Management effectiveness evaluation in protected areas – a global study

Fiona Leverington, Marc Hockings and Katia Lemos Costa

2008 REPORT

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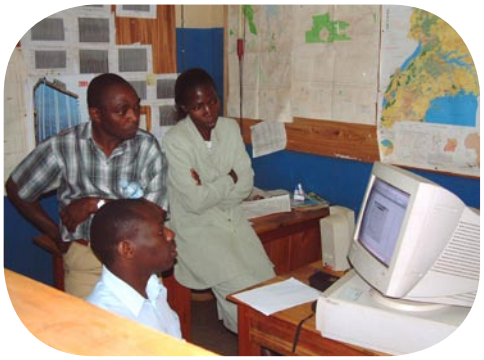
"The goal of parks and protected areas is to contribute as much as possible to the range of choices available to the children of the future. They cannot choose the impossible or dream the unimaginable'."

(Hales, 1989)



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Contents

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Executive summary

The Global Study into management effectiveness evaluation was conducted between late 2005 and 2007. In cooperation with many people across the world, we aimed to strengthen the management of protected areas by compiling the existing work on management effectiveness evaluation, reviewing methodologies, finding patterns and common themes in evaluation results, and investigating the most important factors leading to effective management. The project was supported by WWF International, the Nature Conservancy and the University of Queensland, and worked under the auspices of IUCN World Commission on Protected Areas. Objectives and findings of the Global Study included the following:

Objective 1: Record, collect and collate available information from assessment systems, individual park assessments and other evaluations of management effectiveness that have been undertaken in protected areas. Develop a system for integration of available management effectiveness information into the World Database on Protected Areas (WDPA).

The Global Study recorded over 6300 assessments of management effectiveness from 100 countries. Original data was obtained and analysed for about half of these assessments, and in addition nearly 50 evaluation reports were reviewed. We developed a database which is being linked to the WDPA. A website to enable viewing of the methodologies and study locations has been developed by the World Conservation Monitoring Centre in partnership with the Global Study.

While we are sure that there are some assessments that we did not locate and include in the global study database, we are reasonably confident that we have included the majority of assessments that have been completed and in the public arena. Given this, the gap between completed assessments and the 2010 target under the Convention on Biological Diversity Programme of Work on Protected Areas of assessment of 30% of the world's protected areas is substantial. Assessments recorded in the Global Study represent just 6% of the more than 100,000 protected areas included in the WDPA. Nevertheless, this represents significant progress over the position of just a few years previously and there is evidence of many more countries commencing ambitious programs of evaluation of management effectiveness of their protected area systems in all regions of the world.

Objective 2: Gain an understanding of most appropriate methodologies for different situations and protected area systems.

Over 40 methodologies in management effectiveness evaluation have been reviewed, and these are summarised in a supplementary report (Leverington *et al.*, 2008). The most widely used methodologies across the world are RAPPAM and the Tracking Tool, while other methodologies, including the Parks in Peril Site Consolidation Scorecard, PROARCA and ParksWatch Parks Profiles, have been applied extensively in Latin America and the Caribbean. Depending on the purpose, assessments are conducted at different scales and levels, from detailed site-level studies such as those using the Enhancing our Heritage methodology, to broad system-level assessments such as the study of Finnish protected areas. Guidelines and a checklist for choosing and adapting methodologies are presented in this report. People undertaking assessments are encouraged to use or modify existing published methodologies where possible, and to maintain maximum consistency over time.

Objective 3: Gain as wide a picture as possible of status of protected areas, key threats, factors influencing effectiveness of management and necessary changes to management strategies and approaches.

Protected areas have been assessed using many different methodologies. In order to gain an overall picture, we developed a 'common reporting format', defining headline

indicators which represent the major themes and elements of the thousands of indicators used in the various assessment systems. Data was then 'translated' into the common reporting format, combined into one database and analysed.

Though the available data does not represent a random or representative sample of protected areas, and the method for translating the data inevitably loses some richness of information, interesting patterns can be seen. The average score of 2384 assessments (representing the most recent in each protected area using each methodology), was 0.53 on a zero to one scale. This indicates that management leaves much to be desired, with 65% of the assessed protected areas scoring between 0.33 and 0.67 – in the range we defined as 'basic management with significant deficiencies'. Only 21% scored in the 'sound management' range.

The average was seen to vary significantly according to the Human Development Index (HDI), with protected areas from the low-HDI countries scoring on average one-third lower than those from high HDI countries.

Scores for the overall average and for individual headline indicators increased over time for those protected areas where repeat assessments were conducted. This pattern was particularly clear where assessments were linked to programs to consolidate and strengthen protected area management, as in the Parks in Peril program.

There were clear patterns in the strengths and weaknesses of management, and these patterns were consistent across most methodologies and regions. ighest scoring headline indicators overall were park gazettal, marking of boundaries, resolution of tenure issues, effectiveness of governance and leadership and the skill level of staff and other management partners. Weakest areas related to programs of community benefit, funding reliability and adequacy, management effectiveness evaluation, maintenance, communication, and community involvement. Many protected areas lack basic requirements to operate effectively, and do not have an effective management presence.

Outcome indicators, relating to achievement of objectives, values conservation and effect on the community, also scored relatively well, indicating that even where 'inputs' and many 'processes' are weak, protected areas were still performing a valuable function for conservation and in the community.

Threats to protected areas are still numerous and serious. Threats discussed in assessment reports were classified according to the system developed by the Conservation Measures Partnership. The most commonly nominated threats in most regions were hunting, killing and collecting animals; logging and wood harvesting; gathering non-timber forest products; recreational activities; and the management of adjacent lands. These show some consistency across regions, though differences are seen in countries like Australia, where invasive species and fire management are more serious threats.

Objective 4: Analyse most useful and commonly used indicators for assessing management effectiveness of protected areas (i.e. what indicators are most reliable predictors of overall effectiveness).

Correlations between headline indicators and between grouped averages were analysed. The individual headline indicators with the strongest link to overall average effectiveness were adequacy of infrastructure, equipments and facilities; communication program; production of results and outputs; natural and cultural resource protection; management planning; adequacy of information; and research and monitoring. Of the grouped averages, inputs (funding, staffing, equipment and information) were the most highly correlated to the average effectiveness.

The correlation between these headline indicators and outcome indicators was weaker. Factors seen to be closely linked with positive outcomes were the production of results and outputs; research and monitoring; natural and cultural resource protection; communication program; involvement of communities and stakeholders; appropriate program of community benefit; and staff numbers.

The study shows that though an overall measure of effectiveness could be estimated quite successfully from just ten headline indicators, this measure would not be highly correlated with outcomes, which need to be assessed separately.

A metric was calculated to combine 'importance' of each headline indicator (the strength of the correlation between a headline indicator and both overall effectiveness and outcomes) with 'performance' – the gap between the current overall average and a perfect score. This metric gives some idea of which indicators we might attempt to improve in order to have the greatest impact on overall management and achievement of outcomes. We found that the most critical factors were an appropriate program of community benefit or assistance; communication program; management effectiveness evaluation; natural resource and cultural protection; involvement of communities and stakeholders; and research and monitoring. These factors were closely followed by the inputs (staff, funding, equipment and information) which underlie any effective management, and by visitor management and management planning.

We have drawn upon these findings to recommend that:

- Management agencies, partners and funders continue to cooperate to help protected areas achieve minimum basic standards. Protected areas in low HDI countries are most in need of assistance to improve management effectiveness.
- Provision and maintenance of adequate facilities, equipment and infrastructure needs to be improved, as these factors score poorly and are very strongly liked to effective management.
- Protected area establishment and design – the first building blocks of the systems – are relatively effective in most places, with serious problems recorded in a few. However, it is essential that national governments provide better policy support for tenure resolution where this remains an issue, and for appropriate development planning and control around protected areas across all regions.
- A greater effort should be put into communication, community involvement and programs of community benefit, as these factors show very strong links to effective management and outcomes.
- A boost to the specific program areas of resource management and research and monitoring is also required, especially to achieve conservation of protected area values.
- Visitor management stands out as another area of management which needs to be improved for those areas where tourism is a significant function of protected areas, as it scores poorly in most regions and is strongly linked to effective management.
- Managers need to build better pro-active management capacity, linking management planning, actions, research and monitoring, and evaluation. All these factors scored poorly and are correlated with effective management overall.

The international cooperation and the sharing of information and experiences throughout this project have been greatly appreciated and it is hoped that this spirit will continue to contribute to better management and evaluation in the future.

Chapter 1 The global study into management effectiveness evaluation

1.1 Management effectiveness evaluation helps build better protected areas

Why we need evaluation

Since the second half of last century, protected areas across the world have increased dramatically in area and size (see Figure 1) as most countries have developed protected area systems as a core strategy to protect biodiversity and environment. The many values of protected areas for biodiversity conservation, protection of cultural heritage, maintenance of vital 'ecosystem services' and provision of a range of socio-economic benefits have been well recognised.

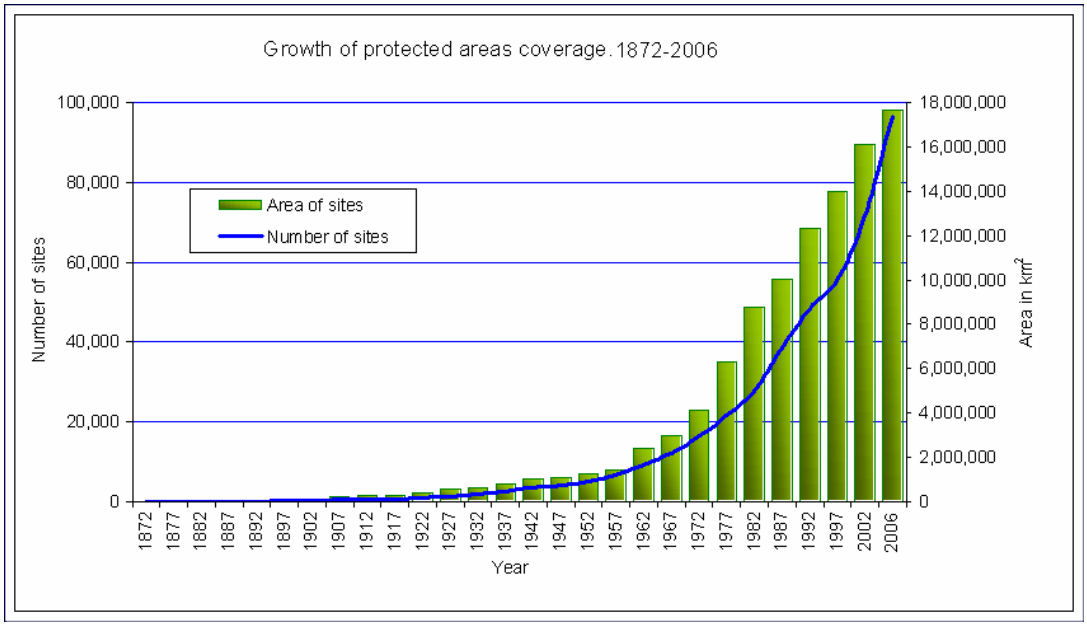


Figure 1: Growth of the world's protected areas. Source: World Conservation Monitoring Centre

However, using protected areas as a key strategy for biodiversity conservation is reliant on the assumption that they can protect their values for the foreseeable future. Society is making investments of money, land, and human effort into protected area acquisition and management and into specific intervention projects. The community, people investing in protected areas, and protected area managers need to know if these investments are sound. Questions include:

- Are protected areas effectively conserving the values for which they exist?
- Is management of these areas effective and how can it be improved?
- Are specific projects, interventions and management activities achieving their objectives, and how can they be improved? (Leverington and Hockings, 2004)

The need to evaluate protected area management effectiveness has become increasingly well recognised internationally over the past ten years, as we have seen in both developed and developing countries that declaration of protected areas does not always result in adequate protection (Hockings and Phillips, 1999; Hockings *et al.*, 2000; Ervin, 2003a). As the total number of protected areas continues to increase, so too do calls for proper accountability, good business practices and transparency in reporting (Hockings *et al.*, 2006). In addition, as other strategies for 'off-park' conservation and multi-use reserves have developed, and as concern for rural poor and Indigenous rights has increased, there has been more questioning about the role and

effectiveness of protected areas (for example, see the records of the IVth and Vth World Parks Congresses). This has led to a greater need to be able to demonstrate the usefulness of protected areas and the extent to which they contribute to or detract from community well-being.

Evaluation is also critical for adaptive management. We live in a world where we experience and can expect dramatic changes – in the biophysical world, the community, the economy and the way we govern ourselves. As global change accelerates, we need to be able to show to what extent protected areas are an effective strategy for conservation. Managers need to understand what works and what does not, so they can build on the best ideas and practices. Evaluation of management effectiveness is a vital component of this responsive, pro-active style protected area management. Through evaluation, both positive and negative experiences can be used as opportunities for learning, and continual improvement can be combined with anticipation of future threats and opportunities.

Management effectiveness evaluation (MEE) is defined as
"the assessment of how well the protected area is being managed – primarily the extent to which it is protecting values and achieving goals and objectives. The term management effectiveness reflects three main themes:

- *design issues relating to both individual sites and protected area systems;*
- *adequacy and appropriateness of management systems and processes; and*
- *delivery of protected area objectives including conservation of values."*

(Hockings *et al.*, 2006, p.xiii).

As discussed above, there are many reasons why countries, non-government organisations, protected area managers, donors and others want to assess management effectiveness. These different purposes may require different assessment systems and varying degrees of detail. Broadly speaking, management effectiveness evaluation can:

- enable and support an adaptive approach to management of protected areas;
- assist in effective resource allocation between and within sites;
- promote accountability and transparency by reporting on effectiveness of management to interested stakeholders and the public;
- help involve the community, build constituency and promote protected area values. (Leverington and Hockings, 2004; Hockings *et al.*, 2006).

Assessments might contribute to all of these, but an evaluation that is useful for one purpose (e.g. accountability to a donor or treasury) may not be useful for another (e.g. on-ground management).

MEE is a requirement of the CBD Program of Work on Protected Areas

The Vth World Parks Congress in 2003 included a well-attended workshop stream on MEE and included in its Proceedings Recommendation 18, where participants affirmed "..the importance of monitoring and evaluation of management effectiveness as a basis for improved protected area management and more transparent and accountable reporting" and called on member states and protected area managers to implement and provide transparent reporting on management effectiveness (IUCN, 2005).

The next year, the CBD Conference of the Parties 'COP7' (Convention on Biological Diversity, 2004, p.345) adopted a Programme of Work on Protected Areas in recognition of the fact that

> "… existing systems of protected areas are neither representative of the world's ecosystems, nor do they adequately address conservation of critical habitat types, biomes and threatened species… and (that) … insufficient financial sustainability and support, poor governance, ineffective management and insufficient participation pose fundamental barriers to achieving the protected areas objectives of the Convention on Biological Diversity."

The Programme established a specific goal (4.2) and related activities relating to MEE:

Goal 4.2 - To evaluate and improve the effectiveness of protected areas management

Target: By 2010, frameworks for monitoring, evaluating and reporting protected areas management effectiveness at sites, national and regional systems, and transboundary protected area levels adopted and implemented by Parties.

Suggested activities of the Parties

4.2.1 Develop and adopt, by 2006, appropriate methods, standards, criteria and indicators for evaluating the effectiveness of protected area management and governance, and set up a related database, taking into account the IUCN-WCPA Framework for evaluating management effectiveness, and other relevant methodologies, which should be adapted to local conditions.

4.2.2 Implement management effectiveness evaluations of at least 30 percent of each Party's protected areas by 2010 and of national protected area systems and, as appropriate, ecological networks.

4.2.3 Include information resulting from evaluation of protected areas management effectiveness in national reports under the Convention on Biological Diversity.

4.2.4 Implement key recommendations arising from site- and system-level management effectiveness evaluations, as an integral part of adaptive management strategies

These are ambitious targets, and many countries are now striving to establish or increase their capacity to evaluate management effectiveness throughout their protected area systems. International initiatives, such as IABIN, are assisting in this effort by providing coordination and helping to share experiences and techniques across jurisdictions.

1.2 The Global Study will help us evaluate more efficiently and effectively

Purposes of the Global Study

The Global Study was conceived when people working in the field realised that there would be advantages in a comprehensive synthesis of all the experiences and results of MEE. Practitioners have called for systems to be increasingly 'harmonised', and the need for some global reporting on management effectiveness, rather than just protected area coverage, has become obvious.

The Global Study was also developed in response to the World Parks Congress Recommendation 5.18; Durban Action Plan Targets 5-7; and the specific goals and activities outlined in the CBD Protected Areas Programme of Work.

The aim of the Study is to strengthen management of protected areas by pulling together the good work on this subject, helping the conservation community to share experiences and to find common themes in the study results. This will help to understand more about what factors are essential to good management, and to recommend ways to maximize the benefits obtained from conducting evaluations of management. Sharing of experiences and lessons learned makes good sense. There can be much wasted effort if organisations start from the beginning in developing evaluation methodologies, ignoring the "lessons learned from a long history of efforts to develop useful and practical methods of monitoring and evaluation approaches in conservation and other fields" (Stem *et al.*, 2005).

The Global Study has listed, and where possible assembled and analysed, all studies of management effectiveness that can be located around the world, drawing on information from the conservation community, NGOs and park management agencies. It is co-funded by the University of Queensland, The Nature Conservancy (TNC) and World Wide Fund for Nature (WWF), under the auspices of the IUCN World Commission for Protected Areas (WCPA), and works in close cooperation with other organisations including the World Bank, Global Environment Fund (GEF) and United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC). It is being led by Dr Marc Hockings, Vice-Chair (Science and Management of Protected Areas) IUCN World Commission on Protected Areas.

The stated objectives of the Global Study are to:
1. Record, collect and collate available information from assessment systems, individual park assessments and other evaluations of management effectiveness that have been undertaken in protected areas.
2. Gain an understanding of most appropriate methodologies for different situations and protected area systems.
3. Gain as wide a picture as possible of status of parks, key threats, factors influencing effectiveness of management and necessary changes to management strategies and approaches.
4. Analyse most useful and commonly used indicators for assessing management effectiveness of protected areas (i.e. what indicators are most reliable predictors of overall effectiveness).
5. Develop a system for integration of available management effectiveness information into the World Database on Protected Areas (WDPA).

Conclusions from the Global Study will be widely distributed, though data from individual parks, systems and studies will be treated confidentially wherever this is requested.

Approach and study methods

The following methods have been used in the Global Study.

Review of methodologies and development of principles

- Collection and review of all known management effectiveness methodologies through literature research, information networks and appeals for information;
- Correspondence with developers or users of methodologies where possible;
- Review of documents which discuss, analyse and compare methodologies;
- Review of evaluation literature and of recorded experiences from expert workshops and discussions.

List of assessments

- Compilation and data entry of all known assessment sites with any available metadata and methodology;
- Cross-checking against World Database on Protected Areas.

Development of common reporting format and minimum data set

- Analysis of the different layers and terminologies of headings, subheadings and indicators used in the various methodologies, according to the IUCN-WCPA Framework and other dimensions;
- Development of a 'classification grid' showing indicators: topics were defined by reviewing questions and indicators used in over 40 different methodologies, and by looking at a logical division of management responsibilities;
- Distillation of possible combinations to commonly reported 'headline indicators' which represent the range of indicators used (see section 3.3);
- Discussion and workshop with colleagues; development of proposed set of indicators for 'minimum data set'; and
- Coding of indicators according to closest match with common reporting format.

Entry and translation of raw data [1]

- Where possible, raw data has been obtained: this is in a range of different formats.
- A 'translation tool' was developed in *Excel* to distil results from many different methodologies into common reporting format headline indicators.
- This process results in a spreadsheet showing scores for each of the 'headline indicators'. These results are than analysed to find correlations and patterns.

Collection and analysis of studies

- Reports of evaluation studies from around the world were collected and recorded.
- Observations and conclusions were entered into the database and analysed for common patterns, including strengths and weaknesses of management and common threats.

This report has drawn on analysis of both raw data and studies to define patterns and correlations of protected area management.

Global study reports

A supplementary report is available summarising many of the MEE methodologies in use (Leverington *et al.*, 2008). In addition, it is intended to produce supplementary reports including more detailed regional analyses.

[1] More details of this methodology are discussed in Section 3.5 and in Appendix 3.

Chapter 2 How can management effectiveness be assessed?

2.1 Development of protected area MEE

The importance of evaluation in effective management and project cycles has been progressively recognised in many fields of endeavour, including health and international development as well as conservation over the past fifteen to twenty years. New methodologies and approaches have developed in a number of fields, with many common issues and some productive exchange of ideas across the sectors (Foundations of Success *et al.*, 2003). Protected area management involves biophysical, cultural, socio-economic and managerial factors as well as numerous stakeholders, so monitoring and evaluation must draw on tools from a wide range of disciplines. Approaches such as participatory rural appraisal and project cycle management have offered many useful ideas.

