program in place that:
 - Establishes goals;
 - Sets time limits to accomplish activities;
 - Functions under an established scientific protocol in accordance with standardized methodologies using robust indicators; and
 - Is integrated into corrective adaptive management decision-making processes.
- Follow-up and evaluation programme that establishes goals and sets time limits to accomplish activities

7. Participatory Processes

Includes effective mechanisms for stakeholder and local institution participation, with:

- Internal by-laws
- Includes all sectors
- Representation mechanisms
- Includes a training programme for stakeholders to raise effectiveness of participation

8. Public Awareness

- Activities to ensure that neighbouring communities are aware of the existence of the protected area and associated laws governing resource use;
- Campaigns and activities to increase understanding of the values and benefits of the protected area and the rationale for actions taken to protect it; and
- Environmental education programmes for neighbouring communities that translate technical information for public use, promote dialogue, and build capacity for conservation decision-making.

9. Public Use Facilities

- Designated areas for recreational activities;
- Carrying capacity has been determined and impact of use is monitored;
- Specialised personnel dedicated to visitors;
- Accessible information for visitors;
- Waste management system;
- Adequate restroom facilities;
- Designated camping sites (if camping allowed);
- Concessions for specific services (e.g. restaurants, gift shop, transportation, guides – preferably local stakeholders).

10. Research

- Basic and applied research programmes to support protection and management, covering:
 - ecosystems and species;
 - socio-economic dimensions;
- Agreements with national and foreign academic institutions to carry out necessary research;
- Adequate regulation for sample collection and handling of natural resources to ensure no adverse impacts from research activities in the protected area.

3.4.2. Assessing performance against the standards

Standards are generally **qualitative** rather than **quantitative** and it is recommended that for the worksheet a scale of Very Good, Good, Fair and Poor is used. Thus personnel can rate themselves on how well they have completed their assigned management tasks or how useful training exercises have been, or how well equipment or facilities have been maintained (e.g. Poor = little or no maintenance undertaken, Fair = maintenance only undertaken when repairs needed, Good = most equipment/facilities regularly maintained, Very Good = all equipment/facilities maintained regularly).

For each criterion in the worksheet, just one of the four ratings should be selected. In some cases, points (indicated by +1) are awarded if an additional standard applies to the MPA.

An assessment of management processes should involve as wide a range of stakeholders as possible. Since it involves a very broad review of all aspects of MPA management, it may sometimes it may be appropriate to complete this worksheet last, to ensure that all relevant information has been gathered.

3.5 Outputs

Assessment of **Outputs** focuses on **what products or services were produced, and what were the results?** This is not the same as assessing whether the objectives (outcomes) are being met, but rather it involves assessing progress made with the steps essential for achieving the outcomes i.e., have the necessary products been completed and services provided. Typical outputs include management plans, research reports, annual and other reports, codes of conduct/best practice guidelines, public awareness materials such as brochures, videos etc., visitor facilities, databases, marker and mooring buoys, patrols, prosecutions, training workshops, seminars, and education programmes.

If the MPA has an objective of raising awareness and understanding about marine resources, relevant outputs contributing to this might be the brochures, leaflets, posters or videos that have been produced. If an outcome is to build local capacity for management, a relevant output might be the number of local community members that have been given appropriate training. If an objective is protection of particular marine resources, outputs might include the installation of mooring buoys to mark boundaries of a no-take area, and training of rangers in enforcement techniques.

An assessment of outputs tries to answer the following questions:

- has the management plan and/or work programme been implemented?
- what are the products and services delivered as a result of management activities?

The worksheet requires that the status (i.e. degree of completion) of each of the actions/interventions in a work or management plan should be recorded (e.g. whether they are ongoing, completed, not commenced). The reasons for lack of completion or delay when actions have not been completed or are running late should be examined and described, and actions proposed to overcome any obstacles or problems. This can show where effort is being focused and which areas are being neglected, and helps to ensure that management plans are used more frequently, and not left on shelves.

Most MPAs will produce quarterly and/or annual reports detailing progress in relation to outputs and these can provide the basis for this component of the assessment.