The need to develop 'tools and guidelines' to 'evaluate the ecological and managerial quality of existing protected areas was recognised in the Bali Action Plan adopted at the end of the Third World Congress on National Parks (the Bali Congress) in 1982. The IVth World Parks Congress in 1992 identified effective management as one of the four major protected area issues of global concern and called for IUCN to further develop a system for monitoring management effectiveness of protected areas. Following these congresses, the issue of management effectiveness of protected areas began to appear in international literature and particularly within the work and deliberations of WCPA.

The development and application of MEE since that time has been strengthened by an interaction of theoretical and practical interests.:

- Academic study, including indicator and scoring development, methods of analysis, field trailing of different systems, and validation of field studies;
- Work by conservation organizations (NGOs) attempting to evaluate programs, create greater awareness, and strengthen management; and
- Work by government protected area management agencies to conduct internal evaluations.

Latin America has been particularly rich in terms of debate and development of MEE. Progress up until 2000 in that region was reviewed by Cifuentes *et al.* (2000), and since then there has been further development of methodologies and extensive application of some systems. The history of some of the countries and methodologies is discussed in Cracco *et al.* (2006).

The earliest known published material on protected area MEE included an assessment in Venezuela (Rivero Blanco and Gabaldon, 1992) and an academic work on indicator selection and scoring (de Faria, 1993). In 1996 a Task Force was formed within the IUCN WCPA and in 2000 it published a Framework and guidelines for assessing the management of protected areas (Hockings *et al.*, 2000). At the same time as the Task Force was preparing these guidelines, a number of other groups and individuals around the world were addressing the same issue. By 2000, several methodologies existed and were being applied around the world.

A second, substantially revised edition of the IUCN-WCPA Framework was released in 2006 (Hockings *et al.*, 2006). The Framework is not, in itself, a specific methodology for assessing effectiveness of management but a framework for developing assessment systems and guidance for the practice of evaluation. It is based on the idea that protected area management follows a process with six distinct stages, or elements (Figure 1):

- it begins with reviewing context and establishing a vision for site management (within the context of existing status and pressures),
- progresses through planning and
- allocation of resources (inputs), and
- as a result of management actions (process),
- eventually produces goods and services (outputs),
- that result in impacts or outcomes.

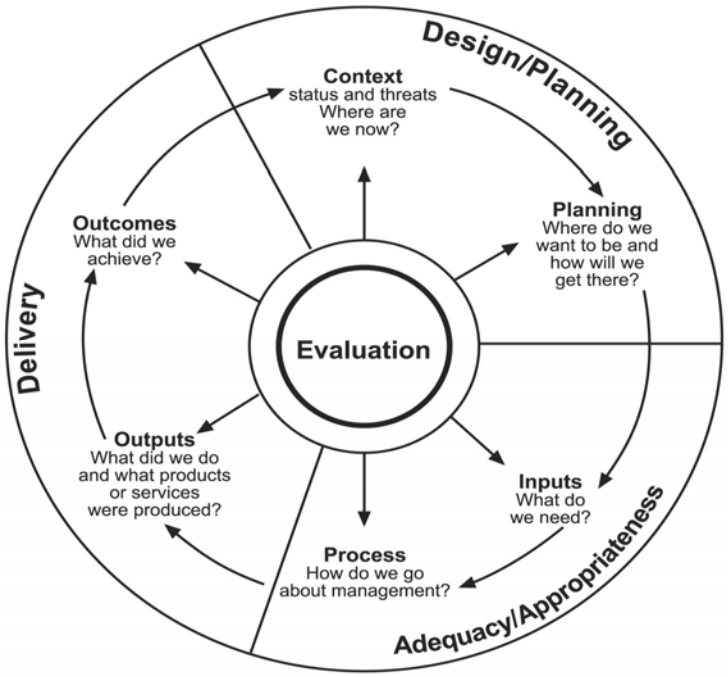


Figure 1: The management cycle and evaluation protected area management (from Hockings *et al*., 2006)

Evaluation that assesses each of the elements of Figure 1 (and the links between them) should provide a relatively comprehensive picture of management effectiveness. The Framework can be used to develop rapid evaluation systems, assessing management of an entire system of protected areas, rapid assessments of individual sites or detailed on-going assessments of management of a site based on extensive monitoring programs. One benefit of using the Framework approach is that all these assessments can be conceptually linked, using a common set of broad criteria and a similar approach to evaluation.

Table 1: IUCN-WCPA Framework for assessing management effectiveness of protected areas (from Hockings *et al*., 2006)

	Design		Appropriateness / Adequacy		Delivery	
Elements of management cycle	**Context**	**Planning**	**Inputs**	**Process**	**Outputs**	**Outcomes**
Focus of evaluation	Assessment of importance, threats and policy environment	Assessment of protected area design and planning	Assessment of resources needed to carry out management	Assessment of the way in which management is conducted	Assessment of the implementation of management programmes and actions; delivery of products and services	Assessment of the outcomes and the extent to which they achieved objectives
Criteria that are assessed	Significance / values Threats Vulnerability Stakeholders National context	Protected area legislation and policy Protected area system design Protected area design Management planning	Resources available to the agency Resources available to the protected area	Suitability of management processes and the extent to which established or accepted processes are being implemented	Results of management actions Services and products	Impacts: effects of management in relation to objectives

Within the four major purposes for evaluation outlined in Section 0, assessments differ in methodology, geographic, topical scope and level of detail. The *scope* of the assessment can vary from a specific topic, such as community relations, to all aspects of management. The *level* of assessment varies according to the purposes and scope, and the available financial and human resources. Three levels of assessment can be recognised (Hockings *et al.*, 2000):

> **Level 1** requires little or no additional data collection but uses readily available data to assess the context of the protected area network, or individual site, along with the appropriateness of planning, inputs and processes of management. Assessment of management processes is often judged against generic criteria that are applicable across a wide variety of protected areas but are not adapted to directly match local circumstances. It may include limited assessment of outputs and outcomes. Assessment relies largely on literature research and the informed opinions of site or system managers and/or independent assessors.
>
> **Level 2** combines the approach taken in Level 1 with some additional monitoring of outputs and outcomes of management. In addition, the indicators used in making assessments may be adapted to suit local or site specific management standards or circumstances.
>
> **Level 3** places greatest emphasis on monitoring the achievement of management objectives by focussing on outputs and outcomes while retaining measures of management context, planning, inputs and processes used in Levels 1 and 2. Level 3 evaluations are directed mainly at the site level.

In addition, every protected area system has individual circumstances and needs, and assessment exercises are often tailored to suit these. Often, especially in earlier years, people had undertaken a number of assessments before they became aware of other approaches, and there was a natural reluctance to abandon methods which had been applied and accepted in the field. For all these reasons, the community of practice involved with management effectiveness evaluation has been reluctant to adopt or recommend a single methodology, preferring to work within the general IUCN-WCPA Framework.

Since the first publication of a draft of this Framework in 1997, it has been used to develop specific management effectiveness evaluation systems which are being applied around the world. They include broad, system-wide assessments such as the WWF RAPPAM system (Ervin, 2003b) and systems developed in Finland (Gilligan *et al.*, 2005), Catalonia in Spain (Mallarach and Varga, 2004) and New South Wales in Australia (NSW Department of Environment and Conservation, 2005); rapid, site-level systems built around questionnaires or scoring, aimed at being applied in multiple sites, such as the World Bank/WWF Tracking Tool (Stolton *et al.*, 2007)and a related version developed for marine protected areas (Staub and Hatziolos, 2004); and detailed, site level monitoring and assessment programs (Hockings *et al.*, 2007).

Above left : training and sharing experiences in Level 1 assessment (Tracking tool, Bali workshop)

Below left: Recording landscape condition for Level 3 assessment, Australia

2.2 What has been done?

Over 40 MEE methodologies have been entered so far into the Global Studies data base and this list is still being added to. Table 1 lists some of these methodologies, with the more widely applied international methodologies listed first and other methodologies listed by UN region.

Table 1: List of MEE methodologies in the Global Studies database

Abbreviation[2]	Methodology name	Organisation/ Affiliation and/or reference
International		
RAPPAM	Rapid Assessment and Prioritisation of Protected Area Management	WWF (Ervin, 2003b)
Tracking Tool	Management Effectiveness Tracking Tool	World Bank/WWF Alliance (Stolton *et al.*, 2007)
EOH	Enhancing our Heritage	UNESCO (Hockings *et al.*, 2007)
How is Your MPA Doing?	How is Your MPA Doing?	NOAA/National Ocean Service/IUCNWCPA Marine, WWF (Pomeroy *et al.*, 2004)
TNC CAP	Conservation Action Planning	TNC (The Nature Conservancy, 2007)
Marine Tracking Tool	WWF-World Bank MPA score card	WWF-World Bank (Staub and Hatziolos, 2004)
CI METT	Conservation International Management Effectiveness Tracking Tool	Conservation International
Africa		
Africa rainforest study	Africa rainforest study	Academic/ WCS (Struhsaker *et al.*, 2005)
West Indian Ocean MPA	West Indian Ocean MPA toolkit	West Indian Ocean Marine Science Association (Wells and Mangubhai, 2004)
Central African Republic	Central African Republic	academic/WWF (Blom *et al.*, 2004)
Congo MEE	Assessing protected area management effectiveness in the Congo Basin	(Stolton *et al.*, 2001)
Uganda threat assessment	Threat reduction assessment in Uganda	(Mugisha and Jacobson, 2004)
Egyptian Site Level Assessment	Site level assessment of World Heritage Areas	(Paleczny *et al.*, 2007)
Asia		
Korea METT	Korea survey on protected area management status	Korea Parks service (Young, 2005)
MEE Indian	Evaluation of Management effectiveness of Indian Protected Areas	Ministry of Environment and Forests (MoEF) Government of India and the Wildlife Institute of India
Indian Tiger Reserves Assessment	Management Effectiveness Evaluation of Indian Tiger Reserves	(Project Tiger Directorate Ministry of Environment & Forests, 2006)
Alder	Marine Protected Area Evaluation	(Alder *et al.*, 2002)
Europe		
Finland MEE	Management Effectiveness Study – Finland	Metsahallitus (Gilligan *et al.*, 2005)
Catalonia MEE	Evaluation of the system of protected areas of Catalonia, Spain	Institució Catalana d'Història Natural (Mallarach and Varga, 2004)
Lithuania	Management effectiveness of Lithuanian protected areas	(Ahokumpu *et al.*, no date)
Latin America and the Caribbean		
PIP Site consolidation	TNC Parks in Peril Site Consolidation Scorecard	TNC/USAID (The Nature Conservancy Parks in Peril Program, 2004)
PROARCA/CAPAS	PROARCA/CAPAS scorecard evaluation	PROARCA/CAPAS (Corrales, 2004a)
Parks profiles	Parks profiles	Parkswatch (ParksWatch, 2007)
WWF/CATIE	WWF/CATIE Measuring protected area management effectiveness	WWF/CATIE (Cifuentes *et al.*, 2000)

[2] These abbreviations are for convenience and are used in following graphs and tables: they are not always formally used in the method itself.

Abbreviation[2]	Methodology name	Organisation/ Affiliation and/or reference
Mesoamerica MPA	Rapid Evaluation of Management Effectiveness in Marine Protected Areas of Mesoamerica.	MBRS/PROARCA/CAPAS (Corrales, 2004b)
Brazil 1999	Degree of Implementation and the Vulnerability of Brazilian Federal Conservation Areas	WWF Brazil with IBAMA (Lemos de Sá *et al.*, 1999)
AEMAPPS	AEMAPPS: MEE with Social Participation - Colombia	Parques Nacionales Naturales de Colombia/WWF Colombia
Ecuador MEE	Ecuador MEE: Indicadores para el Monitoreo y Evaluación del Manejo de las Áreas Naturales Protegidas del Ecuador	Ministry of Environment (Valarezo *et al.*, 1999)
Galápagos MEE	Manual para la evaluación de la Eficiencia de Manejo del Parque Nacional Galápagos. SPNG	SPNG (Velásquez *et al.*, 2004)
MARIPA-G	Monitoring and Assessment with Relevant Indicators of Protected Areas of the Guianas (MARIPA-G)	WWF Guianas (Courrau, 2005)
Belize MEE	Belize National Report on Management Effectiveness	Forest Department Belize (Young *et al.*, 2005)
MEMS	Metodología de Evaluación de Efectividad de Manejo (MEMS) del SNAP de Bolivia	SERNAP (Guachalla and Zegada, 2001)
Padovan 2002	Padovan 2002	IPEMA (Padovan, 2002)
Scenery matrix	Scenery matrix	Forestry institute (IF-SP) (de Faria, 2004)
PA Consolidation index	PA Consolidation index	Conservation International
Valdiviana	Valdiviana Ecoregion Argentina	WWF (Rusch, 2002)
Venezuela Vision	Venezuela Vision	DGSPN – INPARQUES (Rivero Blanco, 2005)
Peru MEE	Peru MEE	INRENA (INRENA)
SIMEC	Sistema de Información, monitoreo y evaluación para la conservación	Mexico
Oceania		
Tasmanian WHA	Tasmanian World Heritage MEE	Tasmanian PWS (Parks and Wildlife Service Tasmania, 2004)
NSW SOP	New South Wales State of Parks (Australia)	NSW DEC (NSW Department of Environment and Conservation, 2005)
Victorian SOP	Victorian State of Parks (Australia)	Parks Victoria
Qld Rapid Assessment	Queensland Rapid Assessment (Australia)	Queensland Parks and Wildlife Service
Fraser Island WHA	Fraser Island World Heritage Area (Australia)	Hockings
Qld Park Integrity	Queensland Park Integrity assessment(Australia)	Queensland Parks and Wildlife Service
North America		
USA SOP	US State of Parks	NPCA (National Parks Conservation Association)
Parks Canada	Monitoring and reporting ecological integrity in Canada's parks.	(Parks Canada Agency, 2005)

Over 6300 assessments from across the world were entered into the Global Study database by the end of 2007, as shown in Figure 2. This information is not complete: in particular, information from the USA and Canada is limited. However, a number of interesting observations can be made:

Oceania has a high number of individual assessments, largely due to three extensive 'State of Parks' studies in Australia (two in NSW and one in Victoria), which assessed most protected areas in the systems, including some very small reserves.

The most used methodologies across the globe to date are RAPPAM (over 1400 protected areas assessed) and the Tracking Tool (over 1000 protected areas). These

tools have been widely applied across Asia, Africa, Eastern Europe and to a lesser extent LAC and in Papua New Guinea. PROARCA and the Site Consolidation Scorecard, which have been used only in LAC, are the next most commonly applied methodologies. These studies have been undertaken over a number of years and include many repeat assessments.

The Tracking Tool is required by the World Bank/WWF Forest Alliance and GEF (including World Bank, UNEP and UNDP) for all protected area projects supported by these donor organisations, and has therefore been used extensively in developing countries, but the tool has been applied little elsewhere. An adaptation to make it more locally relevant was developed and has been used in Korea (Young, 2005), and another version has been applied in the Brazilian Amazon (Weigand Jr *et al.*, 2007). The Tracking Tool has also been used as the basis for a Marine version. RAPPAM has also been mostly applied with NGO support, predominantly in developing countries.

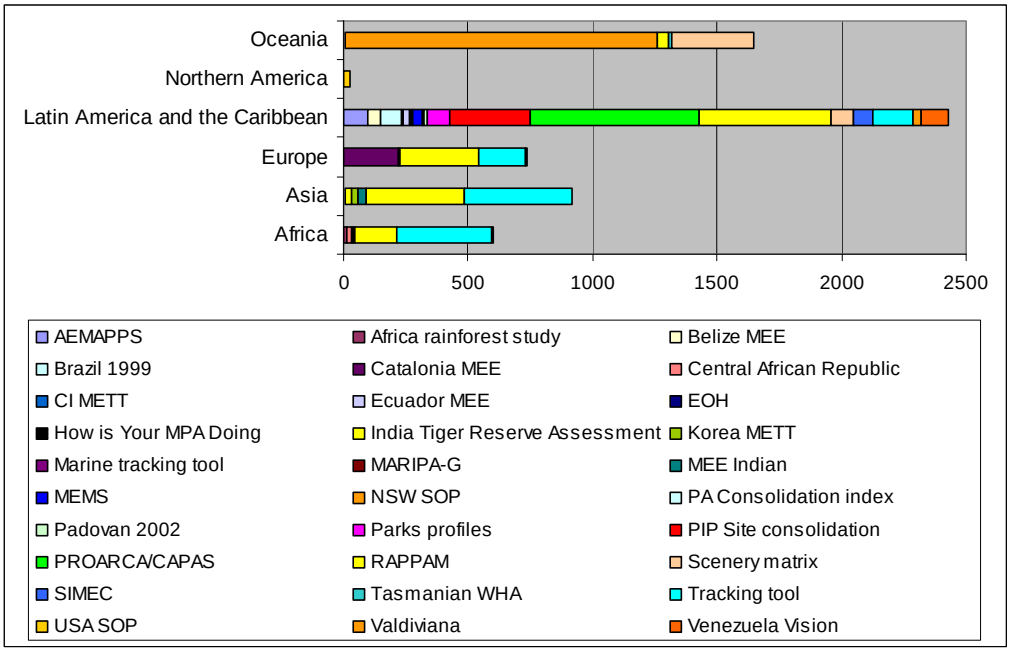


Figure 2: Application of methodologies in each UN region (data entered by December 2007) (numbers represent each assessment in individual protected areas for each methodology – where there are multiple studies for one site these are counted also)

In Africa and Asia, few other management effectiveness methodologies have been undertaken, with the exception of comprehensive work achieved and underway in India.

Latin America has a far greater diversity of MEE methodologies than anywhere else in the world. Of the methodologies listed above, 22 have been applied in LAC and 17 have been exclusively applied there.

2.3 What is evaluated: fields, aspects and indicators

As discussed earlier, some MEE methodologies have been designed or adapted using the IUCN-WCPA Framework (such as RAPPAM and the Tracking Tool), while others, such as the Site Consolidation Scorecard, predate it but refer to it in more recent analyses (Martin and Rieger, 2003).

Where methodologies specifically use the IUCN-WCPA Framework, the primary basis for organising indicators is the cycle of management. By working with the Framework *elements*, methods pay systematic attention to all parts of the management

cycle, including context issues (values, threats and external influences on management), outputs (achievement of work programs, products and services) and outcomes (achievement of objectives, changes in values, and effects on the community). Some of these elements can be under-represented in methodologies which focus on 'input' and 'process' indicators.

Where methodologies have been designed using different organisational frameworks, the IUCN-WCPA Framework can still be applied, by considering how the methodology relates to the IUCN-WCPA Framework and 'coding' the questions and indicators appropriately. For example, a recent assessment in Belize used a different system, but the analysis included reporting according to the Framework elements.

Perhaps the most useful approach, used in several recent methodologies, organises indicators according to both the Framework elements and the more commonly nominated fields of management. Results can easily be analysed either way.

A grid matrix represents a convenient way to map indicators from a variety of MEE systems. As we have seen above, the *elements* in the IUCN-WCPA Framework (the rows in this grid) make sense but when we review the evaluation instruments that have been applied, the series of questions often cut another way. For example, they look at biodiversity conservation, weed management or recreation management, or at a capacity issue like staffing, and follow that thread down the columns from context and planning through input, process and output to outcome. We refer to this as the *dimensions* of management, and these form the columns in the indicator grid. The row and column headings are listed in Table 2.

This matrix provides a way of understanding the diversity and similarities of indicators more easily, by ranging the elements and criteria of the IUCN-WCPA Framework against dimensions of park management. Most questions/ indicators can be fairly easily mapped into a cell on the grid, though sometimes a question covers two or more cells. In many cases, multiple questions will be asked about one cell – for example, the 'biodiversity value' cell.

This matrix can be used to map or to generate indicators for studies at any level from the very general to the very detailed. During the process of the Global Study, over 200 indicators were mapped to understand the most common questions asked in evaluations. It was then used to help generate a 'common reporting format', which will be described in the next section.

Though questions are framed differently, many methodologies have some indicators relating to the protection of threatened species.