A basic worksheet – Assessment of Management Plan Implementation - is also provided in Appendix 1.P that can be adapted, and used to assess the extent to which actions in the planning documents have been completed. It is important to relate the activities to the relevant objectives and management targets, which is not necessarily done in work plans. In addition to noting the status of the action, a short description of what has been undertaken, or the reasons why an activity could not be undertaken, should be provided, as well as recommendations for the future.

If required, the summary worksheet can then be used to compile an overall assessment of progress made in terms of outputs.

3.6 Outcomes

3.6.1 Introduction to the concept of objectives/outcomes

Assessment of **outcomes** focuses on **what did we achieve? Have the MPA's objectives been met? Outcome assessment is ultimately what tells you if management actions and interventions have worked and been effective in terms of having an impact on the values/management targets for which the MPA was established.** Thus if an objective is to protect marine turtles, the assessment would tell you if threats to the turtles have been reduced and if populations are stable or increasing, i.e. whether the MPA has made a difference?



Objectives are generally listed under broader categories called goals (see example in Box 4). Some MPA management plans use the terminology 'mission statements' and 'purposes', which are broadly similar to goals and objectives and can also be used in an assessment of outcomes.

Goals are general descriptions that summarise the **ultimate desired state of an MPA**. A good goal meets the following criteria:

- **Visionary** – a positive statement outlining the desired state of the MPA.
- **Broad** - a broad and general statement that captures vision of the MPA.
- **Brief** – short and succinct so that it can be remembered by different stakeholders that might contribute towards its achievement.

Objectives should be **specific statements** that describe the desired outcomes of the MPA, and what management is aiming to achieve. A good objective should be **SMART** – **S**pecific, **M**easurable, **A**chievable, **R**ealistic, **T**ime-bound:

- **Specific** – clearly defined so that it is understood by all stakeholders.
- **Measurable** – definable according to standard scales (e.g. percentages, numbers), and should be measurable at any point in time.
- **Achievable** – it should be quite clear when the objective has been reached.
- **Realistic** – practical and appropriate within the local context. For example, it is impractical to have an objective that excludes all local uses of resources, if local communities are reliant on the resources of the MPA to meet their food requirements.
- **Time-bound** – can be achieved within a reasonable time-scale. In general, this should not exceed 10 years, though longer (50-year) time-scales may be required for the conservation of long-lived, slow-reproducing species (e.g. turtles and dugongs), or degraded habitats with slow recruitment (e.g. coral reefs). Although the time-scale should be considered, it is not essential to include a deadline for achievement of the objective within the wording of the objective itself and it is often better not to do so.

In reality, the objectives of an MPA are often written in such a way that they are too general to be useful, or lack the clarity needed, for measuring management effectiveness. In some instances objectives are framed as activities, outputs or tools rather than objectives as such. Unless they are clear and specific, it is very difficult to identify suitable indicators to use for monitoring and assessing progress.

It may therefore be necessary to reword objectives for the purpose of the assessment. For example, an MPA objective worded as 'biodiversity protected' may need

to be thought of as several components that reflect the management targets of the MPA e.g.:

- Fully representative habitats and thereby species and community diversity protected;
- The quality of different habitats in the MPA maintained; and
- Species and genetic diversity of marine organisms conserved.

These can then be reworded to meet SMART criteria and to address the specific management targets that have been identified for the MPA. For example, (ii) could be reworded to 'the quality of key coral reef, mangrove and seagrass habitats *improved by X% by X time?*'.

Similarly, an MPA objective 'livelihood opportunities for coastal communities improved', could also be broken down into components reflecting different aspects of improved livelihoods:

- economic status and relative wealth of coastal communities improved;
- dependency of future generations on natural resources decreased by stabilising or diversifying community and household occupational and income structure; and
- coastal communities' access to markets and capital improved.

These could also be reworded to meet SMART criteria. For example, (i) could be reworded as '*the economic status and relative wealth of coastal communities increased by an extra \$10 per individual household/week*'.

The objectives shown in Box 3, demonstrate some of these points. In the case of Kisite Marine Park, the objectives are worded very generally, whereas those for Cousin Island are more precise. In the latter case, the park staff were able to develop measurable management targets that could be used in the outcome assessment (see Appendix 3).