Hyacinth macaw, Brazil

Table 2: Headings for the indicator matrix and small sample of grid showing example of classification of indicators

ELEMENTS AND CRITERIA (ROWS in the grid)	**DIMENSIONS OF MANAGEMENT** (COLUMNS in the grid)
Context	**conserving natural integrity**
values and significance	biodiversity
threats/issues/pressures	ecosystem function
stakeholder attitudes and relations	landscape and geology
influence of external environment	
Planning	**conserving cultural/ spiritual and aesthetic**
legal status/ gazettal	cultural (material)
tenure issues	cultural (other)
Adequacy of legislation	spiritual
system design	aesthetic/ scenic
site design	
management planning	**socio-economic, community engagement and recreation**
Inputs	recreation
staff	sustainable resource use
funding	economic
equipment and facilities	science and educational use
information	community
Process	human health and well-being
capacity	
governance, high-level management and leadership	**capacity to manage/ governance**
policy development	staff capacity
administration, work programming and internal organisation	information availability
evaluation	governance and administration
maintenance of infrastructure, facilities, equipment	legal framework
staff training	equipment and facilities
human resource management	enabling policies
relating to people	budget capacity
law enforcement	enabling social, legal and civil environment
community involvement	
communication, education and interpretation	
community development assistance	
sustainable resource use - management and audit	
visitor management	
managing the resource	
restoration and rehabilitation	
resource protection and threat reduction	
research and monitoring	
Outputs	
achieving work program	
results/outputs	
Outcomes	
achieve objectives	
condition of defined values	
trend of defined values	
effect of protected area on community	

ELEMENTS AND CRITERIA **DIMENSIONS OF MANAGEMENT**	**conserving natural integrity**	biodiversity	ecosystem function	landscape and geology	**conserving cultural/ spiritual and aesthetic**	cultural (material)	cultural (other)	spiritual
Context								
values and significance		X						
threats/issues/pressures								
stakeholder attitudes and relations						X		
influence of external environment			X					
Inputs								
staff		X				X		
funding				X				

Chapter 3 Analyzing diverse information: common reporting format, minimum data fields and common threat framework

3.1 Analysis across methodologies

The previous sections have shown the diversity of methodologies and indicators applied across the world. Though this diversity has many advantages, it means that it is difficult to look across the different studies to find out common patterns and issues for management in the region. Until now, it has been necessary to track down and read a large number of individual reports, many of which are difficult to obtain, or to organise workshops. The need to undertake broader-scale analysis has been increasing in recent years, with information particularly required by international funding and policy organisations as they wish to answer questions such as:

- What are the major strengths and weaknesses of management in a region or across a particular resource type or designation (e.g. World Heritage areas)?
- What major threats at protected area and system level need attention?
- Which are the priority areas (both spatially and in terms of scope or topic) requiring additional funding or technical assistance?

One aim of the Global Study was to find a mechanism to enable cross-analysis of data from methodologies using a variety of different indicators.This mechanism has two components: 'matching' the topic of each indicator to a common 'headline indicator'; and establishing a 'translation' system so that the different scoring systems are incorporated in a consistent way. It is hoped that the mechanism used in the Global Study provides a meaningful way to meet these requirements.

3.2 Protected area level

Common reporting format

For the purpose of cross-analysis, a '**common reporting format**' has been developed. This is a 'bottom-up' compilation of 'headline indicators', which was derived from reviewing over 2000 questions and indicators from more that 40 different protected area management effectiveness evaluation (MEE) methodologies. The 'headline indicators' were selected by reviewing the matrix headings listed in Table 2. The aim was to include as many as possible of the topics covered by the different methodologies in a logical list.

The common reporting format is intended to:

- represent most indicators found in any MEE methodology;
- provide a platform for cross-analysis of results from MEE studies using different methodologies, while maintaining as much information as possible;
- be flexible, with the potential to add more 'headline indicators' in the future.

It should be noted that the common reporting format is **NOT** intended to represent a required set of information (see the minimum data set below), nor to be a questionnaire to be filled out by park managers or agencies. It is merely a list of topics included in the range of evaluation methodologies, used so that analyses can be undertaken.

A simple translation tool' mechanism (using *Excel*) for converting data from diverse methodologies and scoring systems into the common reporting format and into the minimum data set has been developed by the Global Study. Indicators in the principal methodologies have been allocated to appropriate 'headline indicators', and this has enabled cross-analysis of all data available to date. This tool can if desired be built into spreadsheets or databases generated by individual studies, so that only information rolled up into the common reporting format needs to be forwarded to

coordinating agencies. Other reporting and analysis can continue through individual methodologies in the usual manner.

Minimum data set

A number of international meetings on MEE also proposed that a **minimum data set** should be defined. This would be a set of information which all countries or protected area systems are encouraged to collect to fulfil obligations such as CBD reporting. As with the common reporting format, it should be noted that the minimum data set is merely a list of topics included in the range of evaluation methodologies, used so that analyses can be undertaken. It is *not* intended to be a new methodology or questionnaire to be filled out by park managers or agencies, but methodologies may be altered to ensure that they include assessment of the fields mentioned.

For convenience and to maximise the ability to utilise information already being collected, the team associated with the Global Study and the WCPA have worked to develop a minimum data set which meets the needs of international agencies but also would be able to be derived from the common reporting format. Thus the development of the minimum data set has been both 'bottom-up' (using the same data set as the common reporting format) and 'top-down', derived from reviewing international needs according to the IUCN-WCPA Framework. It is intended to:

- represent the minimum information that might be required to effectively evaluate all aspects of protected area management according to the IUCN-WCPA Framework; and
- be the basis for future simplified indicators or index of MEE which will be associated with the WDPA.

As shown in Figure 3, a two-stage process will enable global reporting on 45 indicators, but using data collected from the variety of existing methodologies. The minimum data set and common report format used in this study and the Global Study are shown in Error! Reference source not found..

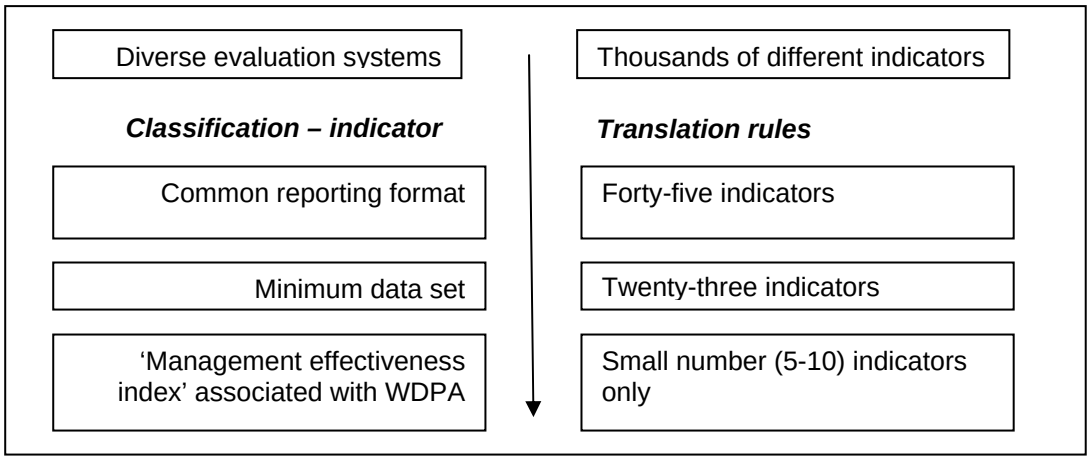


Figure 3: From many to a few: the process of developing a minimum data set.

Table 3: Minimum data component and common reporting fields – protected area level

Element	Minimum data component	Common reporting field 'headline indicators'
context	Values and significance	1. Level of significance
		2. Five important values*
	Threat	3. Level of extent and severity of threats
		4. Trend of threats
		5. Five important threats*
	Enabling environment	6. Constraint or support by external political and civil environment
		7. Main constraining factors of external political and civil environment*
planning	Legal status / land tenure	8. Park gazettal
		8a. Tenure issues
		46. Adequacy of PA legislation and other legal controls
	Boundary demarcation	9. Marking and security/ fencing of park boundaries
	PA site design	10. Appropriateness of design
	Management plan and biodiversity objectives	11. Management plan
Input	Staffing input	12. Adequacy of staff numbers
	Funding input	13. Adequacy of current funding
		14. Security/ reliability of funding
	Infrastructure/equipment input	15. Adequacy of infrastructure, equipment and facilities
	Information/ inventory	16. Adequacy of relevant and available information for management
	Governance and capacity (includes financial management)	17. Effectiveness of governance and leadership
		18. Model of governance*
		19. Effectiveness of administration including financial management
		20. Management effectiveness evaluation undertaken
	Infrastructure/equipment maintenance	21. Adequacy of building and maintenance systems
process	Staffing - process	22. Adequacy of staff training
		23. Staff/ other management partners skill level
		24. Adequacy of human resource policies and procedures
		25. Staff morale
	Law enforcement	26. Adequacy of law enforcement capacity
		27. List (up to) five main issues for law enforcement*
	Stakeholder relations	28. Involvement of communities and stakeholders
		29. Communication program
		30. Appropriate program of community benefit/ assistance
		31. List community benefit/ assistance program*
	Visitor management	33 Visitors catered for and impacts managed appropriately
		34. Character of visitor facilities and services*
		35. Level of visitor use
	Natural resource management	32. Sustainable resource use - management and audit
		36. Natural resource and cultural protection activities undertaken
	Values and threat monitoring and research	37. Research and monitoring of natural/ cultural management
		45. Threat monitoring
Outputs	Achievement of work program	38. Achievement of set work program
		39. Results and outputs have been produced
Outcomes	Management plan objectives achieved	40. Proportion of stated objectives achieved
	Condition assessment (all values)	41. Conservation of nominated values - trend
		42. Conservation of nominated values - condition
	Net effect of park on community	43. Effect of park management on local community

*Notes: * indicates a qualitative indicator. Numbering is not sequential in a few cases as some headline indicators were added later in the process.*

As an example, the following indicators relating to natural resource management could be grouped under these headings:

Minimum data set field: Natural resource management
Common reporting format headline indicator: Natural resource and cultural protection activities undertaken

Methodology	Indicator examples
AEMAPPS	Percentage of the area protected with management of some competent authority
Catalonia MEE	Fire prevention plan and management
EOH	Cultural/ historical resource management: Are the site's cultural resources adequately managed?
Korea METT	Historic and cultural resources management
Parks profiles	Are there any active conservation projects?
Scenery matrix	Physical barriers for fire prevention
Scenery matrix	Protection Programme
Tracking Tool	Is access/resource use sufficiently controlled?
Tracking Tool	Is the protected area adequately managed (e.g. for fire, invasive species, poaching)?
Tracking Tool	There are active programmes for restoration of degraded areas within the protected area and/or the protected area buffer zone

3.3 System-wide common reporting format and minimum data set

The discussions above assume that questions in MEE relate to the level of individual protected area. However, there is also a need for assessment and reporting of how well entire systems of protected areas are being managed.

While site-level management and evaluation is critical for achieving real on-ground conservation outcomes, we also need to recognize the need for robust and effective management at system level. This is the level where critical financial disbursement and management, protected area acquisition, wide-scale community engagement, and overall planning and policy initiatives usually occur. Support for site-level management is also vital. MEE systems which consider these indicators as well as those concerned with individual protected area management will gain a better measure of progress in protected area management on a country and system-wide scale.

In many cases where data is gathered at the protected area level, reports available to the public 'roll up' the data and present results at the system or group of protected areas level. In this way, the evaluation is presented as an evaluation of the system as a whole rather than of individual areas.

Some methodologies, notably RAPPAM (Ervin, 2003b), are intended to assess protected areas over an entire protected area system, and include a number of questions which relate to the design and management of the system as a whole. Such a study was undertaken in Brazil in 2006, where RAPPAM was applied at a system level, assessing a total of 246 federal protected areas (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis and WWF-Brasil, 2007). A valuable study conducted in Finland (Gilligan *et al.*, 2005; Heinonen, 2006) was aimed at the system level, and while the assessors visited a number of parks and considered information relating to individual protected areas, all the indicators are at system level (this was combined with a RAPPAM study to look at site-level indicators). Other recent assessments of protected area systems include a similar study in Lithuania (Ahokumpu *et al.*, no date) and an extensive assessment under way in India (Vinod Mathur *pers. comm.*).

The matter of system-level reporting has not been discussed as extensively as site-level evaluation, but work is beginning to develop some minimum indicators for system-level reporting. Evaluation of a protected area system would consist of two types of indicators:

- Indicators aimed at protected area level, reported at system level; and
- Indicators aimed at system/ agency level.

Reasons for taking this approach are:

- For the purpose of optimizing scarce financial and human resources, information on management effectiveness of the system as a whole is essential;
- Under the CBD requirements, countries have committed themselves to develop frameworks for reporting on management effectiveness at national and regional level as well as at site level. Many agencies are reluctant to publicly discuss evaluation results at protected area level and are more likely to share and transparently report on results at system level; and
- Moves to develop one or a small number of MEE 'indexes' may more practically relate to system or country-level reporting.

Table 4 shows the first draft of proposed indicator set for reporting at system level. Other indicators 'rolled-up' or analysed from protected area level reporting can be added, but this proposal suggests the minimum required fields.

System-wide assessments would look at overall staff training, standards and human resource policies, while site-level assessments look at local adequacy and capacity.

Rangers at Fraser Island, Australia and Tsavo, Kenya

Table 4: Proposed Common Reporting Format at system level (note: other indicators can also be 'built up' by summarising site-level results). Shaded fields are most easily obtained from combining site-level data

Element	Suggested 'headline indicators'	Comment
CONTEXT	International cooperation and support	Includes commitment to international treaties, international aid, participation in regional/ cross-boundary initiatives
	Supportive national government policies, laws and mechanisms for protected are management	Includes policies for cooperative conservation management
	Overall level and trend of threats to protected area system	Build up from PA results
	Most common threats to protected area system	Build up from PA results
	Level of community support for protected area system	
PLANNING	A systematic and clearly articulated design/ vision for establishment of a representative protected area system	Principles for reserve selection, gap analysis conducted
	Adequacy of current protected area system to protect diversity of ecosystems, biodiversity and natural processes across the landscape	
	Adequacy of current legislation	Evaluation of system-wide legislative basis. Could also include complementary legislation if relevant
	Use of appropriate range of IUCN PA categories to achieve conservation and community well-being goals	
	Proportion of parks with management plans	Build up from PA results
	Extent to which protected areas in the system are linked by sympathetic land use/ remnant habitats on other lands	
	Adequacy of system-wide management vision/ strategic plan	
INPUT	Sufficient financial resources for management of the PA system	
	Sufficient human resources for PA system	Staff numbers and training/ capacity, including support staff and system managers
	Adequate information and information systems to manage the PA system	Includes overall system-wide knowledge of biodiversity, cultural issues
PROCESS	Effective system of governance, leadership and administration at system-wide level	Unlikely to be measured by internal audit
	Monitoring and research programs for threats and values of PA system	
	Participation/ involvement of stakeholders at system level	System-wide advisory committee; transparency of agency dealings etc
	Management effectiveness evaluation	e.g. Regular state of parks assessments
	Training and capacity-building program for staff	Planned system-wide training initiatives and support for staff
	Effective enforcement of protected area laws at all levels	e.g. existence of support staff for enforcement
	System-wide program of communication, education and stakeholder relations	
	Adequacy of system-wide policies, standards and guidelines for PA management	
	Areas of greatest strength and weakness in management	From analysis of PA results
OUTPUT	Extent to which system plan has been achieved over previous period	

Element	Suggested 'headline indicators'	Comment
OUTCOME	Protection of cultural heritage	
	Protection of natural integrity/ biodiversity	
	Expectations of visitors generally met or exceeded	May be linked with question below
	Overall impact of/ perception of protected area system on communities	e.g. As shown by national/ regional community attitude surveys in relation to their opinions and experiences with PAs

This proposal for system-wide analysis has not yet been applied and results in this report do not reflect it.

3.4 MEE data and the WDPA

Close links with the World Database on Protected Areas were specified in the terms of reference for this Global Study and have been maintained throughout. Proposals for how information will be stored, used and made available through the WDPA are in development. Security and, where specified, confidentiality of data are a primary consideration. Work has begun on a website where internet searchers will be able to find out what methodologies have been applied and what studies have been conducted on a protected area or in a country, and where available linked to published studies and reports. Links to summary data might also be available in the future where formally approved, but raw data will not be supplied unless specifically requested and sanctioned by the relevant organisations.

3.5 Transforming data into the common reporting format

As discussed earlier, the Global Study and its partners in management effectiveness evaluation wished to analyse information obtained through a range of methodologies. The challenges with this cross-analysis included:

- Trying to gain a comprehensive picture when all methodologies use different indicators; and
- The range of rating and scoring systems used.

To enable cross-analysis, a list of 'headline indicators' was developed (the common reporting format), indicators from each methodology 'matched to these headline indicators, and a transformation to a common scale effected.

As discussed in Section 3.3, The common reporting format is a 'bottom-up' compilation of 'headline indicators', which can be used to match a wide range of indicators to the relevant element of the IUCN-WCPA Framework

For more details about the transformation of data, see Appendix 3.

After the raw data was transformed into the common reporting format 'headline indicators' and data from all studies combined, the resulting figures were analysed to obtain averages and standard deviations for total overall management effectiveness and for each headline indicator. As mentioned above, this data was sorted according to whether the study was the first or most recent using a particular methodology in a protected area, so the averages presented in this report do not contain repeated studies. None of the methodologies ask questions relevant to all the 'headline indicators', so the number of records vary for each indicator. Where the number of records is very small or from only one localized study, the results are interpreted with additional caution or excluded from analysis.

Overall averages are comprised of whichever 'headline indicators' are available from the information at hand, and therefore vary widely in their composition depending on

the methodology used. To confirm whether the arithmetic averages would be significantly biased according to the fields used to calculate it, a comparison was made between the 'least square means' (which take into account which indicators are missing) and the overall arithmetic averages. The results showed clearly that there was very little difference between the two methods of calculation and it was concluded that the simple approach of calculating the average of available indicators appears to be sound (Allan Lisle *pers. comm.*).

Raw data was available for 3224 of the 6300 assessments of individual protected areas recorded in this study. About a quarter of these were repeat studies applying the same methodology at the same protected area over time, so studies were separated into older iterations and 'most recent' assessments. Many of the analyses were conducted on the 'most recent' data only and all summary statistics reflect this. Correlations were also calculated between various fields and elements using the Pearson's Correlation Coefficient[3]. As this analysis is intended to reveal the links between various factors of management at any one time, all the data (included earlier studies) was pooled for correlation analysis.

Numbers of assessments used in the Global Study are shown in Table 5.

Table 5: Assessments with available data

system used	Africa	Asia	Europe	LAC	Oceania	Total
AEMAPPS				94		94
Central African Republic	16					16
MEMS				19		19
NSW SOP					639	639
Parks profiles				62**		62
PIP Site consolidation				318		318
PROARCA/CAPAS				467		467
RAPPAM	108	240	238	70	51	707
Tracking Tool	346	225	181	147	3	902
Total	**470**	**465**	**419**	**1177**	**693**	**3224**
' Most recent'	**439**	**403**	**364**	**529**	**651**	**2386**

** for most of the 'Park Profile'' studies, only threat data was available so averages could not be calculated.

3.6 Cautions and constraints

When considering the results presented in this report, the reader should be aware of the following constraints:

- We have considered only information that is available from studies already conducted. There is no reason to believe that the protected areas evaluated are a 'representative sample' of the protected areas across the world. Many of the studies have been undertaken by non-government conservation organizations because the protected areas concerned were considered to be particularly vulnerable. In other cases, government agencies have evaluated all or a sample of their protected areas. There has been no attempt to moderate these results: they reflect the picture of the available assessments.

- As discussed above, most of the information in this report is derived from qualitative assessments, and scoring may vary depending on the point of view and knowledge of the evaluators.

[3] The software package 'Minitab' was used to analyse the data.

- Statistical analysis is conducted only on the assessments for which we have been provided with usable raw data, which is about 50% of the known assessments.

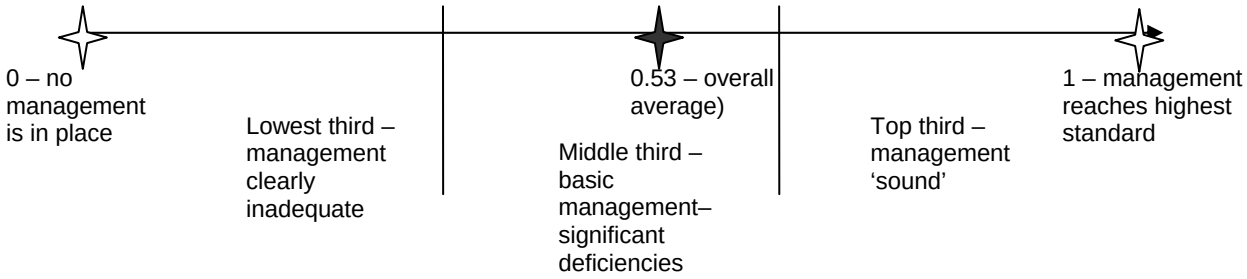
- Translation of raw data into the common reporting format enables cross-analysis but inevitably leads to a loss of the 'richness' in data, especially information obtained from more detailed studies. People interested in more detail should consult the original reports.

- The information content of the headline indicators varies widely: some methods ask numerous questions about one broad topic such as community involvement, which are then combined into only one headline indicator, while other methods have only asked one question relating to this topic. This also means that the original weighting systems of the methodologies are often not reflected in our analysis.

- The methodology for combining and cross-analyzing data is the best available to look across the diversity of methodologies, but we recognize the imperfections, and the fact that data collected by different methodologies may not always paint the same picture of a protected area.