The WCPA-Marine methodology covers this topic, and identifies a list of generic objectives (biophysical, socio-economic and governance), which are useful to look at; they are summarised in Tables 5 and 6. At the national level, Hockey and Branch (1997) have defined generic objectives for MPAs in South Africa: 4 for biodiversity protection; 4 for fisheries management; and 6 for utilisation.

It may not be possible to revise the objectives of an MPA very quickly if they have been formalised through legislation. However, an assessment will help to identify weaknesses in them, and it may ultimately be possible to make them more measurable and useful (SMART) for management and they can then be included in any revision of the management plan.

Box 3. Mission, goals and objectives

Kisite Marine National Park/Mpunguti Marine National Reserve, Kenya

Mission: To conserve unique flora and fauna and protect scenic islands as special habitats for endemic marine mammals and breeding sites for migratory birds.

Goal 1. To enhance biodiversity conservation through participatory approaches.

Objectives

- Create and strengthen partnerships
- Provide opportunities for public education and conservation awareness
- Maintain the variety of life
- Ensure the existence of viable populations
- Counteract threats to marine life
- Allow regeneration of damaged habitats
- Carry out research and monitoring in support of management

Goal 2. To provide suitable breeding and feeding habitats for marine organisms.

Objectives

- Ensure protection of the breeding and feeding habitats for migratory birds, turtles, fish and marine mammals

Goal 3. To promote sustainable nature tourism.

Objectives

- Generation of revenue
- Ensure visitor safety
- Ensure availability of visitor facilities
- Encourage local tourism
- Regulate tourism activities e.g. by zoning certain areas for certain activities
- Provide opportunities for staff training on visitor handling

Objectives: for Cousin Special Reserve (Seychelles)

1-5 cover biodiversity and natural values; 6-7 cover socio-economic issues; and 8 covers governance:

1. To maintain viable populations of endemic land birds and internationally important breeding seabird populations on the island.
2. To maintain or establish threatened endemic plant species where appropriate, so long as this does not conflict with objective 1.
3. To maintain and enhance viable populations of the island's endemic terrestrial vertebrates and invertebrates.
4. To protect and maintain the integrity of the island's coastal and littoral habitats, especially the coral reef and its associated flora and fauna and the internationally important breeding populations of hawksbill turtle.
5. To understand and mitigate long-term and external influences.
6. To use the island's conservation features as a vehicle to raise and maintain education and public awareness
7. To maintain a safe, effective and sustainable physical infrastructure for carrying out the reserve's management plan.
8. To administer and manage the reserve in a professional manner ensuring that all Nature Seychelles standards are maintained or exceeded measures

Table 5. Biophysical Goals & Objectives

Goal 1. To protect biodiversity
Objectives
1.1 Protect fully representative habitat types (and thereby species and community diversity) at the biogeographic region and national level.
1.2 Protect unique biodiversity 'hotspots'.
1.3 Conserve and maintain the quality of different habitats within the MPA.
1.4 Conserve the species and genetic diversity of marine organisms.
1.5 Conserve and maintain ecosystem function, structure and processes.
1.6 Protect areas essential for the completion of life-cycle phases of species.
1.7 Minimise threats and damage to biodiversity due to human activities inside and outside the MPA.
1.8 Minimise threats and damage to habitats due to human activities inside and outside the MPA.
1.9 MPA Design that adequately spreads risk from unmanageable disturbance
Goal 2. To conserve and sustainably use marine resources
Objectives
2.1 Maintain and restore resource species at sustainable harvesting levels.
2.2 Protect vulnerable life-cycle stages of resource species.
2.3 Prevent over-exploitation of resource species.
2.4 Ensure non-extractive use of marine resources is done sustainably.
2.5 Prevent destructive resource harvesting/ extraction practices.
2.6 Improve or sustain fishery yields within MPA (if allowed) and adjacent to MPA.
Goal 3. To conserve individual species of concern
Objectives
3.1 Conserve and restore populations of rare, localised, endemic or threatened species to viable levels.
3.2 Eliminate or reduce threats to rare, localised, endemic or threatened species.
3.3 Prevent or remove alien and invasive species and genotypes.
Goal 4. To rehabilitate or restore degraded areas within the MPA
Objectives
4.1 Rehabilitate or restore degraded habitats.
4.2 Restore ecosystem function, structure and processes.
4.3 Minimise, and where possible eliminate threats, to facilitate rehabilitation or restoration.