3.7 What do the headline indicator and overall average scores represent?

As the scores are derived totals from a number of methodologies, they have no absolute meaning. By scoring protected areas between zero and one for their overall performance, the scores reflect a continuum from no management at all to reaching the highest standards. The lowest third (below 0.33) means that protected area management is likely to be seriously constrained. Scores between 0.33 and 0.67 indicate that while basic management is in place, considerable improvement is still needed. Generally a 'sound' level of management would begin at a score of around two-thirds (0.67). Scores above this mean that the area is being managed relatively well.



Chapter 4 Trends in protected area management

4.1 How effective is protected area management?

This is the largest study to date compiling results of site-level protected area assessments, and within the limitations described above some patterns are clear:

Protected areas are performing at a 'barely acceptable' level overall.

The overall mean score is 0.53 out of a maximum of one for the 2322 'most recent' assessments for which averages could be obtained (some studies with few indicators were excluded). The distribution of the average scores is shown in Figure 4, while basic statistics are provided in

Table 6. It can be seen that scores for individual protected areas vary from zero to very high. Only 14% are in the 'clearly inadequate' range and 21% in the 'sound' range. Most protected areas are therefore clustered in the middle third (basic management), with 27% of the total in this range but below 0.5 and 38% above 0.5.

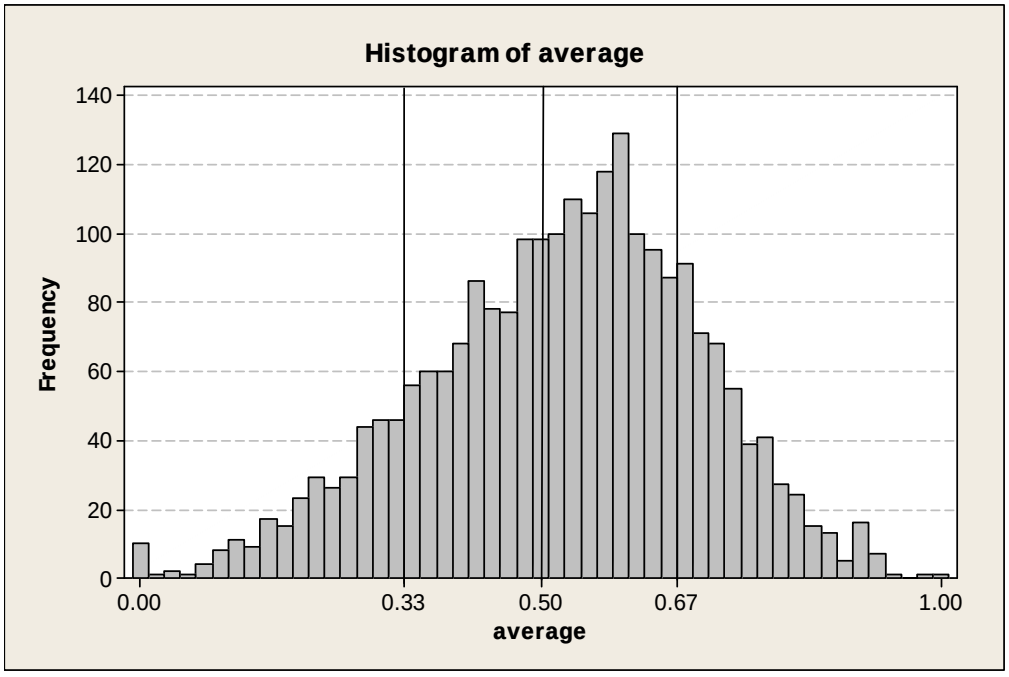


Figure 4: Distribution of average scores for 'most recent' assessments

Table 6: Statistics to complement Figure 4.

Mean	0.52512
St Dev	0.17127
Variance	0.02933
Skewness	-0.315005
Kurtosis	-0.104592
N	2322
Minimum	0.00000
1st Quartile	0.41393
Median	0.54000
3rd Quartile	0.64609
Maximum	1.00000
95% confidence for mean	
0.51846	0.53246
95% confidence for median	
0.53128	0.54826
95% confidence for std deviation	
0.16646	0.17636

Scores vary according to the economic environment of management.

The average scores vary significantly according to the methodology used[4] and the UN region[5], as shown in Table 7. However, an examination of the results shows that it is most likely that this variation is largely due to the particular sample of protected areas assessed or the socioeconomic environment of the protected area systems evaluated.

For example, RAPPAM in Africa appears to score more highly than the Tracking Tool. However, this may not be due to inherent differences in how the methodologies rate the level of management performance. The Tracking Tool in Africa has been applied to many new protected areas and those targeted by aid projects, so low scores are to be expected, while RAPPAM results in that region are largely drawn from an assessment in South Africa, in one of the more developed protected area systems on the continent. The PIP site consolidation scorecard in Latin America and the Caribbean scores more highly than other methodologies in the region, but these are the most recent assessments of protected areas where intensive capacity building projects have been undertaken. In contrast, scores for the first assessments on these protected areas – before interventions were undertaken to improve management – averaged only 0.24, the lowest of any methodology used (Leverington *et al.*, 2007).

UN regions encompass huge variation in the standard of protected areas and the assessments considered do not attempt to sample this variation, so it is considered unlikely that the difference between UN regions is meaningful: for example the assessments in Oceania include a small number in Papua New Guinea and a large number in Australia, with none from the Pacific Island Nations.

Table 7: Overall averages from most recent data (sample size in brackets)

Methodology	Africa	Asia	Europe	LAC	Oceania	Average
AEMAPPS				0.52 (47)		**0.52**
CAR evaluation	0.36 (16)					**0.36**
MEMS				0.49 (19)		**0.49**
NSW SOP					0.56 (597)	**0.56**
Parks profiles				0.56 (20)		**0.56**
PIP Site consolidation				0.64 (53)		**0.64**
PROARCA/CAPAS				0.54 (137)		**0.54**
RAPPAM	0.55 (108)*	0.54 (234)	0.58 (238)	0.60 (66)	0.42 (45)**	**0.56**
Tracking Tool	0.40 (315)	0.54 (165)	0.55 (124)	0.40 (135)	0.50 (3)	**0.46**
Average	**0.44**	**0.54**	**0.57**	**0.52**	**0.55**	**0.53**

*includes 93 from South Africa
**all from Papua New Guinea

However, an analysis of results according to the Human Development Index (HDI) shows highly significant differences which may be more meaningful. As expected, the scores are much higher in those countries with high and medium HDI ratings.

Table 8: Average scores (most recent) analysed according to HDI

HDI	N	Median	Ave Rank	Z
Low	265	0.3627	618.4	-13.85
Medium	1108	0.5396	1152.0	0.18
High	923	0.5724	1300.0	8.91

Overall 2296 1149.5
H = 218.30 df = 3 P < 0.0001

[4] (Kruskall-Wallace test, H = 203.58 df = 8 P< 0.0001)
[5] (H = 159.63 df = 4 P< 0.0001)

4.2 Which aspects of management are most effective?

There are clear patterns in the strengths and weaknesses of different aspects of management , and most of these are consistent across regions and methodologies. Average scores for individual headline indicators vary from 0.29 (very low) to 0.86 (high) on a zero to one scale. The five management aspects assessed as strongest overall (scoring over 0.65) are mostly from the 'planning' element of the IUCN-WCPA Framework: gazettal and legal status, marking of protected area boundaries, tenure issues, and design of protected areas. (However, the 'management planning' indicator scores much lower). 'Process' indicators relating to governance and staff skill levels also score highly.

The six aspects of management on average assessed as most unsatisfactory (below 0.45 on a zero to one scale) include inputs (funding budget and funding security) and the process indicators relating to community assistance programs, communication and building and maintenance.

Figure 5 shows average scores from the most recent assessments for each 'headline indicator' in descending order[6]. Shading indicates for each indicator which element it matches from the IUCN-WCPA Framework explained in Section 2.1 (Hockings *et al.*, 2006). For more details, see Table 11, which presents average scores for each indicator including the number of assessments and standard deviation. Averages for each region are also shown.

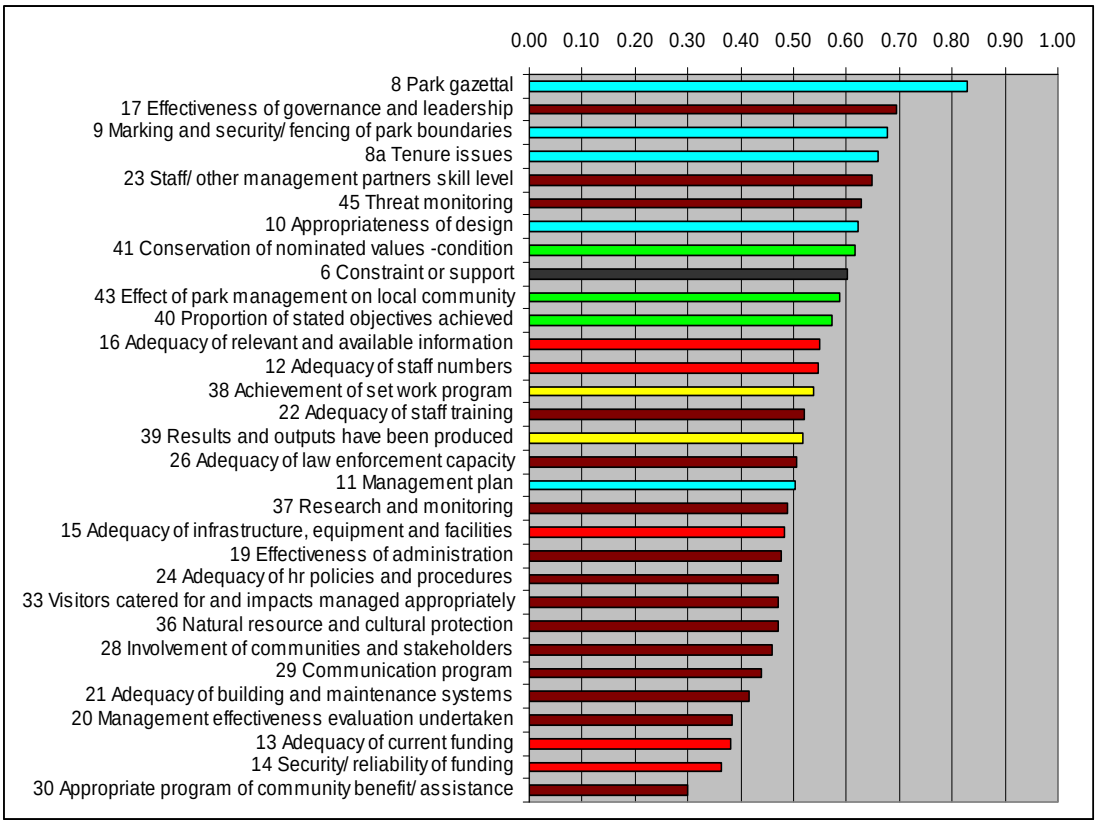


Figure 5: Average scores for headline indicators from 'most recent' studies

Notes: Where there have been multiple studies at a site using a methodology, only the most recent data has been used. While data from approx 2300 studies was analysed, most headline indicators have fewer entries (see Table 9) Headline indicators with less than 200 entries have been deleted from this figure. Colours used to indicate the element of the IUCN-WCPA Framework: Black indicates 'context' factors, aqua 'planning' , red 'inputs', brown 'process' ,yellow ' outputs', and green 'outcome'.

[6] Headline indicators with 200 or fewer records have been omitted from this figure but are included in the table. None of the methodologies include indicators relevant to all headline indicators, so the number of records for each varies. In addition, some records are blank.

Headline indicators have been summarised according to the WCPA elements, as shown in Table 9. Broad patterns in management include the following:

Table 9: Overall averages using most recent data only

	Mean	Sample	Stdev	Africa	Asia	Europe	LAC	Oceania
Average inputs	0.50	2302	0.22	0.37	0.52	0.49	0.48	0.59
Average planning indicators	0.64	2305	0.22	0.60	0.64	0.72	0.60	0.64
Average process indicators	0.49	2336	0.19	0.39	0.50	0.53	0.49	0.52
Governance processes	0.51	2301	0.23	0.43	0.50	0.51	0.50	0.54
Community processes	0.45	2189	0.25	0.33	0.45	0.52	0.46	0.48
Environmental processes	0.49	2199	0.23	0.40	0.53	0.53	0.50	0.51
Average output indicators	0.53	1368	0.25	0.58	0.49	0.57	0.54	0.51
Average outcome indicators	0.60	2196	0.21	0.54	0.67	0.62	0.57	0.59

Planning is the strongest of the elements overall, but management planning itself is weak. Aspects of management relating to the establishment and design of protected areas are relatively strong. The large dataset from Australia does not include indicators about gazettal or tenure issues as these are not issues of concern in these systems where all protected areas are legally gazetted: if these were included the average for these indicators would be even higher. However, in some areas tenure issues and boundary marking remain major constraints on management (note the high standard deviation relating to these scores).

Management planning scores below the acceptable level (0.50) and is one of the weaker headline indicators on a global scale.

Input indicators score at below an acceptable level, especially those relating to budget adequacy and reliability. The input ratings for African assessments are particularly low, on average falling well below an acceptable level, and it can be assumed that this would seriously compromise effective management. Inputs for Oceania appear high, and the influence of the Australian assessments needs to be considered as the average inputs excluding this data is 0.45. The NSW data is different from other methodologies because the only contributing indicator to the 'inputs average' is availability of information, a relatively high-scoring input, and no rating for budget or staff is included in this analysis[7].

Processes range from very weak to acceptable, but most need improvement on a global scale. The weakest processes are the 'community processes' relating to communication, community relations and visitor management, while those to do with governance and administration are somewhat stronger on average. However, 'building and maintenance' scores very poorly, which is a concern as this further undermines the already poor adequacy of equipment and infrastructure. The African data shows concerningly low scores for processes, especially in relation to communication and community relations.

Outputs are rated as just acceptable, though these are measured in only half the assessments (notably RAPPAM and the NSW State of Parks, but not the Tracking Tool).

[7] The NSW State of Parks does include information about staff and budgets but it is not scored or in an easily comparable form so has been excluded from this analysis.

Outcomes of management are generally scored relatively highly. Outcomes relating to the achievement of stated objectives, the condition of values and the effect of the protected area on the community all score over 0.55. Asian assessments have higher outcome scores.

When the strengths and weaknesses are examined across the UN regions (see Table 11), there is a remarkable similarity in the patterns of the headline indicator scores. Though the actual scores vary, the ten highest and ten lowest indicator sets are very similar. The exception is Oceania, where the ten highest scoring factors include visitor management and adequacy of equipment and infrastructure. This reflects a greater emphasis and capacity in this regard in the Australian (NSW) protected areas assessed. Management planning is also stronger there, where a concerted effort to increase the coverage of management plans has been made in recent years.

Patterns in this study confirm many of the observations made in relation to scoring of questions in the Tracking Tool (Dudley *et al.*, 2007) as shown in Table 10. Here also, design and legal status were the highest scoring factors, with low ratings for funding, visitor management and community relations.

Table 10: Highest and lowest scored questions from an analysis of Tracking Tool data from 331 forest protected areas (Dudley *et al.*, 2007)

Ten highest scored questions (in descending order)	*Ten lowest scored questions (in descending order)*
▪ Legal status ▪ Protected area demarcation ▪ Protected area design ▪ Biodiversity condition assessment ▪ Protected area objectives ▪ Resource inventory ▪ Regular work plan ▪ Protected area regulations ▪ Resource management ▪ Economic benefits assessment	▪ Education and awareness ▪ Current budget ▪ Security of budget ▪ Fees ▪ Management plan ▪ Monitoring and evaluation ▪ Indigenous peoples ▪ Local communities ▪ Visitor facilities ▪ Commercial tourism

Table 11: Overall and regional averages for each headline indicator

Headline indicator	Overall			Africa		Asia		Europe		LAC		Oceania	
	Mean	N	Stdev	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
1Level of significance	**0.65**	1334	0.24	0.60	124	0.72	230	0.68	238	0.65	100	0.62	642
6 Constraint or support	**0.60**	889	0.31	0.51	124	0.67	229	0.60	232	0.56	259	0.77	45
8 Park gazettal	**0.83**	1556	0.31	0.84	422	0.82	397	0.84	362	0.85	326	0.57	48
8a Tenure issues	**0.66**	775	0.37	0.73	108	0.55	227	0.75	238	0.63	157	0.69	45
9 Marking and security/ fencing of park boundaries	**0.68**	1556	0.32	0.69	421	0.66	391	0.77	362	0.59	333	0.63	48
10 Appropriateness of design	**0.62**	1468	0.24	0.54	420	0.61	396	0.73	361	0.64	244	0.64	46
11 Management plan	**0.50**	2304	0.28	0.34	423	0.50	399	0.53	362	0.47	474	0.62	645
12 Adequacy of staff numbers	**0.55**	1696	0.29	0.51	421	0.67	397	0.54	361	0.47	469	0.65	47
13 Adequacy of current funding	**0.38**	1621	0.27	0.28	421	0.45	398	0.43	357	0.41	397	0.14	47
14 Security/ reliability of funding	**0.36**	1361	0.30	0.23	328	0.41	398	0.43	159	0.42	430	0.11	45
15 Adequacy of infrastructure, equipment, facilities	**0.48**	2011	0.28	0.37	422	0.48	394	0.49	358	0.49	468	0.60	368
16 Adequacy of relevant and available information	**0.55**	2277	0.25	0.44	420	0.57	397	0.55	362	0.58	452	0.59	645
17 Effectiveness of governance and leadership	**0.70**	804	0.35							0.63	207	0.72	597
19 Effectiveness of administration	**0.48**	1650	0.28	0.40	422	0.50	398	0.52	361	0.53	420	0.19	48
20 Management effectiveness evaluation undertaken	**0.38**	1327	0.28	0.33	311	0.44	164	0.51	123	0.30	128	0.39	600
21 Adequacy of building and maintenance systems	**0.41**	1598	0.31	0.33	416	0.41	394	0.50	354	0.43	385	0.51	48
22 Adequacy of staff training	**0.52**	1420	0.27	0.50	421	0.52	397	0.57	158	0.52	395	0.53	48
23 Staff/ other management partners skill level	**0.65**	705	0.28	0.65	108	0.73	230	0.57	238	0.63	84	0.67	45
24 Adequacy of hr policies	**0.47**	1583	0.25	0.49	418	0.47	396	0.47	357	0.47	365	0.30	46
25 Staff morale*	**0.51**	158	0.29							0.51	158		
26 Adequacy of law enforcement capacity	**0.51**	1981	0.27	0.50	438	0.53	398	0.66	362	0.50	356	0.37	426
28 Involvement of communities and stakeholders	**0.46**	1851	0.25	0.35	345	0.47	398	0.50	164	0.50	451	0.47	492
29 Communication program	**0.44**	1911	0.28	0.34	423	0.42	399	0.51	361	0.44	409	0.52	318
30 Program community benefit/ assistance	**0.30**	742	0.36	0.22	313	0.46	157	0.34	91	0.28	177	0.50	3
32 Sustainable resource use – m'ment and audit*	**0.44**	87	0.36							0.44	87		
33 Visitors catered for , impacts managed	**0.47**	2130	0.33	0.28	416	0.45	392	0.47	359	0.41	317	0.64	645
36 Natural resource and cultural protection	**0.47**	2084	0.25	0.40	423	0.49	398	0.50	269	0.45	364	0.50	629
37 Research and monitoring	**0.49**	1593	0.29	0.40	422	0.58	398	0.52	272	0.48	452	0.49	48
38 Achievement of set work program	**0.54**	691	0.24	0.57	93					0.88	1	0.53	597
39 Results and outputs have been produced	**0.52**	677	0.26	0.66	15	0.49	234	0.57	235	0.53	148	0.25	45
40 Proportion of stated objectives achieved	**0.57**	241	0.23					0.58	195	0.57	46		
41 Conservation of nominated values -condition	**0.62**	1847	0.26	0.54	343	0.72	394	0.72	161	0.56	315	0.59	633
42 Conservation of nominated values – trend*	**0.55**	88	0.30							0.55	88		
43 Effect of park management on local community	**0.59**	1533	0.26	0.56	421	0.63	391	0.59	359	0.58	313	0.53	48
45 Threat monitoring	**0.63**	316	0.26					0.59	107	0.65	209		
46 Adequacy of pa legislation*	**0.69**	136	0.26							0.69	136		

4.3 Which factors are most strongly linked to effective management?

To look at which factors of management appear to be most closely linked to each other and to overall effectiveness, all data were combined and analysed for correlations (using the Pearson's Correlation Coefficient)[8] . The strength of the relationship was tested between each pair of headline indicators and between these individual headline indicators and:

- The overall average score for management effectiveness (weighting all the headline indicators evenly);
- Averaged scores for
    - inputs (headline indicators 12-16),
    - planning (headline indicators 8-11) ;
    - All processes; and
        - 'governance' processes(headline indicators 17-25),
        - 'community' processes(headline indicators 28-30), and
        - 'environmental' processes(headline indicators 36-37);
    - All outputs; and
    - All outcomes
- Outcome indicators (the current status of values and the effect on the protected area on the community.