Table 6. Socioeconomic Goals & Objectives

<p>Goal 1: Maintain and/or enhance food security for local communities</p> <p>1.1 Improve local nutrition. 1.2 Improve availability of locally caught seafood for food.</p>
<p>Goal 2: Maintain and provide livelihood opportunities for coastal residents and resource users</p> <p>2.1 Improve the economic status and relative wealth of coastal communities. 2.2 Stabilise or diversify the community and household occupational and income structure by decreasing resource dependency for future generations. 2.3 Improve coastal resident access to market and capital. 2.4 Improve or contribute toward the health of local communities.</p>
<p>Goal 3: Maintain and provide sustainable development opportunities</p> <p>3.1 Develop sustainable tourism opportunities. 3.2 Stimulate the rational development of under-utilised natural resources.</p>
<p>Goal 4: To enhance non-monetary benefits to stakeholders and the general public</p> <p>4.1 Maintain or enhance aesthetic values. 4.2 Maintain or enhance existence values. 4.3 Maintain or enhance wilderness values. 4.4 Maintain religious and cultural values. 4.5 Maintain or enhance recreational opportunities.</p>
<p>Goal 5: To strive towards the equitable distribution of benefits from coastal and marine resources and the costs of protection</p> <p>5.1 Equitable monetary benefit distribution to and through local communities. 5.2 Equitable non-monetary benefit distribution to and through local communities. 5.3 Improve equity among social groups (e.g. minority gender).</p>
<p>Goal 6: To maximise compatibility between the MPA management and local culture and practices</p> <p>6.1 Minimise adverse effects on traditional relationships/systems that support the MPA with natural coastal resources 6.2 Maintain or enhance (material) ancestral and historical features/sites/monuments that are linked to coastal resources.</p>
<p>Goal 7: Enhance environmental awareness and knowledge</p> <p>7.1 Enhance respect and/or understanding of traditional knowledge that supports the MPA. 7.2 Increase understanding of "sustainability". 7.3 Increase understanding of protection, conservation and the role of Marine Protected Areas. 7.4 Increase understanding of the value, need and role of coastal and marine resources. 7.5 Enhance scientific knowledge.</p>
<p>Goal 8: Improve and stabilise the funding base for conservation and management</p> <p>8.1 Generate funding to support conservation and management by lead institutions. 8.2 Generate funding to support local community conservation initiatives.</p>

3.6.2 Assessment of biodiversity objectives

All MPAs in the WIO have **conservation or maintenance of biodiversity** as one of their primary objectives (indeed, for an MPA to qualify as a 'protected area' under the IUCN definition, it must have conservation as its primary objective). An assessment of **biodiversity health** is therefore a crucial aspect of assessing management effectiveness. If an MPA is not maintaining or improving biodiversity (i.e. maintaining the ecological integrity of its values and management targets), then the management is not effective, and should be improved.

For example, if a management target for an MPA is its coral reefs (contributing to an objective relating to biodiversity conservation), coral reef health should be monitored. Commonly used indicators for reef health are relative abundance (community composition) of hard corals, percentage cover of live coral, certain groups of fish (e.g. butterfly fish) etc. Data from the monitoring programme will help to indicate if the biodiversity is being met. For example, coral cover and diversity might be increasing, which would show some progress, but it might not be happening as far as expected and through the assessment it may be possible to identify management actions that could improve the situation.

It is most important that the outcome worksheets are completed in **collaboration** with the **scientists** and **MPA personnel** who have been involved in the collection of the monitoring data and in its interpretation and analysis. Before starting, it is helpful to identify reports and scientific papers that have been published as a result of any monitoring programmes.

The worksheet (Appendix 1.R.) is completed as follows:

Columns 1 and 2: List all **management targets**, with their objectives (as in the Management Targets Worksheet, for section 3.1)

Column 3: For each management target, briefly describe any relevant monitoring programmes. Specify the indicators (e.g. in the coral reef example above, relative abundance of hard coral species, % cover of live coral, etc.) and the methods used (e.g. line-intercept transect at 6 monthly intervals for years xx - xx etc).

Column 4: Describe the results of data analysis if this is available (e.g. has the number of coral species increased or decreased? Which coral species are most abundant? Which species are no longer present or have declined in abundance? What are the observed changes in % live coral cover, etc.). It is important to specify the dates when the data were collected. A brief description of what the results mean should also be given - e.g. if coral cover has increased, is this thought to be natural recovery, or because coral transplantation has been undertaken? List any major 'events' (e.g. mild bleaching, increase in crown-of-thorns starfish feeding on corals) that may have caused the decline in coral cover, and if there is data collected on these possible causes for coral decline, these should be stated too. If no data are available, or if this has not been analysed, it is good to say so in the assessment. Lastly, it is important to distinguish between results that have been obtained through statistical analysis of the

data, and that perhaps have been published, and those that are 'inferred' or assumed just by looking at the raw data.

Columns 5 and 6: These require that there is some sound knowledge about the management target, and the situation that would be expected in an optimum situation. 'Meets preferred status' is asking whether stakeholders are happy with status of a management target and objective. For biological targets and objectives (e.g. coral health, or healthy fish populations) some guidance may be needed from experts working in that field as to what is 'optimum'. Consideration may need to be given to historical data. For example, if hard coral cover was recorded as 80% in the 1980s, and scientists consider this percentage essential to maintaining ecosystem functioning, then 80% cover may be the preferred status. 'Current status is reversible?' refers to whether the situation can be changed or not. It may not always be possible to fill in these columns in a meaningful way, in which case they should be omitted from the assessment.

Column 7: This should always be completed as this provides the key information for improving management of the MPA. For each management target, using the results obtained in column 4, 5 and 6 management actions that are necessary to improve or maintain the status/health of the target should be identified. Thus, if coral health appears to be declining, identify the actions needed to reverse this. Sites should be as specific as possible to enable actions to be followed up after the assessment, and should state which agency or stakeholder should take the lead on each action.



Column 8: This column should be completed only with advice from those who have done research on and monitored the target in question. It is used for making a summary statement on the health of each management target. For this to be meaningful, it is essential to have a good understanding of the target in question, and knowledge of the health of the target over time and in relation to the same target in other MPAs or adjacent regions.

An example of a completed assessment of biodiversity health is provided in Appendix 3.

3.6.3 Assessment of socio-economic objectives

This assessment is carried out using the same process as for the biodiversity objectives, and the worksheet template is identical. However, monitoring of **socio-economic parameters** is a relatively new field, with methodologies still being developed and tested, and many MPAs may not have the data needed.

Most MPAs nevertheless, collect some data on resource use (e.g. fish/invertebrate catch), stakeholder perceptions or characteristics, MPA revenue and visitor numbers. For example, if an objective of an MPA that is closed to fishing is to increase the availability of food ('food security') for local communities, indicators might be the types and amount of fish being caught in adjacent areas, and the amount of money spent by households on food from other sources. If an MPA has the creation of ecotourism or recreational opportunities as a major objective, it will be important to monitor trends in the use of the MPA for these purposes. Useful indicators might be the number of overseas and local visitors to the MPA, the types of activities undertaken, the 'satisfaction' of the visitors, and the funding raised through these activities.

3.6.4 Assessment of threats status

The status of current threats is another important measure of management effectiveness. Threats were identified as part of the Context Review (section 3.1.2). In this component, each threat is assessed against the management actions being taken to see if they are being reduced. This assessment can be done by managers at a workshop, and through interviews with stakeholders. The stresses and sources of stresses for each management target were identified during the Context Review (see section 3.1). Use this information for assessing whether threats to the different management targets are being reduced, by completing the worksheet in Appendix 1.T/U, using the following steps:

Step 1 - Rank each stress and its sources according to Table 7 below. Ranking for each stress should be based on the severity of damage and geographic scope of damage to the management target, as determined by the Context Review. Ranking of each source of stress should be based on the expected contribution of the source to the stress under current circumstances (i.e., given the continuation of the existing management/conservation situation). It is essential to document the rationale for the ratings being assigned.