Overall management effectiveness is most strongly linked to adequate infrastructure, equipment and information; good management planning; high levels of communication, visitor management and community participation; professional resource management, research and monitoring; and good governance and administration. Management outcomes are most strongly correlated with environmental processes (research and monitoring and resource protection) and community processes (communication, involvement of communities and programs of community benefits).

Correlations with individual headline indicators

The 20 individual headline indicators with the strongest correlations to the overall average scores and the highest correlation to the averages outcome scores are listed in Table 12. These correlations do not necessarily mean a causative link, but show a picture where the most effectively managed protected areas are characterized by certain factors.

8 Correlation measures the strength and direction of a relationship between two sets of variables (such as two different indicators). That is, the more strongly they are positively correlated, the more you will expect that as one increases, the other one will increase too. If the two indicators are completely independent, the correlation will approach zero. If they always vary in exactly the same way, the correlation will be one. (If they vary in the opposite way, the correlation will approach -1)

If the correlation is significant at $p<.0001$, this means that there is a very low probability (less than one in 10,000) that the observed correlation arose simply by chance. A positive correlation does not necessarily mean that there is a 'causal' relationship: there might be some other factor (such as resourcing) that influences both variables.

Table 12: Correlation of headline indicators with overall average (R av) and with averaged outcomes (R out). Top 20 for each are ranked (Rank A is the order in which the indicator is correlated with the average; Rank O the order of correlation with outcomes), and those in the top 10 for both are shaded.

Headline indicator	element	R (av)	Rank A	R (out)	Rank O
15 Adequacy of infrastructure, equipment and facilities	Input	0.734	1	0.279	15
29 Communication program	Process	0.717	2	0.368	4
39 Results and outputs have been produced	Output	0.714	3	0.411	1
36 Natural resource and cultural protection	Process	0.701	4	0.369	3
11 Management plan	Planning	0.686	5	0.258	17
16 Adequacy of relevant and available information	Input	0.683	6	0.296	12
37 Research and monitoring	Process	0.674	7	0.379	2
17 Effectiveness of governance and leadership**	Process	0.668	8	0.254	18
33 Visitors catered for and impacts managed appropriately	Process	0.665	9	0.296	13
28 Involvement of communities and stakeholders	Process	0.653	10	0.354	5
19 Effectiveness of administration	Process	0.645	11	0.221	
40 Proportion of stated objectives achieved*	Outcome	0.635	12	na	
20 Management effectiveness evaluation undertaken	Process	0.633	13	0.308	11
22 Adequacy of staff training	Process	0.627	14	0.286	14
14 Security/ reliability of funding	Input	0.619	15	0.213	
38 Achievement of set work program	Output	0.606	16	0.341	8
12 Adequacy of staff numbers	Input	0.582	17	0.344	7
24 Adequacy of hr policies and procedures	Process	0.576	18	0.206	
30 Appropriate program of community benefit/ assistance	Process	0.571	19	0.346	6
13 Adequacy of current funding	Input	0.570	20	0.273	16
23 Staff/ other management partners skill level	Process	0.384		0.319	9
1 Level of significance	Context	0.160		0.313	10
25 Staff morale*	Process	0.528		0.248	19
10 Appropriateness of design	Planning	0.386		0.243	20

* relatively small sample size or spread
** only in two regions

It is interesting that staff numbers and current funding, while among the 21 most significant factors, are not in the 'top 15'. The data indicates (perhaps surprisingly) that the 'input' factors which most predict effective management are equipment, infrastructure and information rather than staff or budget. However, it is obvious that adequate and well-managed financial and human resources must underlie the other input factors, as well as being essential to develop other vital elements such as visitor management, management planning and community relations. Perhaps this emphasises the fact that in the complex field of protected area management, money alone does not equate to effectiveness, but must be accompanied by good planning and capacity-building.

Correlations between grouped indicators

Can the best headline indicators be regarded as very strong predictors of overall management, so that effectiveness could be scored by a very brief survey asking only a few questions? To investigate this, the ten most highly significant factors were correlated against the overall average and other factors. Table 13 shows the correlations between groups of indicators and the overall average. It can be seen that the average of the 'top ten' is a good predictor of overall average effectiveness, but is only half as strong when predicting outcomes. A combination of the inputs or of the processes also gives a good indication of overall effectiveness, but these grouped indicators are also quite weak predictors of outcome.

Table 13: Correlations (Pearson's coefficient) between grouped headline indicators and the average score. All are significant at p<.0005

	average	planning	Input	process	output	outcome
Average						
All planning (5)	0.69					
Inputs (5)	0.83					
Governance processes (9)	0.81	0.48	0.63	--	0.42	0.33
Community processes (3)	0.75	0.41	0.57	--	0.43	0.39
Environmental processes (3)	0.79	0.46	0.61	--	0.49	0.42
All processes (18)	0.94	0.53	0.73	--	0.54	
All outputs (2)	0.71	0.41	0.45	0.54	--	
All outcomes (3)	0.55	0.22	0.35	0.44	0.35	--
'Top 10' (10)	0.93	0.59	0.82	0.90	0.66	0.48

Correlation with outcomes

Outcomes have been measured by a range of indicators, grouped under headline indicators 40 (achievement of objectives), 41 (status of values), 42 (trend of values) and 43 (effect of the protected area on the community). While these three headline indicators are all positively and significantly correlated with the overall average, averaged 'overall effectiveness' alone is not a very strong predictor of positive outcomes for protected area management. The grouped indicators and the 'top 10' indicators also show a comparatively weak correlation to outcome measures (see Table 13).

The headline indicator 40 *'achievement of objectives'* has a relatively small data set (with questions asked only in AEMAPPS in Colombia and RAPPAM in South Africa). It is strongly correlated to the grouped environmental processes score (R=0.74) as well as to management planning (0.5), funding security (0.51), community involvement (0.56), communication processes (0.50), resource management (0.70), and research and monitoring (0.55)

The individual headline indicator relating to *status of values* is linked with overall values and with inputs. When we look at individual indicators, the five most strongly linked to estimations of values conservation are the achievement of objectives and work programs, research and monitoring, information availability, and staff numbers.

The *effect of the protected area on the community* is most strongly linked with the grouped 'community processes' (community participation, communication and programs of community benefits). Looking at individual indicators, the impact on the local community is also strongly linked to individual community processes (communication, community participation and programs of community benefit), followed by visitor management and management planning.

4.4 What are the most critical management factors needing attention?

Where factors have been identified as strongly linked with overall effectiveness and good outcomes, it appears to be particularly important to make efforts to maintain or improve their ratings. It could also be assumed that an optimum strategy for increasing management effectiveness to an acceptable level would be to improve those aspects of management which are generally weak, but are strongly correlated with overall effectiveness and with good outcomes.

To define these critical management aspects, a simple metric was calculated for each headline indicator by multiplying the sum of its correlation with overall average score and with average outcome score (i.e. weighting the 'importance' of the headline indicator as a predictor of effective management), by one minus the average score (i.e. the improvement needed to score one), equivalent to an inverse level of 'performance' for the indicator. This gives an 'importance-performance' estimate which indicates which factors are poor now

but are likely to provide greatest impact if addressed. Indicators of context, output and outcome were excluded from this exercise as they are more difficult to directly influence.

Overall, the most factors rated highest by this estimate, in order of importance, were:

- Appropriate program of community benefit/ assistance
- Communication program
- Management effectiveness evaluation undertaken
- Natural resource and cultural protection
- Involvement of communities and stakeholders
- Research and monitoring
- Security/ reliability of funding
- Adequacy of infrastructure, equipment and facilities
- Adequacy of current funding
- Visitors catered for and impacts managed appropriately
- Management plan
- Effectiveness of administration
- Adequacy of relevant and available information
- Adequacy of staff training
- Adequacy of staff numbers

4.5 Is management improving over time?

As further management effectiveness studies are conducted, there will be more evidence about how the standard of protected area management can be improved. Early analysis shows that a targeted program of protected area 'consolidation', accompanied by additional inputs and by management effectiveness studies, can show good and often dramatic results. Perhaps the most comprehensive program documented in this regard is the Parks in Peril program (Martin and Rieger, 2003)

In this study, we have looked at 263 repeat studies – where two or more assessments have been conducted over time in the same protected area using the same methodology. Of these, 193 showed that effectiveness improved, with the 'most recent' score an average of 99.8% increase on the original score. The greatest increase for one protected area was from .02 to .80! Eight protected areas stayed the same, while 60 showed a decrease in score, averaging 14.5%.

These repeat studies include the repeat Tracking Tool assessments which were recently analysed by Dudley *et al.* (2007). That study found that 60% of sites improved while the scores in 34% declined. The greatest improvements were in management planning, condition assessment, relations with local communities, and education, but some parks had also declined in management planning, especially implementation of management planning, and in human resources management.

In Latin America, repeat studies for 207 protected areas[9] were analysed for a study commissioned by IABIN in association with the Global Study (Leverington *et al.*, 2007). Changes over time for those areas are presented in Figure 6.

Clearly improved management was seen in most of the assessed topics and sites. Headline indicator scores in the first studies varied from 0.17 to 0.68, while in the most recent

[9] Repeat study results were available for protected areas assessed by AEMAPPS in Colombia (this methodology changed somewhat between the two assessments), Parks in Peril across 17 countries, PROARCA in Guatemala and Panama and a very small number of studies using the Tracking Tool. These total 207 protected areas, but a lesser number of assessments are available for most of the headline indicators, due to variable questions asked in each methodology. Only those indicators with more than 50 records have been included.

studies the variation was from 0.41 to 0.79, so the poorest aspects of management had been greatly boosted. This trend data mostly represented protected areas where there have been specific intervention programs, such as the Parks in Peril program and PROARCA, and appears to indicate the success of such programs in improving these aspects of management.

The most dramatic improvements shown between the first and last assessments are in the management and auditing of sustainable resource use, and the level of land tenure issues. Strong improvement is also seen in the involvement of communities and stakeholders and in the availability and security of funding, all of which remain below 0.5, but are significantly less negative than in the earlier assessments.

Marking or fencing of protected area boundaries, measured only by PROARCA in the repeat studies, showed no improvement over time. Other factors which exhibited little positive change include processes of staff morale, adequacy of human resource policies and procedures, effectiveness of governance and leadership, and building and maintenance. None of these factors were measured by the Parks in Peril Site Consolidation Scorecard, and all are complicated processes which require considerable and consistent effort to improve.

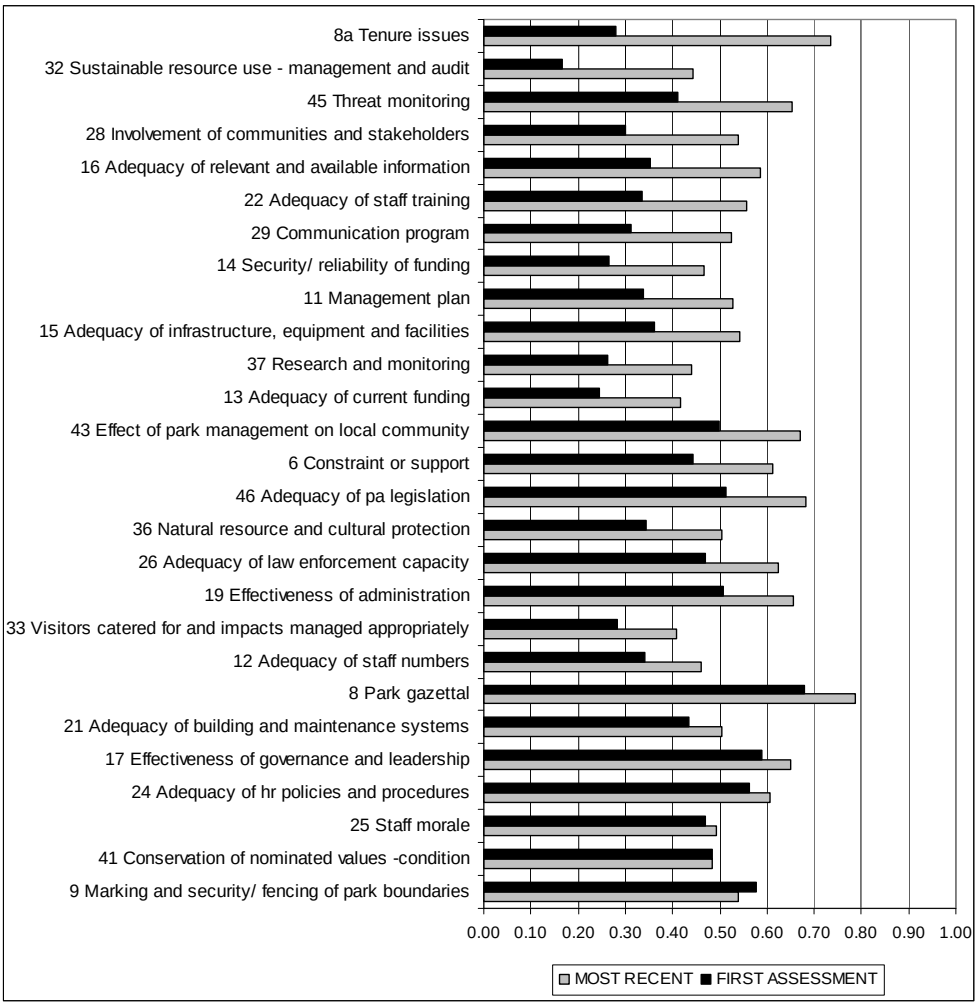


Figure 6: Average scores for headline indicators in repeat studies, showing changes from first to most recent assessments (in descending order of change magnitude). Source (Leverington *et al.*, 2007)

4.6 Which are the most serious threats to protected areas?

Most management effectiveness assessments evaluate to some extent the types and level of threats to protected area values and management. Some methodologies, such as ParksWatch and RAPPAM, provide detailed analyses of threats and potential threats. This study considered threats nominated in 47 MEE reports covering 51 countries. Further analysis of available information is needed to better understand the situation, but it is hoped that this preliminary analysis will be useful in providing an initial picture. It is intended to provide more detail in supplementary regional reports.

The reports and/or data were analysed and the threats and pressures listed according to their best fit with the standard classification of threats developed by the Conservation Measures Partnership (IUCN and Conservation Measures Partnership, 2006). This classification lists several 'layers' of threats from general to specific – we have reported on 'second level' threats though some have been combined to 'first level' as it was impossible to distinguish between threats in more detail (for example, some assessments do not distinguish between invasive plants and animals or between different types of pollution).

Threats to protected areas regarded as most frequent and serious in the reports of management effectiveness across five UN regions are shown in Figure 7. While many other threats are also mentioned, those of most common concern appear to be :

- Hunting and fishing on protected areas;
- Logging, wood harvesting and collection of non-timber forest products;
- Housing and settlement within protected areas and resulting issues;
- Recreational activities – mostly unregulated tourism;
- Activities on adjacent lands including urbanisation, agriculture and grazing;
- Grazing and cropping within protected areas;
- Fire and fire suppression;
- Pollution;
- Invasive species. and
- Mining and quarrying.

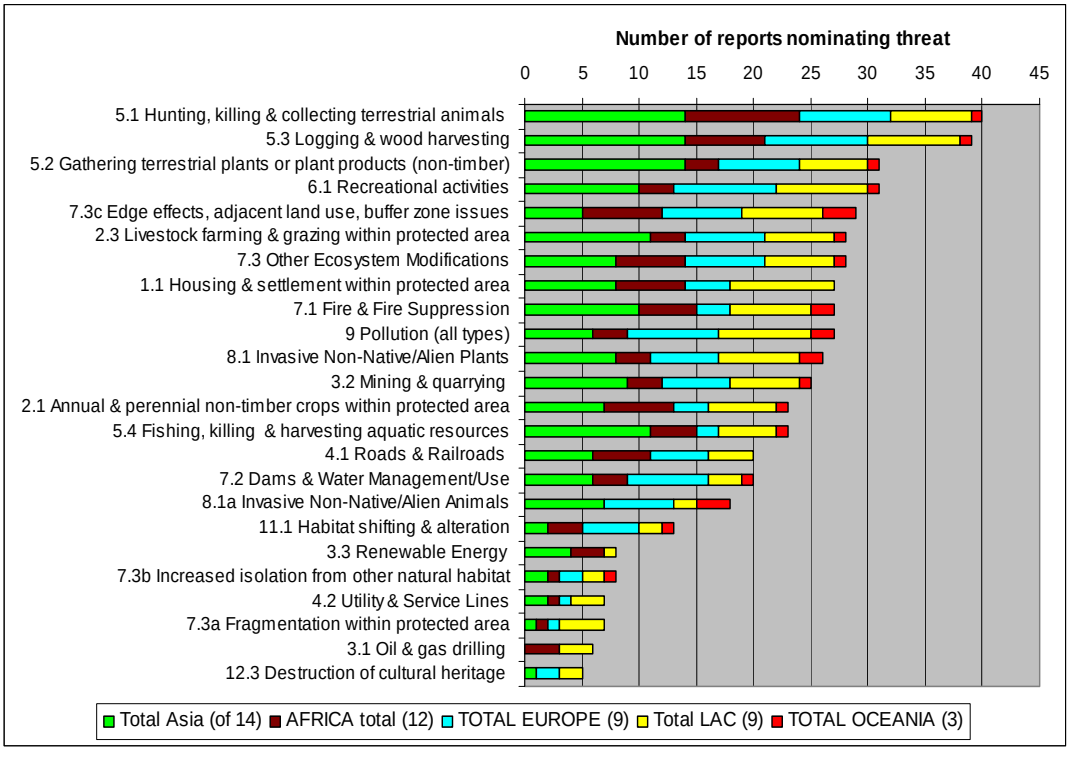


Figure 7: Threats mentioned in 45 MEE studies, interpreted via the Common threat classification (note that one of the reports from LAC includes 87 ParksWatch studies over 7 countries)

Chapter 5 Conclusions and recommendations : what can we learn?

5.1 Conclusions and recommendations about protected area management

Results of the assessments overall show that protected area management leaves much to be desired, with management effectiveness in most cases just meeting or missing acceptable minimum standards. While some protected areas are being well managed, about one in three is still in an 'establishment' phase where significant deficiencies are obvious, and another one in seven shows clearly inadequate management, where basic needs are not being met. This study includes many poorer protected areas which are targeted for development aid programs, but there are also a number from more developed (high HDI) countries and even there management effectiveness could be substantially improved.

Assessments consider that protected areas are conserving their values and contributing to their communities. In spite of lack of inputs and adequate management processes, the 'outcome' factors of meeting objectives, conserving values and affecting the community all achieved positive and relatively high ratings. It is true that most assessments contributing to this study have used only qualitative 'self-rating' judgments, but there is no reason to believe that these indicators would be rated any more leniently than others. Studies looking at empirical evidence also suggest that on a larger scale protected areas are reducing the rate of deforestation, even where there is lack of funding and weak institutions (Naughton-Treves *et al.*, 2005).

Numerous and serious threats to protected areas require attention if their values are to be conserved. Many of these threats relate to the interface between conservation and human welfare, so are extremely challenging to resolve. Deforestation or intensified landuse up to the protected area boundary is in many cases leading to increased pressure and 'edge effects'. This is an issue in some more developed countries, such as Australia, as well as in tropical countries with rapidly increasing populations and changing economies.

As discussed above, protected areas do appear to be performing important conservation functions and protecting biodiversity, especially from wholesale destruction. However, the frequency of threats recorded in this study from hunting, adjacent land use, farming and grazing, and settlements within protected areas across most of the world confirms the concern that protected areas which seem to be maintaining their values may in fact be experiencing more subtle declines as we see 'half-empty forests' with loss of biodiversity (Peres and Palacios, 2007).

Some protected areas still lack the basic requirements to operate effectively, and threats are aggravated by the lack of a clear management presence. Very low scores for security of funding in many assessments are a concern. There is a very strong link between adequate 'inputs' and overall effective management, with the most important individual indicators being equipment, infrastructure and information. Adequate equipment and infrastructure is very highly correlated with effective management but is one of the weakest indicators in almost all regions, so this factor deserves some serious attention. Reports consistently mention the need for more staff, but the difficulty of attracting and maintaining good technical staff often appears to be the problem (sometimes related to human resource policies and wage levels).

It is recommended that management agencies, partners and funders continue to cooperate to help protected areas achieve minimum basic standards. The concept of protected areas becoming 'consolidated' through defining and working towards minimum standards of management across a number of factors makes intuitive sense and has been applied in a number of methodologies. Where this approach is linked with additional funding, regular evaluations and a concerted effort towards improving the fundamentals, marked improvement can be seen over time. This is clearly evidenced by the Parks in Peril data and to a lesser extent by experience from the PROARCA program and use of the Tracking Tool. This process takes time, so long-term commitments to protected area improvement are essential (Martin and Rieger, 2003), as are efforts to build sustainability into all externally-funded programs.

It is essential that national governments provide better policy support for tenure resolution in some cases, and for appropriate development planning and control around protected areas. The consistent nomination of adjacent land use or 'buffer zone management' as a major threat emphasizes the need to consider protected areas in the wider landscape, especially as they are faced with additional pressures from climate change.

Protected area establishment and design are relatively effective, so the basics of protected area systems are in place in most places. Gazettal of protected areas, resolution of tenure issues, boundary marking, and sound design of protected areas have generally scored among the strongest management factors. Reports and data indicate that there are some areas where these vital factors still need attention, but in most cases these first steps towards effective management have been achieved to an acceptable level.

A greater effort should be to be put into communication, community involvement and programs of community benefit. In all regions, these factors scored poorly but were strongly correlated with both overall effectiveness and good management outcomes. The data analysed here shows that positive impacts on communities are most strongly linked with specific communication, participation and community benefit programs (rather than with good funding, staffing or overall management processes). This finding, combined with the lack of awareness of protected areas reported in many assessments, argues for a specific effort to boost community relations.

A boost to the specific program area of 'values conservation' through resource management, research and monitoring is also justified. Positive outcomes for protected area values conservation – primarily biodiversity conservation – are most strongly correlated with specific resource management activities, monitoring and research and threat monitoring. It appears that if we wish to conserve the values of protected areas, a focus is needed on specific activities to manage and monitor the values: general improvement to overall management is not sufficient.

Visitor management stands out as an area of management which needs to be improved, given its poor rating in most regions, the strong links with overall effectiveness and the prevalence of uncontrolled visitation and tourism being nominated as a serious threat. Needs include better communication with visitors, more appropriate infrastructure, facilities and waste disposal in some cases, and control of impacts which occur through unregulated use.

Managers need to build better pro-active management capacity. Management planning, monitoring and research and management effectiveness evaluation scored as comparatively weak, but all are strongly linked with good overall effectiveness. A key factor mentioned repeatedly is the need to improve the *application and use* of planning, evaluation and management tools to deliver good and consistent management on the ground.

5.2 Conclusions and recommendations about evaluating management effectiveness

The Global Study has given us the opportunity to analyse and learn from numerous studies of management effectiveness across the world, and more importantly to talk to many people who have learned from experiences in the field. Some of the findings have been incorporated into the revised version of the IUCN-WCPA Guidelines on management effectiveness (Hockings *et al.*, 2006), and others are presented below in the Principles for Methodologies, and in the Checklist in Appendix Two.

It has been emphasized that management effectiveness evaluation can be conducted for a range of different purposes. At the scale of this study, the contribution to on-ground adaptive management of protected areas is limited, but it is hoped that the recommendations in the previous section will be helpful. The definition of some key management factors might also be of interest to managers, and provides some basis for thought about the most critical issues to address on regional scales.

For the purposes of prioritisation and reporting across many protected areas, there are occasions where a very simple assessment tool with only a few indicators might be appropriate. This study has shown that a group of ten 'headline indicators' correlates very strongly with an overall average obtained from many more factors, but does not correlate so well with management outcomes. Therefore a minimum set of questions would need to relate to the 'top ten' headline indicators plus at least two outcome indicators, to separately address the conservation of values and the effect on the community. This small set of questions is not, however, recommended for general evaluation purposes, as it would not enable managers to understand enough about the protected area management to undertake necessary improvements and would not provide a learning experience for staff.

This study has shown that the range of methodologies in use often paint a remarkably similar picture of management strengths and weaknesses. Most importantly, the assessment process provides the opportunity for managers and partners to learn from each other and to raise the standard of their protected area management. This is a particularly successful technique when it is coupled with a concerted effort to apply the findings of the evaluation and to strengthen management to acceptable levels.

5.3 Principles for methodologies in MEE

As well as experiences from the Global Study, we have drawn on some of the extensive literature on evaluation which has developed, especially over the last ten years, with excellent publications and websites to assist in designing and conducting evaluations. The work by Patton (1997), for example, introduces the concept and practices of 'utilisation-focused evaluation' which is particularly appropriate to protected area managers. In various areas of evaluation, primarily those connected with international development agencies, guidelines and sets of principles have been defined by groups of practitioners to encourage evaluations which are both effective and ethical (Conservation Measures Partnership, 2004; Kusek and Rist, 2004; DAC Evaluation Network, 2006).

In the protected area context, a number of writers have listed characteristics of 'good' management effectiveness evaluations. Basic principles were defined by Courrau (1999) and recommended in the PROARCA manual (Corrales, 2004a). A set of guiding principles were derived from a meeting in Melbourne in 2003, where a number of international practitioners shared the 'lessons learned': these were incorporated into a book on global change (Leverington and Hockings, 2004) and the revised version of the IUCN-WCPA Guidelines on management effectiveness (Hockings *et al.*, 2006). An excellent synthesis of guidelines was also presented in the report on strengthening MEE in the Andes region (Cracco *et al.*, 2006).

The background into the methodology applied in Belize (Young *et al.*, 2005) also provides a good summary, while the 'How is Your Marine Protected Area Doing' guidebook (Pomeroy *et al.*, 2004, p.2) simply writes that evaluation should be

- 'Useful to managers and stakeholders;
- Practical in use and cost;
- Balanced to seek and include both scientific input and stakeholder participation;
- Flexible for use in different sites and in varying conditions; and
- Holistic through a focus on both natural and human perspectives'.

Even the best methodology will be ineffective or have negative impacts if it is applied in a punitive manner, if there is no follow-through to result in improved management, or if the process of evaluation causes serious friction and loss of trust between the parties. Where evaluations show negative trends, sensitive handling of the situation is essential so that improvements are encouraged. Evaluation teams should discuss in advance how to deal with cases where assessments uncover real incompetence, or in the worst scenario, deliberate misuse of power or resources.

Before an evaluation is begun, a methodology needs to be selected and adapted as necessary, and then implementation planned carefully. Adaptation and implementation planning are vital stages in the use of any methodology.

As discussed above, it should be kept in mind that while these are general principles, some characteristic of a 'good' evaluation will be determined by its purpose, scope and level. For example, while participation and transparency are good in principle, there are some cases were a less inclusive and open approach is necessary. Many of the principles described apply to more in-depth assessments (levels 2 and 3), and will be difficult to achieve in rapid, simple (level 1) exercises.

In summary, methodologies for evaluating management effectiveness of protected areas should be:

- *Useful and relevant in improving protected area management*; yielding explanations and showing patterns; and in improving communication, relationships and awareness;
- *Logical and systematic*: working in a logical and accepted framework with balanced approach;
- *Based on good indicators*, which are holistic, balanced, and useful;
- *Accurate*: providing true, objective, consistent and up-to-date information;
- *Practical to implement* within available resources, giving a good balance between measuring, reporting and managing;
- *Part of an effective management cycle*: linked to defined values, objectives and policies and part of strategic planning, park planning and business and financial cycles;
- *Cooperative*: with good communication, teamwork and participation of protected area managers and stakeholders throughout all stages of the project wherever possible; and
- *Focussed on positive and timely communication and application of results.*

A checklist relating to these principles is provided in Appendix Two. Guidelines for management effectiveness evaluation outlined in the IUCN-WCPA Guidelines (Hockings *et al.*, 2006) should also be referred to when conducting evaluations.

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Appendix One: Summary of regional patterns

It is intended to produce a series of reports outlining the state of protected areas in each of the UN regions. This section presents a brief outline of what studies have been undertaken and the average scores.

Africa

Management effectiveness assessments in Africa have included several informative published studies as well as RAPPAM studies conducted over several states and countries and Tracking Tool assessments, some associated with World Bank, WWF and/or GEF funded projects and others as country initiatives. Several in-depth studies of World Heritage Areas have also been conducted, and an innovative assessment of marine areas is also available. Reports used in the threat analysis and the supplementary regional report (in preparation) include the following (note that most Tracking Tool assessments do not include an overall report – raw data has been used):

- African rainforest study (Struhsaker *et al.*, 2005)
- Central African Republic (Blom *et al.*, 2004)
- Paper on the threat reduction assessment methodology in Uganda (Mugisha and Jacobson, 2004)
- RAPPAM studies in South Africa (Goodman, 2003), Malawi (WWF, 2006) Cameroon (MINEF Department of Wildlife and Protected Areas and WWF Cameroon Programme Office, 2002), Ghana (Republic of Ghana Ministry of Lands Forestry and Mines (Wildlife Division of The Forestry Commission), 2001), Mozambique (Republic of Mozambique, 2006) and Egypt (Fouda *et al.*, 2006).
- Tracking Tool applications in Namibia and Zambia (Smith, 2004c; Smith, 2004a; Smith, 2004b)
- Marine Protected Areas of the Western Indian Ocean
- In-depth site assessments of World Heritage Area in Egypt (Paleczny *et al.*, 2007)
- Assessment of management effectiveness in selected marine PA in the Western Indian Ocean (IUCN *et al.*, 2004; Wells, 2006).
- The forests of the Congo Basin – a preliminary assessment (Congo Basin Forest Partnership, 2005).

A total of just over 600 assessments from Africa have been recorded on the Global Studies database, as shown in Figure 8.

Of these, data was available for 439 assessments. The overall mean for these is 0.44, as shown in Figure 9. This is well below the world mean and is lower than any other region. This may be partly explained by the inclusion of a large dataset of Tracking Tools from new protected areas (being transferred from forest reserves) which have not yet established management structures and practices. Some 27% of the assessments scored in the bottom third of the scale (clearly unacceptable), while only 9% scored in the top third (sound management).

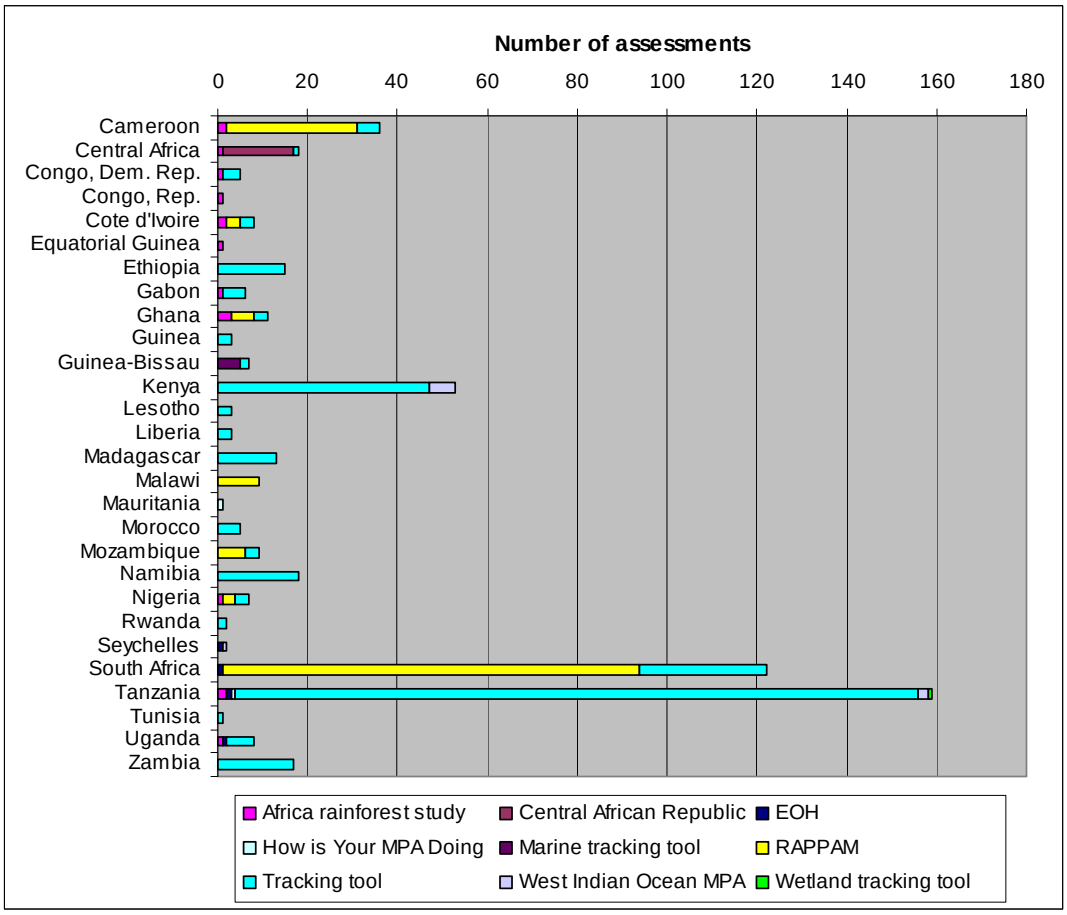

Figure 8: MEE assessments by country in Africa (UN region) recorded on the Global Studies database (note data has been analysed for only some of these)

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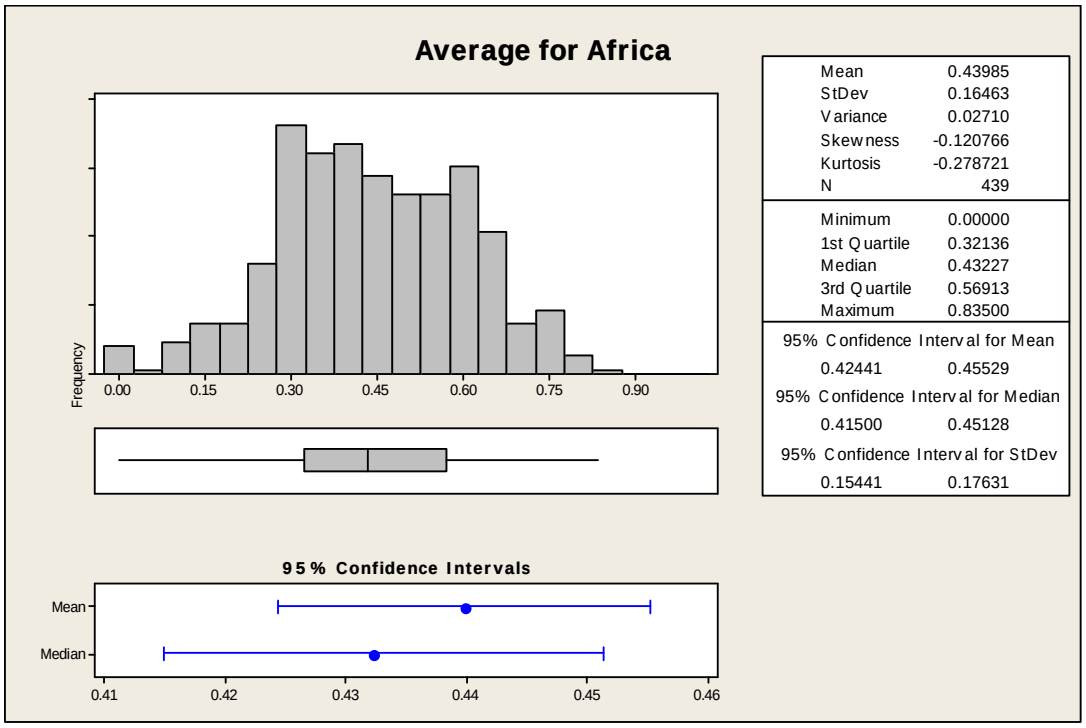

Figure 9: Overall average scores for African assessments

Asia

In the Asian region, most countries which have undertaken MEE assessments have used either the Tracking Tool or RAPPAM, and in many cases both, usually with the involvement of NGO organizations, particularly WWF, or the World Bank/GEF. The exceptions include studies in India and an application of the Tracking Tool in Korean protected areas. Studies in Asian countries are summarized in Figure 10.

Reports on management effectiveness in the Asian region include:

- Rappam studies in India (Department of Forests and Wildlife Sikkim and WWF India, 2003; WWF India, 2006) , Cambodia (Lacerda *et al.*, 2004), Nepal (Nepali, 2006), Bhutan (Tshering, 2003) , Laos (Anonymous, no date), Malaysia (Ministry of Natural Resources and the Environment, 2006), Indonesia (Anonymous, 2004) , Georgia (no report published), Turkey (Steindlegger and Kalem, 2005), Vietnam and Mongolia (Nemekhjargal and Belokurov, 2005) and the Yangzte Ecoregion of China (Diqiang *et al.*, 2003)
- Studies of tiger reserves in India (Project Tiger Directorate Ministry of Environment & Forests, 2006)
- Application of a modified Tracking Tool in nature reserves in China (Department of Nature Conservation - State Forestry Administration and Research Center for Eco-environmental Sciences - the Chinese Academy of Sciences, 2006)
- Enhancing our Heritage studies in Nepal and India (Wildlife Institute of India, 2007b; Wildlife Institute of India, 2007c; Wildlife Institute of India, 2007a)

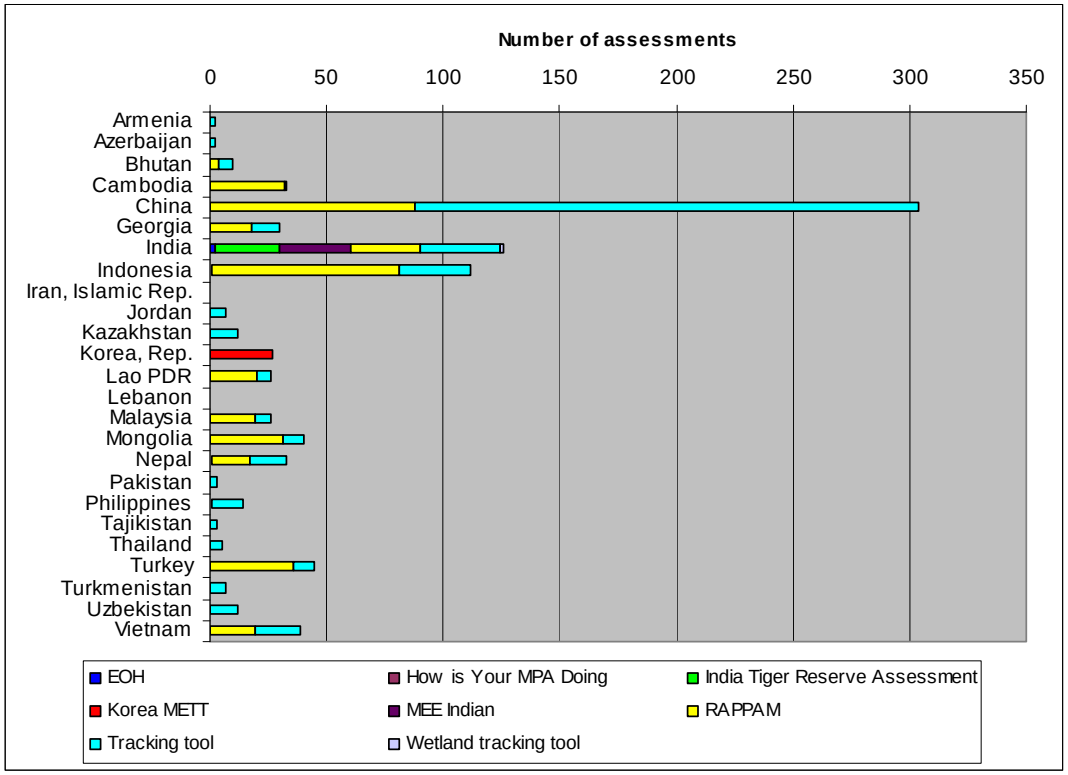

Figure 10: MEE assessments by country in Asia (UN region) recorded on the Global Studies database (note data has been analysed for only some of these)

The overall mean score for Asia is relatively high at 0.54, with strengths shown in the outcome measures. It is possible that culturally, the process of self-assessment in this region may lead to slightly higher scores, but many of the protected areas evaluated in this region are well-established and have very high remaining values in spite of severe threats to their integrity.

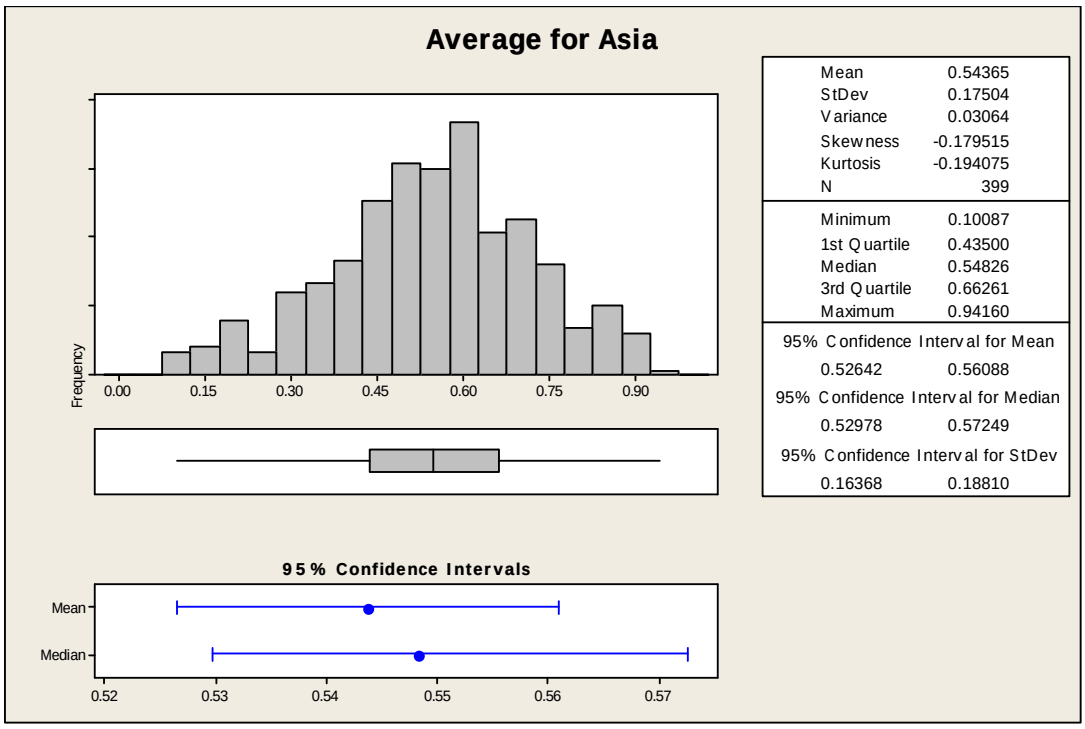

Figure 11: Overall average scores for Asian MEE assessments

The management of Kerinci National Park, Indonesia, has been evaluated on several occasions

Europe

In recent years, studies in Europe have included significant assessments of protected area systems and protected areas in Catalonia, Spain (Mallarach and Varga, 2004; Mallarach, 2006); across Finland, combining RAPPAM and a new system assessment tool (Gilligan *et al.*, 2005; Heinonen, 2006); and in Lithuania (Ahokumpu *et al.*, no date).