Step 2 – Determine the combined rank (i.e. stress-source overall rank') using Table 8 below.

Step 3 - List management actions being implemented within and outside the MPA to address the sources of each stress. Note - many of the management actions may have been listed during the Assessment of Outputs

(section 3.5) and should be used for this component of the assessment.

Step 4 - Rank each management action according to the extent to which it has reduced or removed the stress, using the rankings in Table 7. It is important to document the rationale for the ratings being assigned, and to give recommendations for improvement.

Step 5 - The summary Worksheet can then be completed as follows:

- List all sources of stress identified for the MPA and the stress-source overall rank assigned for each target.
- Determine the overall threat rank (far right column of the table) for each source of stress. 'Rules' for this would need to be developed e.g.: 3 "High" stress-source combinations are equivalent to one "Very

Table 7. Rankings for Threat Assessment worksheet

Stress		Source	Management action
Very High	The stress is likely to destroy or eliminate the target and it is very widespread and pervasive affecting the focal target throughout its occurrence at the site.	The source is a very large contributor of the particular stress, its primary cause.	Management actions have resulted in the removal or reduction of the stress to low levels, such that the management values are no longer being impacted upon.
High	The stress is likely to seriously degrade the target and is widespread, affecting many of the focal target's locations throughout the site.	The source is a large contributor of the particular stress, though not the primary cause.	Management actions have resulted in the reduction of the stress to low-medium levels, and the slowing or reversing of impacts to management values.
Medium	The stress is likely to moderately degrade the target and is localised in its distribution, affecting only some of the target's locations at the site.	The source is a moderate contributor of the particular stress, and is accompanied by other equal or greater contributors to the stress.	Management actions have resulted in some reductions of the stress to medium levels, but these are not significant to reverse the impacts to management values.
Low	The stress is likely to only slightly impair the target and is very localised in its distribution, affecting only a limited portion of the target's locations at the site.	The source is a low contributor of the particular stress; other sources are predominantly causing the stress to occur.	Management actions have not resulted in any significant reduction of the stress, and MPA values are continuing to be degraded.

Table 8. Combined Source-Stress rank

		Stress			
		Very High	High	Medium	Low
Source	Very High	Very High	High	Medium	Low
	High	Very High	High	Medium	Low
	Medium	High	Medium	Low	Low
	Low	Medium	Low	Low	--

High"; 5 "Mediums" = one "High"; and 7 "Lows" = one "Medium."

- Determine the MPA's overall threat status (bottom right corner), using the overall threat ranks in the far right column and the 'rules' above.

3.6.5. Indicators and monitoring programmes

Long-term monitoring programmes, using appropriate indicators, are necessary to determine whether outcomes are being achieved, and so ideally all management targets relating to an objective should be monitored. For example, if an objective is to maintain the health of the coral reefs in an MPA, the reefs will need to be monitored to show changes. If they are deteriorating, this could indicate that management actions may not be effective (although the decline could also be due to external causes). If one of the objectives is to improve the livelihoods of local people, a monitoring programme would be required to show whether family incomes are improving as a result of the MPA, e.g. through increased fish catches, tourism revenue or other livelihood opportunities offered by the MPA.

Many MPAs in the WIO have monitoring programmes underway (Mangubhai, 2002) and thus will be able to provide some of the necessary data for this component of an assessment. The assessment will also help to show where improvement to monitoring programmes are needed, or whether a new programme is required.

It is important to obtain technical advice, particularly during the early design phases of the monitoring programme to ensure financial and human resource use is optimised. Experiences and skills within the region should be used where appropriate, particularly from long-term monitoring programmes underway through organisations such as CORDIO and CRCP (both based in Mombasa). Several MPAs (e.g. Kiunga Marine National Reserve in Kenya) and coastal management programmes (e.g. Tanga Coastal Zone Conservation and Development Programme in Tanzania) have also developed monitoring programmes and their advice should be sought. Where possible local people should be involved in monitoring programmes as this will help to increase their sense of involvement in the MPA, as well as reduce costs in carrying out the monitoring (Obura et al., 2002). The extensive literature on how to design monitoring programmes should also be consulted (e.g. English et al., 1997; Bunce et al., 2000; Wilkinson et al., 2003; Hill and Wilkinson, 2004).