RAPPAM reports have also been prepared for Russia (Tyrlyshkin *et al.*, 2003), which was an early trial site and used a slightly different version of the tool, and more recently for Czech Republic (Ervin, 2004) and Romania (Stanciu and Steindlegger, 2006). RAPPAM studies have also been conducted in Bulgaria and Slovakia. Tracking Tools have been applied especially in Eastern Europe where they are linked to GEF and World Bank project funding.

A study comparing methodologies for marine protected area assessment was carried out in the UK (Gubbay, 2005). A trial adapting the Parks in Peril Site Consolidation Scorecard for use in Europe was conducted in two protected areas in Austria and Germany (Pfleger, 2007).

The number of known studies in the European region are shown in Figure 12.

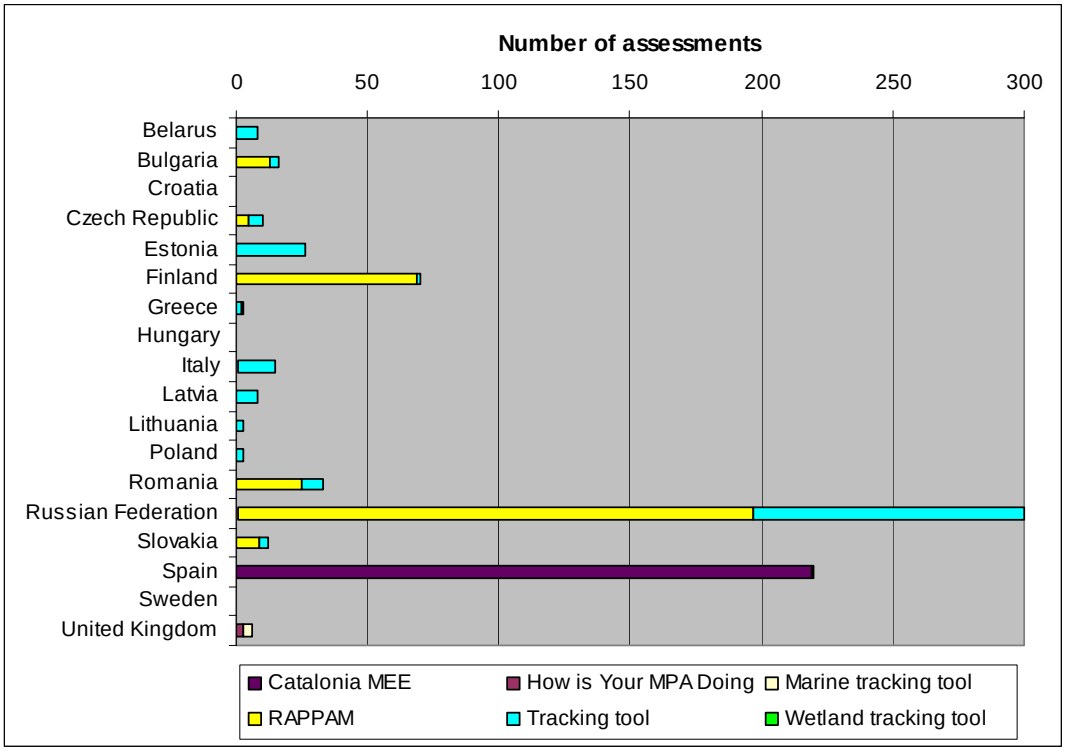

Figure 12: MEE assessments by country in Europe (UN region) recorded on the Global Studies database (note data has been analysed for only some of these)

The distribution of scores from the European data is shown in Figure 13. Data was available only for some of the RAPPAM and the Tracking Tool assessments, and did not include figures from Spain or Finland, However, the mean average score for European assessments is well over the world average, at 0.57. Only 6% of the 385 protected areas assessed scored in the bottom third (clearly unacceptable), while 27% scored in the top third (sound management).

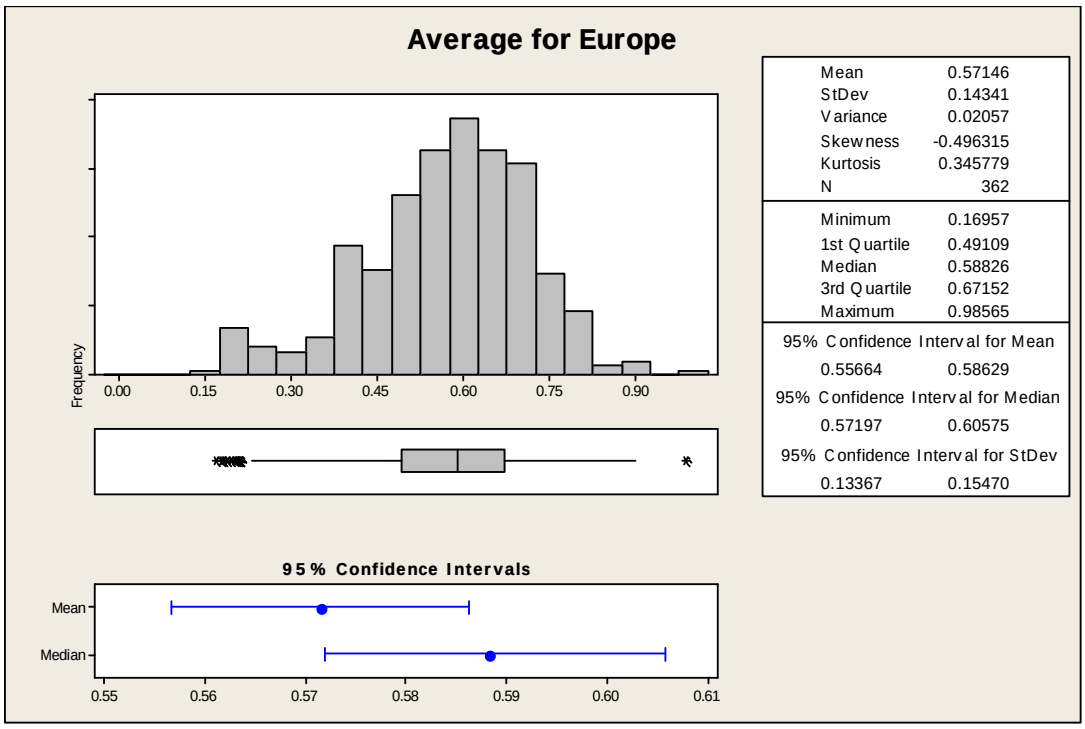

Figure 13: Overall average scores for European assessments

Latin America and the Caribbean

There has been extensive development and application of management effectiveness methodologies in LAC over the past 20 years with a wide range of methodologies developed, trialed and implemented in the region. For example, PROARCA has been adapted and implemented throughout Central America (Corrales *et al.*, 2006). History of some of the countries and methodologies is discussed in Cracco *et al.* (2006)

Reports relating to MEE in the region include:

- Reports from ParksWatch covering 87 protected areas (ParksWatch, 2007);
- RAPPAM reports and/or data sheets from Brazil, Chile, Peru, Jamaica and Bolivia (Simoes and Numa de Oliveria, 2003; Ministry of Natural Resources and the Environment, 2006; Olivas and Ruesta, 2006; Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis and WWF-Brasil, 2007; Tacón *et al.*, 2005);
- PROARCA reports from Central American countries (Autoridad Nacional del Ambiente *et al.*, 2006; CONAP, 2006; Corrales *et al.*, 2006; Estrada, 2006; Ministerio De Medio Ambiente y Recursos Naturales El Salvador and Ministerio ye Medio Ambiente y Recursos Naturales El Salvador, 2006);
- A number of reports from the 'Parks in Peril' project presenting the results of the site consolidation scorecard (Martin and Rieger, 2003; Marco Robles *et al.*, 2005; The Nature Conservancy, no date): other reports are also available on the TNC website;
- The 'Venezuela Vision' report (FUDENA/INPARQUES, 2001);
- Analysis of protected areas of the Valdiviana ecoregion, Argentina (Rusch, 2002);
- A report on management effectiveness in Belize (Wildtracks, 2006);
- Study of protected areas in Brazil in 1999 (Lemos de Sá *et al.*, 1999) ;
- Reports on adaptation of the Tracking Tool in the Brazilian Amazon (Weigand Jr *et al.*, 2007);
- Overview of management effectiveness in the region (Cracco *et al.*, 2006) and
- Reports from the Enhancing our Heritage project (see http://www.enhancingheritage.net/docs_public.asp)

The number of known assessments in LAC is shown in Figure 14.

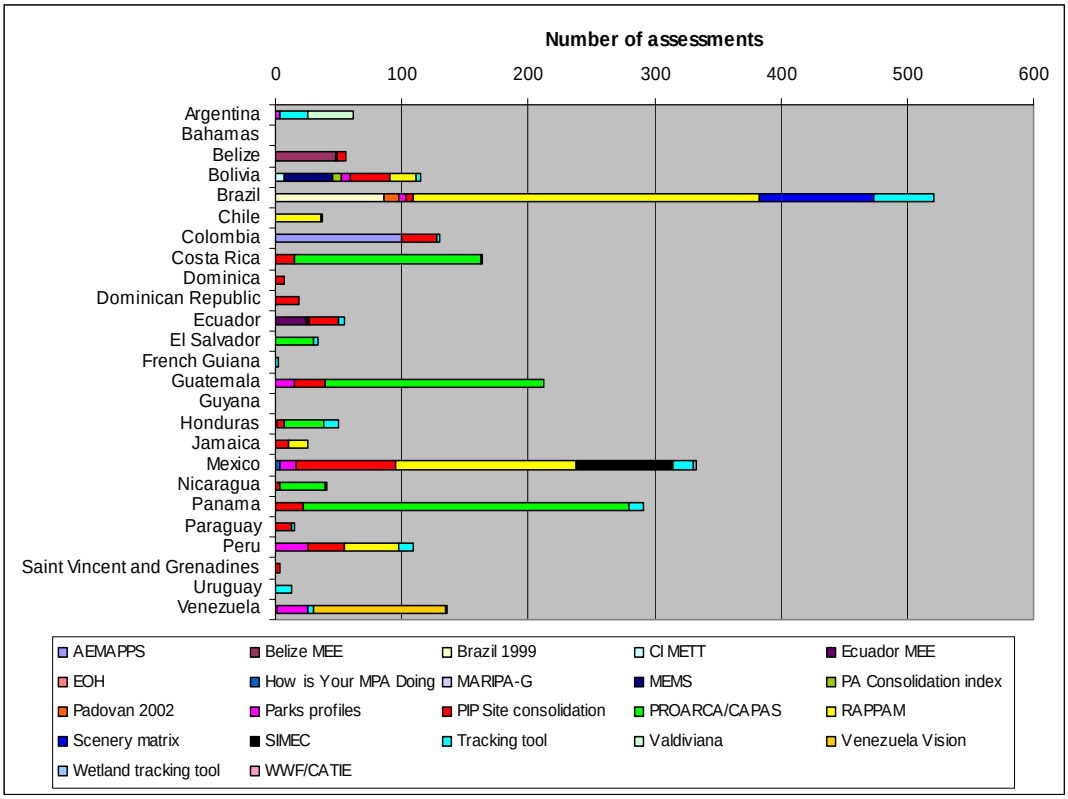

Figure 14: MEE assessments by country in LAC (UN region) recorded on the Global Studies database (note data has been analysed for only some of these)

The overall average score for most recent assessments in the region is 0.52, which is slightly below the worldwide average. This region has more repeat studies that any other, and as discussed earlier, there has been dramatic improvement over time in those areas assessed more than once, especially where intensive management improvement programs have also been undertaken. In particular, many of the very low scores were lifted, and only 9% of the 'most recent' assessments score in the bottom third (rated clearly unacceptable).

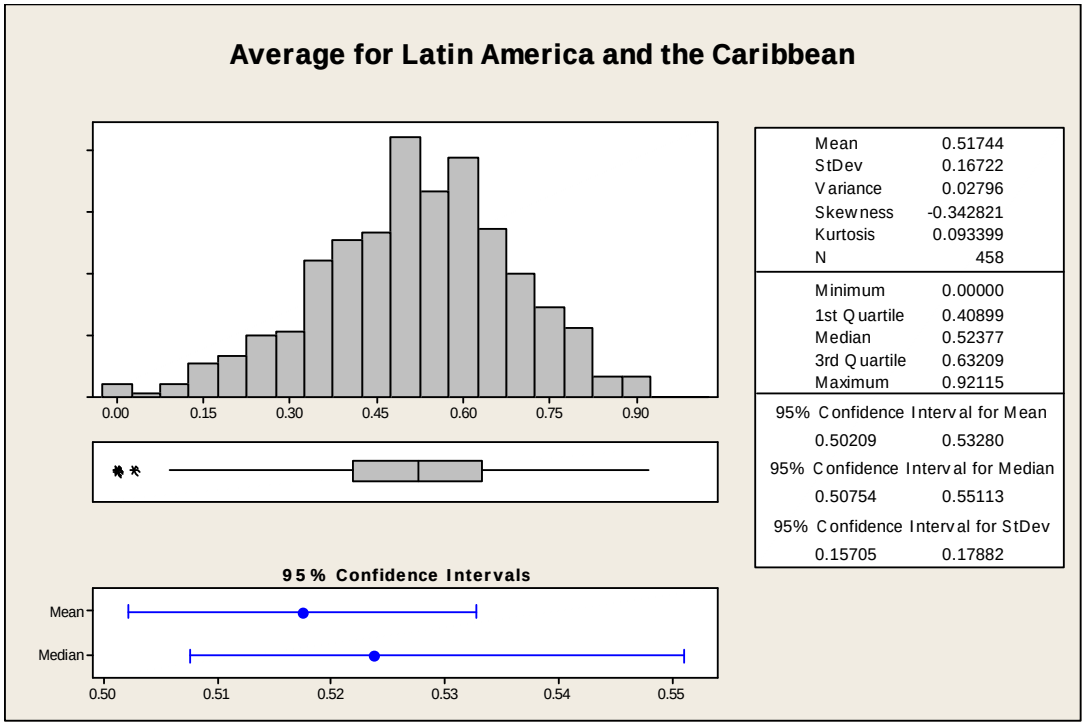

Figure 15: Overall average scores for LAC assessments

Oceania

Management effectiveness studies have so far been recorded and collected from only a few countries in the Oceania region, as shown in Table 14. A RAPPAM study was conducted in Papua New Guinea (Duguman, 2006), and a small number of Tracking Tool assessments have also been carried out in that country. A number of large-scale assessments have been undertaken in Australian parks services: State of Parks reporting in New South Wales (NSW Department of Environment and Conservation, 2005) and unpublished work in Victoria and Queensland, with more planned or underway. An in-depth study of World Heritage areas has also been undertaken in Tasmania, Australia (Parks and Wildlife Service Tasmania, 2004)

Table 14: MEE assessments by country in Oceania (UN region) recorded on the Global Studies database (note data has been analysed for only some of these)

Methodology	Australia	Guam	Micronesia, Fed. States	Northern Mariana Islands	Palau	Papua New Guinea	Total
How is Your MPA Doing		2	1	2	1		6
NSW State of Parks	1251						1251
RAPPAM						51	51
Tasmanian World Heritage Area	7						7
Tracking tool						3	3
Victorian State of Parks	330						330
Total	**1588**	**2**	**1**	**2**	**1**	**54**	**1648**

Data for analysis was available only from the RAPPAM study, a few Tracking Tools and the large NSW State of Parks data set, which contributed to fewer headline indicators than other studies. The overall average score for Oceania is 0.55, above the world average. Though the Australian protected areas scored comparatively well, the overall effectiveness of that system was also constrained by factors including the large number of small protected areas where there is limited management presence.

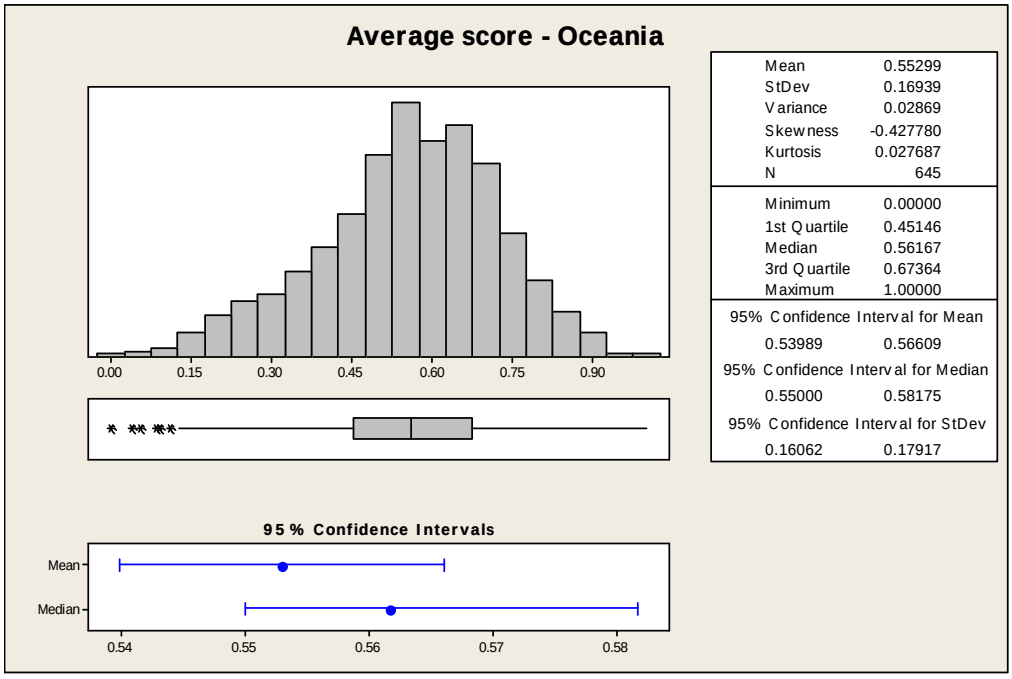

Figure 16: Overall average scores for assessments in Oceania

Appendix Two: Checklist for good evaluation methodologies[10]

The discussion below presents a more detailed criteria 'checklist' for each of the principles outlined in Section 5.3. This can be used to consider the applicability of any methodology for evaluation and to conduct a 'quality check' of an adapted methodology before it is implemented. Note that this is designed as a checklist for choosing or adapting a methodology: more complete guidelines for conducting assessments are contained in the IUCN-WCPA Guidelines (Hockings *et al.*, 2006).

Principle 1: The methodology is useful and relevant in improving protected area management; yielding explanations and showing patterns; improving communication, relationships and awareness

All protected area management assessments should in some way improve protected area management, either directly through on-the-ground adaptive management; or less directly through improvement of national or international conservation approaches and funding. Evaluations which do not appear to have any useful outcomes can be worse than useless, as those involved – especially at protected area level – are often less willing to be involved in other evaluations in the future.

☑	**'Checklist' of criteria**
	It is clear that using the methodology can achieve one or more of the four types of purposes outlined in Section 1.1. a) It is a useful tool for improving management/ for adaptive management or to aid understanding; b) It assists in effective resource allocation and prioritisation; c) It promotes accountability and transparency; and/or d) It helps involve the community, build constituency and promote protected area values.
	It helps understand whether protected area management is achieving its goals or making progress.
	The questions asked are relevant to the protected area and the management needs, or can be adapted or others added so they are relevant.
	It will allow useful comparisons across time to show progress and *if desired* will also allow comparison or priority setting across protected areas. *Note that this criteria might balance with the one above – for broad comparisons, at least some questions or the broader themes need to be the same*.
	Even simple analyses will show patterns and trends and allow for explanations and conclusions about protected area management and how it might be improved. [11]

Principle 2: The methodology is logical and systematic: working in a logical and accepted Framework with balanced approach.