To be useful for assessing management effectiveness, monitoring programmes must be designed to provide the data needed, which means choosing appropriate indicators (i.e. units of information that when measured over time will document change). This is discussed in

detail in the WCPA-Marine guidebook, which provides a set of generic indicators covering 10 biophysical, 16 socio-economic and 16 governance issues. In this workbook for the WIO, only biophysical and socio-economic objectives are assessed, as governance issues are covered in the other components of the method. Hockey and Branch (1997) provide 17 criteria (equivalent to the generic indicators referred to in the WCPA-Marine guidebook) against which the objectives for South African MPAs can be measured.

Given the limited human capacity and financial resources at most WIO MPAs, indicators should be selected that are as simple and straightforward to measure as possible. Unrealistic indicators are often selected, that are too difficult to measure regularly with available skills and capacity, or that are found later not to measure impact or success. Selection must be based on:

- a careful analysis of the objectives and the types of changes wanted, as well as how progress might be measured; and
- an analysis of available human, technical and financial resources.

Two types of indicator are necessary: '**impact indicators**' which measure changes in the system (e.g. coral abundance as a measure of coral health), and '**process indicators**' which measure the degree to which activities are being implemented (e.g. number of patrols undertaken). A good indicator should:

- Be clearly defined and understood by all stakeholders.
- Have an unambiguous, predictable and verifiable relationship with the parameter being assessed - i.e. they should closely track the objective that they are being used to measure. For example, abundance and diversity of coral species are good indicators if the objective is to maintain healthy coral reefs
- Be based on an understanding of threats. For example, if El Nino events are a potential threat, indicators should include sea surface temperature and coral bleaching.
- Be simple to measure and interpret, cost-effective, and able to be collected, analysed and reported in a timely fashion and on qualitative or quantitative terms.
- Be consistent, so that it is always measuring the same thing, and does not change over time; it should be precise and unambiguous so that different people can measure it and get similar results.
- Reflect changes in the parameter being measured over temporal and spatial scales.



- Reflect the human capacity available - e.g. coral species diversity would be an inappropriate indicator if no one can identify corals to species level.
- Should concern just one type of data (e.g. numbers of nesting turtles rather than numbers of turtles in general).
- Must also be present frequently enough for meaningful data to be gathered - e.g. very rare species or events are generally not good indicators as there will be many 'zero' observations and trends will be difficult to determine.

Quantitative measurements (i.e. numerical) are most useful, but often only **qualitative** data (i.e. based on individual judgments) are available, and this has its own value. Selecting indicators for visible objectives or activities (e.g. mooring buoys installed, reef survey undertaken) is easier than for objectives concerning behavioural changes (e.g. awareness raised, women's empowerment increased). A few good indicators may be better than many weak ones, even if this means a compromise; for example not being able to determine overall biodiversity health.

Note that it may be difficult to attribute a change, or effect, to one particular cause. For example, an

increase in nesting turtles could be due to good management of the beach or to a decline in harvesting of turtles outside the MPA. When choosing indicators, it may help to frame the objective as a question. For example, is the MPA resulting in an increase in the catch per unit effort of local fishers within a 5-year time-frame?

- It is important to choose the right method(s) to answer your question, and to ensure the method can be replicated. In some instances a combination of methods may provide better accuracy. Once decided on, the same method(s) must be used all the time to allow comparisons over time.
- Determine the right frequency for sampling. The timing or seasonality (i.e. time of year) and frequency (e.g. weekly, monthly, biannually, annually, seasonally) of sampling should remain fixed as much as possible once monitoring has commenced. Alterations to timing or frequency of sampling can reduce the strength ('statistical power') of the data, and limit the conclusions that can be made.
- Determine the right sample size (e.g. number of transects, number of sites). The larger the sample size, the more accurate are the data, and a minimum number of samples are required for the analysis to be statistically valid. However, sample size needs to be balanced against the human and financial resources available for monitoring.

4. ASSESSMENT RESULTS

4.1 Reporting assessment results

The main aim of assessing management effectiveness is to improve performance of the MPA and to ensure that an adaptive management approach is adopted. It is therefore essential that the results are carefully documented and disseminated to all those involved in management. The presentation of the results should be tailored to the individual needs of the MPA and a balance must be sought between the detail of the information and the speed and ease with which it can be assimilated and used by managers. The results might be presented in the following forms:

Verbal Report - this is the simplest option where the consultant, a member of the assessment team or senior manager summarises the findings. This allows the results of the assessment to be shared directly with other stakeholders, including those who did not participate. A verbal report however, should be accompanied by a written and more permanent record.

Written Report – the results of an assessment should be recorded permanently both electronically and on paper to enable managers to consult the document and use it to modify, adjust and improve management. In addition to the completed worksheets, there should also be a descriptive summary explaining why the various ratings in the worksheets were given, and describing key points and issues that arose during discussions. Recommendations should be clearly detailed, and the agency, section or person responsible for carrying these out should be clearly identified.

Summary Report – at some sites it may be useful to summarise the results of the assessment for a wider audience, particularly for stakeholders who may not have participated in the assessment process but who are affected directly or indirectly by the MPA.

Box 4. Suggested format for assessment reports

1. Brief description of main characteristics of the MPA
2. Methods used – how the assessment was carried out
 - who was on the implementation team (names, positions, organisations),
 - what was each person’s role and responsibilities in the assessment;
 - what meetings were held – when, where, who attended, what was discussed and what resulted.
 - how was the information gathered; list of sources (N.B. sites should keep a record of their sources of data and references)
3. Results achieved
 - Worksheets
 - Text summary of main results of the assessment and conclusions
4. Review of assessment process – identifying any constraints or obstacles
5. General conclusions and summary of recommendations

Table 9. Suggested template for summary recommendations

Component of Management Cycle	Main recommendations	Lead agency or stakeholder	Supporting stakeholders	Time-frame (where applicable)
Context				
Planning				
Process				
Inputs				
Outputs				
Outcomes				

Some adjustments to management maybe quick to implement with no additional costs while others such as monitoring may take more time and require additional financial support.

Consideration should be given to translating materials into local languages or targeting specific members of the community (e.g. local fishers, politicians and other key decision makers).

4.2. Implementing the recommendations

It is important that the assessment is well integrated into the core management system of the MPA. A process should be defined at the beginning to ensure that recommendations are followed up. As shown in Figure 3 (page 12), there are likely to be two main types of response:

1. **Adjustment of management strategies/interventions**, if the assessment shows that some aspects of management could be done better and/or more effectively, or are not being done at all and need to be start. The organisation or individual responsible for following up such recommendations should be identified as well as a mechanism to monitor progress.
2. **Development of improved monitoring programmes**, where the assessment shows gaps in information needed to determine management effectiveness.

To ensure the results of the assessment are being used to improve the management of an MPA, a summary of all the recommendations should be compiled for dissemination to relevant agencies and stakeholders. A suggested template for this is given in Table 9. It is important to identify which agency or stakeholder will be responsible for following up on a recommendation, and if other stakeholders will be involved in the follow up. Ideally this should have been done during the assessment process.



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Global Coral Reef Monitoring Network (GCRMN): www.coral.noaa.gov/gcrmn

ReefCheck methods and instruction manual available from: <http://www.reefcheck.org>

C-NAV Coral Navigator - a CD-ROM on GCRMN and ReefCheck methods, available from AIMS Bookshop Science Communications, Townsville, Qld 4810, Australia.

Coral Health and Monitoring Programme (CHAMP): <http://www.coral.noaa.gov/methods.html> - lists a variety of resources for reef monitoring.

Hawaii Coral Reef Monitoring Program (CRAMP): http://cramp.wcc.hawaii.edu/overview/3_methods/ - provides an analysis of advantages and disadvantages of different methods.

CORDIO – Coral Reef Degradation in the Indian Ocean: www.cordio.org