A consistent and accepted approach such as the IUCN-WCPA Framework provides a solid theoretical and practical basis for assessment, and enhances the capacity to harmonise information across different systems. Evaluation exercises that assess each of the six elements in the Framework and the links between them build up a relatively comprehensive picture of management effectiveness and have greater 'explanatory power'.

Many systems use a hierarchical structure which contains different layers of indicators or questions assessing a particular element or dimension. Layers of questions should proceed logically and link from very general level (e.g. biodiversity) to more specific and measurable level (e.g. the population of one animal species recorded at one time in one place; the opinions of stakeholders about a particular issue.

[10] Thanks to Jose Courrau for comments on these principles and checklist

[11] *Protected area management is very complex and clear explanations are difficult, but evaluations should enable at least 'reasonable estimations of the likelihood that particular activities have contributed in concrete ways to observed effects'.*

☑	'Checklist' of criteria
	The methodology is based on a systematic framework, preferably presented in a manual or other document which can be reviewed.
	All six elements of the IUCN MEE Framework are measured, balancing the need to assess the context, inputs, planning, process, outputs and outcomes of management.[12]
	There is also a balance between the different themes or dimensions of management –e.g.. governance and administration, natural integrity, cultural integrity, social, political and economic aspects.[13]
	It provides a hierarchical, nested structure so that information can be 'rolled up' or de-segregated easily to answer different needs and reporting requirements.
	Assumptions behind the indicators, and linking different levels of indicators, are clearly specified.
	The design supports analysis by providing a consistent and logical scoring and rating system (where scoring and rating is used) and clear directions for weightings and comparisons.

Principle 3: The methodology is based on good indicators, which are holistic, balanced, and useful.

☑	'Checklist' of criteria
	Indicators are relevant and appropriate (see principle 1) or more indicators can be added within the structure. There is clear guidance on how to measure and score the indicators.
	Indicators have some explanatory power, or able to link with other indicators to explain causes and effects.
	Characteristics of good indicators defined by (Margoluis and Salafsky, 1998) are: • **Measurable**: able to be recorded and analysed in qualitative or quantitative terms; • **Precise**: defined in the same way by all people; • **Consistent**: not changing over time so that it always measures the same thing; and • **Sensitive**: Changing proportionately in response to actual changes in the condition or item being measured.

Principle 4: The methodology is accurate: providing true, objective, consistent and up-to-date information

Results of evaluations can have far-reaching implications and must be genuine and able to withstand careful examination.

Data gathered needs to be as accurate as possible, but in most protected areas there are significant constraints on the quality of certain kinds of information, particularly those that are useful for the measurement of *outcomes* and the status of park values. Often, evaluation must make the most of what information is available. However, evaluation of management effectiveness is enhanced if it is backed up by information obtained from robust, long-term monitoring of the status of key values and of trends in such indicators as natural resources use and visitor patterns. Such monitoring systems should be designed to efficiently provide information for evaluation, so that information can be collected and processed without duplication of effort.

Both qualitative and quantitative information can be accurate, as long as it is collected with good techniques and preferably verified. We need to be sure that inferences drawn can be substantiated

For all except special-purpose single-event evaluations, it is desirable to repeat similar measures at intervals. Standardised reporting allows comparisons across sites (where appropriate) and to meet multiple reporting requirements. The system should be capable of showing changes through time.

[12] This depends on the purpose – for a general/ overall evaluation, strive for balance, but some assessments might need a more specific emphasis

[13] As above

☑	'Checklist' of criteria
	The methodology is structured and explained to be likely to yield accurate results.
	Techniques for implementing the methodology are clearly spelt out e.g. with guidance on how questionnaires should be filled out; how workshops should be conducted; or how the population status of a species should be estimated.
	Well-recognised and accepted – or other new but defensible – data collection techniques are used, so the assessment will be able to withstand scrutiny.
	It will be replicable – that is, easy to apply consistently across different protected areas or regions, and over time, so questions are answered in the same way and patterns are real.
	More detailed and accurate information can be added at a later iteration when available, and the methodology will help to develop a relevant monitoring program.
	Cultural issues are considered, so that people are likely to provide accurate answers without fear, bias or intimidation[14].
	Some 'triangulation', cross-checking or quality control is built in or can be added. The results will be honest, credible and non-corrupt.
	Opinions of a cross-section of people (stakeholders, landowners, protected area staff from different levels, technical experts) should be included wherever possible.
	The evaluation can be conducted quickly enough to provide up-to-date information.
	A record of data sources and levels of certainty is kept.

Qualitative evaluation systems are based on the exercise of expert judgement to assess management performance. Considerable attention needs to be paid to promoting consistency in assessment across sites and evaluators. Consistency can be enhanced by:

- care in choice of language in the assessment instrument to minimise potential differences in interpretation;
- provision of detailed guidance and examples in supporting documentation;
- staff training in preparation for the assessment;
- requiring supporting information such as justification for the assessment rating given and sources of information used in making the assessment;
- checking across assessments to identify clear inconsistencies or application of different standards of assessment; and
- use of a process of correction where clear inconsistencies are evident (while ensuring that bias is not introduced in this process).

Principle 5: The methodology is practical to implement, giving a good balance between measuring, reporting and managing

Evaluation is important but should not absorb too many of the resources needed for management. Methodologies which are too expensive and time-consuming will not be repeated, and are less acceptable to staff and stakeholders. Ability to make the most of existing information (e.g. from pre-existing monitoring and research) is important. As monitoring systems become attuned to providing information for evaluation, data gathered will become richer and more accurate without increasing demands on financial resources and staffing time.

Cooperation of participants is vital to ensure an accurate and easily implemented assessment, so methodologies must be designed to appeal to people in the field.

☑	'Checklist' of criteria
	It is possible to implement the methodology with a reasonable allocation of resources.
	It allows the use of existing information and processes wherever possible.
	All steps in the process are clear and unambiguous.
	It is comprehensible and acceptable to staff and stakeholders Language in questionnaires or presentations is simple and relevant to the local situation, and carefully chosen not to give offence to any gender, ethnic or cultural group.
	The design encourages positive interaction and discussion and immediate improvements in management practices.
	Simple and useable tools for data entry, analysis and reporting are provided.
	The methodology allows for a level of cooperation, rather than competition, with other evaluation exercises in the same area.

[14] This applies to protected area staff as well as to stakeholders

Principle 6: The methodology is part of an effective management cycle: linked to defined values, objectives and policies.
Evaluations that are integrated into the managing agency's culture and processes are more successful and effective in improving management performance in the long term.

To link evaluations with other aspects of management, it is critical that the key values, management goals and objectives for the protected area have been spelt out clearly. Standards against which inputs, processes and outputs can be judged are also important. As monitoring programs develop and mature, monitoring, reporting and evaluation should become one integrated efficient process.

☑	**'Checklist' of criteria**
	It is possible to make a commitment to repeated evaluations using this methodology.
	It will meet and be part of the core business cycle and reporting requirements of the agency.
	It ties in with protected area planning, monitoring, research and annual work programs.
	It relates to expressed values, goals and objectives of the protected area or agency and measures the extent to which these are met and policies implemented.
	Senior executives or politicians will be likely to accept the results, act on recommendations and disseminate the reports.

Principle 7: The methodology is cooperative: with good communication, teamwork and participation of protected area managers and stakeholders throughout all stages of the project wherever possible;

Gaining approval, trust and cooperation of stakeholders, especially the managers of the protected areas to be evaluated, is critical and must be ensured throughout the assessment. A wide survey of protected area assessments has found that broad participation improves accuracy, completeness, acceptance and usefulness of evaluation results (Paleczny and Russell, 2005). Assessment systems should be established with a non-threatening stance to overcome mutual suspicion. Evaluation findings, wherever possible, should be positive, identifying challenges rather than apportioning blame. If the evaluation is perceived to be likely to 'punish' participants or to reduce their resources, they are unlikely to be helpful to the process.

However, as discussed earlier, there are occasions when negative repercussions may be inevitable and these cases need careful handling.

☑	**Checklist' of criteria**
	Different viewpoints are actively sought, including perspectives of community and field staff.
	The methodology encourages or allows good cooperation and communication between all the evaluation partners.
	An adequate but serviceable level of participation by staff and community is included in both the design and implementation.
	The implementation of this methodology will contribute to a higher level of trust, better relationships and cooperation between protected area staff at all levels and community.

Principle 8: The methodology promotes positive and timely communication and use of results. Short-term benefits of evaluation should be demonstrated clearly wherever possible.

Findings and recommendations of evaluation need to feed back into management systems to influence future plans, resource allocations and management actions.

☑	Checklist' of criteria
	The methodology includes discussion of how results should be communicated and used.
	Reports will be clear and specific enough to improve conservation practices realistic, addressing priority topics and feasible solutions.
	Benefits and results from the evaluation will be clearly visible in the short term.
	Feedback to evaluation participants can be given quickly.
	Results will influence future plans and actions in protected area management.

Steps in developing methodologies

Most methodologies for MEE have some common origins, and share the following, logical steps in their development:

1. Essential characteristics of 'good' management are defined: such as the features of a 'consolidated site' in the Parks in Peril program (Martin and Rieger, 2003). Most of the methodologies firstly define the broad fields, 'ambits' or themes needed for effective management, and these form the first level (or two levels) of organisation of the indicators.

   The terminology and the approach for defining these fields varies from method to method. Often the fields include some combination of the following: administration, social, political, management of natural and cultural resources, community participation, and legal aspects. Some more recent methodologies specifically use the elements of the IUCN-WCPA Framework. In some cases, a combination of 'fields' and WCPA 'elements' is used.

2. The next, more specific level of features that are important to good management are listed. Common factors identified at this level include: good systems of financial administration, adequate staffing and funding, communication with stakeholders, environmental education programs, management planning, law enforcement and boundary marking.

3. Specific indicators for each of these aspects are then chosen and described. (Different methods vary as to the number of levels and as to which factors are considered first, second or third level indicators).

4. A scoring system is defined. While some methodologies, notably RAPPAM and the Tracking Tool, use a four-point scale, most of the methodologies in Latin America use a five-point scale: many of them have based this approach on the recommendation of de Faria (1993) and subsequent publications and adaptations of this scheme.

   Most systems either carefully define what each of these levels are (i.e. define precise criteria for each score level), or set guidelines for the individual park or system to define these standards. In some cases, quite detailed instructions or sub-indicators are included to ensure that an objective and quantitative method is used, especially for calculating the 'optimum' staff, finances, or equipment needed.

5. Analyses are then recommended. In most cases, scores for individual indicators are combined or 'rolled up' into the level or levels above, to provide overall scores for the aspects and the fields. The indicators at each level may be weighted to reflect relative importance and contribution to the field.

Appendix Three: Notes on methodology

Translation of MEE results into the Common Reporting Format

'Matching' the indicators

In order to combine and analyse information from studies using different methodologies, the first step is to 'match' indicators from each methodology with the 'headline indicators' listed in the common reporting format. In the Global Study database, the indicators for each system are coded according to their logical matching with one (or in some cases two) of the headline indicators from the common reporting format. This matching has to be done individually for each methodology and variation in indicators. Some subjectivity is inevitable in this matching so the work has all been done or checked by one person to maximize the consistency. An example (from the Tracking Tool) is shown in Table 15 .

Table 15: Some Tracking Tool questions matched with headline indicators from the Common Reporting Format

Headline Indicator	Tracking Tool Question
Park gazettal	Does the protected area have legal status?
Marking and security/ fencing of park boundaries	Is the boundary known and demarcated?
Appropriateness of design	Does the protected area need enlarging, corridors etc to meet its objectives?
Management plan	The planning process allows adequate opportunity for key stakeholders to influence the management plan
	There is an established schedule and process for periodic review and updating of the management plan
	Is there a management plan and is it being implemented?
	Have objectives been agreed?
	The results of monitoring, research and evaluation are routinely incorporated into planning
Adequacy of staff numbers	Are there enough people employed to manage the protected area?
	Number of staff - permanent and temporary
Adequacy of current funding	Annual budget
	Is the current budget sufficient?
Security/ reliability of funding	Is the budget secure?
Adequacy of infrastructure, equipment and facilities	Is equipment sufficient?
Adequacy of relevant and available information	Do you have enough information to manage the area?
Effectiveness of administration including financial management	Is the budget managed to meet critical management needs?
	Is there an annual work plan?
Management effectiveness evaluation undertaken	Are management activities monitored against performance?
Adequacy of building and maintenance systems	Is equipment adequately maintained?
Adequacy of staff training	Is there enough training for staff?
Adequacy of hr policies and procedures	Are the staff managed well enough?
Adequacy of law enforcement capacity	Can staff enforce protected area rules well enough?
	Are inappropriate land uses and activities (e.g. poaching) controlled?

Once the indicators are matched with the common reporting format headline indicators, scores from different systems can also be 'translated'. Where there is more than one indicator matching to a headline indicator, the scores are divided by the number of applicable questions in order to derive a score for the headline indicator. However, in some cases one indicator is clearly more important than another. For this reason, each indicator is allocated a weight from zero to one in terms of its contribution to a headline indicator. For example, in the Tracking Tool there are five questions matching the heading indicator 'management plan'. The question 'Is there a management plan and is it being implemented' is a key question here and is therefore weighted more heavily than the other, supplementary questions.

In most cases, the allocation of weightings was very simple due to the low numbers of indicators relating to the common reporting format in each methodology. In more complicated cases, allocating the weightings has been undertaken through a very simplified version of an Analytical Hierarchy Process, with collaborative decision-making (Saaty, 1995).

Converting to a common scale

The next challenge in cross-analysis is posed by the fact that a range of different rating and scoring systems are used in MEE methodologies. However, most are variations on the theme of defining the ideal situation for each indicator and measuring the progress towards achieving that ideal. Thus the lowest score represents no progress, negligible progress or a very poor situation, and the highest represents the ideal (or in some methodologies the achievable) situation. This best practice or optimum situation may be defined broadly for the country or in the system methodology, or may be defined for individual protected areas during the evaluation process.

Some data is quantitative (though often 'best estimate) 'ratio' data, for example where people estimate the amount of funding needed for a protected area and then estimate what proportion of this funding they have. However, most of the data is 'ordinal', where the ratings are in order from lowest to highest, but the gaps between the different scores are not entirely even and consistent, and are often difficult to quantify (for example, the quality of a management plan or how 'good' a protected area design is).

Some methodologies, including most of those adopted in Latin American countries, use a five-point scale, as proposed by Cifuentes *et al.* (2000), based on the recommendations of ISO 1004. Most of these systems work on the concept of what percentage of the optimum (or the optimum desirable/achievable) state currently exists.

Other methodologies follow the scoring system used by the Tracking Tool (McKinnon, 2003), which uses a four-point scale to avoid the issue of most responses clustering to a mid-point. RAPPAM (Ervin, 2003b) uses a variation of the four-point scale. The four-point scale also corresponds well with the ecological evaluation work being undertaken by TNC, which proposes that a scale of 'poor', 'fair', 'good' and 'very good' has scientific merit (Parrish *et al.*, 2003).

The variation of scoring systems poses the question of how best to use the different data types and how to 'translate' systems using different scales without losing statistical validity. It was recommended by the University of Queensland statistician (Allan Lisle *pers. comm*.) that the most valid way to undertake this is to map all ratings onto a zero to one scale, where zero represents the lowest measurement and one the optimum situation. This approach has minimised the loss of information and enables averages to be calculated. The scoring systems of some of the major MEE methodologies are shown in Table 16 , with the 'translation' to a zero to one scale in the bottom row for each system.

Table 16: Scoring systems with translations to a zero to one scale

Methodology		Ratings				
		lowest		mid		best
Rappam	Answer	no	Mostly no		Mostly yes	yes
	Score	0	1		3	5
	translation	0	0.33		0.67	1.00
TRACKING TOOL	Score	0	1		2	3
	translation	0.00	0.33		0.67	1.00
PROARCA	Answer	1	2	3	4	5
	Score	0% ideal	25%	50%	75%	100%
	translation	0.00	0.25	0.50	0.75	1.00
MPA scorecard	Score	0	1		2	3
	translation	0.00	0.33		0.67	1.00
AEMAPPS	Answer	1	2	3	4	5
	Score	very low	low	medium	high	excellent
	translation	0.00	0.25	0.50	0.75	1.00
TNC site consolidation	Score	1	2	3	4	5
	translation	0.00	0.25	0.50	0.75	1.00

It was intended to always maintain the integrity of the original scoring system, by keeping the gaps between the rescaled scores the same. However, analysis of preliminary results showed that this was creating false differences in results among different methodologies, so a more consistent conversion was applied[15].

Translating the data

In order to analyse data, an automated 'translation tool' was constructed in *Excel* by Allan Lisle and applied to each methodology and variation. A brief explanation of the two-step process is as follows:

First step is to translate results to a common zero to one scale. Raw data is entered in an 'original data' sheet, then the translation rule for that methodology entered into a 'scale' sheet. The 'rescaled data' sheet then shows this data transformed to a zero to one scale.

Second step is to translate the different indicators. As discussed above, all the indicators have been numbered and mapped on our database and allocated to a particular 'headline indicator' in the common reporting format. The 'weighting' sheet creates a matrix which shows how each indicator maps to a headline indicator. Shaded cells indicate a 'match'. As discussed above, where there is one indicator to a headline indicator, then the weighting is one. Where there are more than one, then the weighting is usually one divided by the number of 'contributing' indicators but may differ if questions differ in importance.

Note that for some headline indicators there are no contributing indicators, so they are left out. Where a question has not been answered, the weightings are recalculated so they still add up to one. This sheet can be changed as needed: for example, weightings and 'translation rules' can be changed and the data will automatically recalculate.

Calculating and grouping averages

Overall average

After the raw data was transformed into the common reporting format 'headline indicators' and data from all studies combined, the resulting figures were analysed to obtain averages and standard deviations for total overall management effectiveness and for each headline indicator. This data was sorted according to whether the study was the first or most recent

[15] The RAPPAM methodology used a 0,1,3,5 scale and this is now converted to 1, 1/3, 2/3, 1 (with consistent gaps between scores) so it is more compatible with other methodologies.

using a particular methodology in a protected area, so the averages presented in this report do not contain repeated studies. None of the methodologies ask questions relevant to all the 'headline indicators', so the number of records vary for each indicator. Where the number of records is very small or from only one localized study, the results are interpreted with additional caution or excluded from analysis.

Overall averages are comprised of whichever 'headline indicators' are available from the information at hand, and therefore vary widely in their composition depending on the methodology used. To confirm whether the arithmetic averages would be significantly biased according to the fields used to calculate it, a comparison was made between the 'least square means' (which take into account which indicators are missing) and the overall arithmetic averages. The results in Figure 17 show clearly that there was very little difference between the two methods of calculation with all but 2 of the cases examined being within 0.04 of each other. (The two exceptions were cases where only 4 indicators were available.) The correlation between the two methods was obviously strong (r = 0.9958, $p<0.001$) and it was concluded that the simple approach of calculating the average of available indicators appears to be sound.(Allan Lisle *pers. comm.*)

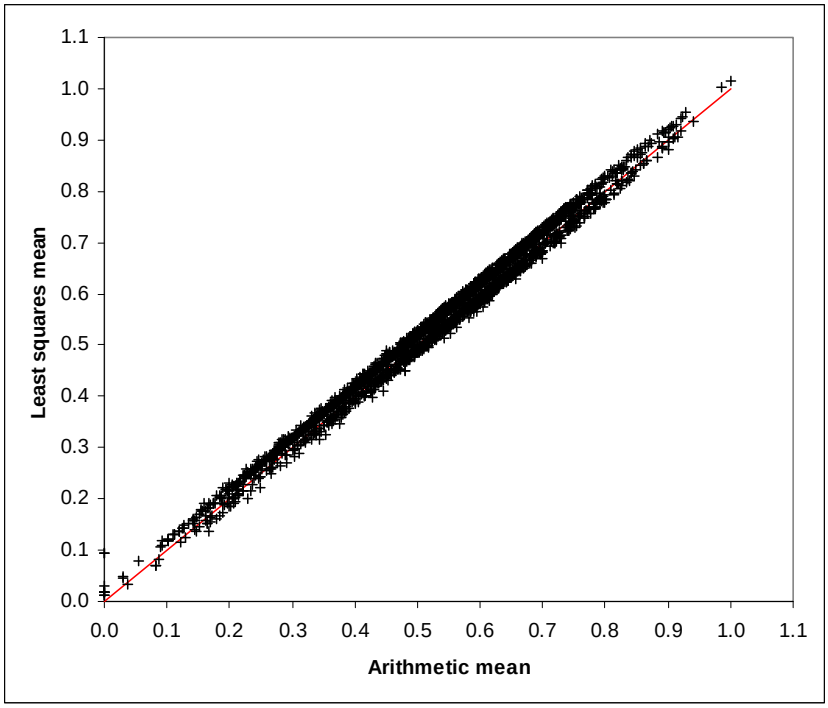

Figure 17: Comparison of arithmetic mean and least squares mean

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