

DEVELOPING INDICATORS FOR THE SUSTAINABLE MANAGEMENT OF VISITOR USE OF PROTECTED AREAS IN AUSTRALIA



By Joanna Tonge, Susan Moore, Marc Hockings, Graeme Worboys and Kerry Bridle

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Summary

With protected areas in Australia receiving over 80 million visitors a year and covering 10% of the continental land mass, it is essential that these areas are managed in a sustainable manner so that they can continue to be enjoyed by future generations. Protected areas in Australia and elsewhere are being subject to increasing visitor numbers leading to escalating concerns regarding the impacts that visitors may have on the natural resources of these areas. Protected area managers have the dual obligation of ensuring the conservation and protection of natural and cultural heritage while providing high-quality recreation experiences.

Protected area managers need to balance the protection of natural heritage while still ensuring the provision of satisfactory experiences for visitors. Both these goals need to be achieved while under mounting public scrutiny and the associated need to be publicly accountable for their actions. Performance reporting has emerged as a response to this trend in accountability, whereby objectives for management are developed and then the progress of agencies in achieving these objectives is documented and reported. The extent to which outcomes have been achieved is usually assessed through the use of indicators. Reporting is increasingly being directed towards the achievement of sustainability and its triple bottom line of environmental, social and economic outcomes.

This 7-month scoping project was commissioned to begin the task of developing indicators for the sustainable management of visitor use of protected areas and most importantly to recommend future research directions to the Board of the Sustainable Tourism Cooperative Research Centre (STCRC). Also as part of this commissioning process, the STCRC requested that the indicators be developed for potential inclusion in the Earthcheck™ benchmarking system. This environmental management and benchmarking system underpins the international Green Globe 21 Certification Program available to tourism businesses worldwide. Given the widespread view that indicators are best located and activated from within a conceptual or management framework, the recently developed IUCN World Commission on Protected Areas evaluation framework was used in this study to assist with indicator development.

To ensure the relevance of this scoping project and its recommended future research directions to potential end users the project was guided by an Industry Reference Group. Members included managers of visitor services from a number of protected areas agencies around Australia, plus the manager of Earthcheck™. This particular group of stakeholders was satisfactory for this scoping project. Further research must, however, draw on a broader range of expertise and interests, in particular stakeholders in the tourism industry working in protected areas such as tour operators, staff from state tourism organisations, local community members and indigenous interests.

Methods

The aims of this scoping project were to:

- Review indicators for the sustainable management of visitor use of protected areas; and
- Develop detailed research proposals jointly with protected area managers to progress the development and adoption of suitable indicators.

The following research objectives guided the achievement of these aims:

- To identify significant management issues in relation to visitor use of protected areas;
- To list indicators currently in use by management agencies relevant to the sustainable management of visitor use of protected areas;
- To identify, with the Industry Reference Group, potential indicators for the sustainable management of visitor use of protected areas for issues of the greatest importance to them;
- To progress indicator development and adoption by placing indicators within the IUCN WCPA evaluation framework (Hockings, Stolton & Dudley 2000) and commenting on their suitability for further development as part of the Earthcheck™ benchmarking system; and
- To develop research proposals jointly with protected area managers to undertake indicator development for identified priority issues.

Three main approaches were used to conduct this scoping study:

1. Review of protected area websites and documents as well as research literature;
2. Survey of protected area agencies across Australia conducted via email; and
3. One-day workshop attended by the Industry Reference Group and the project team.

The review and email survey were conducted to identify issues relating to visitor use of protected areas as well as indicators currently in use. Issues and indicators were identified and organised according to their sustainability category (environmental, social or economic) as well as the management level (site, park or corporate) at which they are applicable. These issues and indicators were presented and discussed at the workshop. The workshop identified three key issues for each sustainability category, generated indicators for these issues and recommended future research directions. The consideration of environmental issues and indicators was narrowed to ecological, 'green' concerns given that development of 'brown' environmental indicators is much further progressed.

Key Findings (Knowledge Products)

The literature review and email survey showed that the central ecological concerns, and the associated indicators, were physical disturbance and the effects of visitors on the natural heritage of protected areas. Both concerns are predominantly at the site level. This result can be attributed, in a large part, to the strong influence of the work of North American recreation ecologists on both research and monitoring activities here and globally. The workshop, on the other hand, generated larger scale issues such as ecological integrity and the 'naturalness' of protected areas. The three ecological issues of highest priority identified by workshop participants were: 1) impacts on ecological communities, 2) perceptions of naturalness and, 3) the use of tourism resource units¹ as a basis for monitoring. Further development of indicators will need to investigate measures for these issues, especially for the impacts of visitor use on ecological communities, as well as reintegrating brown indicators, such as energy consumption, into the proposed indicator set.

The workshop also discussed possible indicators for the key issues. For ecological communities most interest centred on the condition, structure and function of ecological communities and how these features could be understood and protected in the context of visitor use of protected areas. Indicators for naturalness focused on the visual extent of human alteration of the landscape and identifying the proportion of the protected area system in different naturalness categories. No indicators were proposed for tourism resource units.

Social issues and indicators from all sources centred on the visitor experience and local communities. The three highest priority issues identified by the workshop participants were: 1) measurement of visitor satisfaction, 2) local communities and, 3) Indigenous heritage. Most of the social indicators are or can be measured at all three management levels – site, park and corporate (e.g. visitor satisfaction). Indicators were generated for local communities and Indigenous heritage but not visitor satisfaction. Workshop participants expressed concerns about the adequacy of current approaches to measuring satisfaction. For local communities, measures of employment, tourism operators and the extent of volunteering were proposed. A number were also proposed for Indigenous heritage – satisfaction, employment, place names, vandalism and co-management.

With indicators for local communities and Indigenous heritage, care must be taken to ensure that the indicators selected have a causal relationship with visitor use. For example, only those elements of local communities directly reflected and influenced by visitor use are relevant. Several additional issues of importance to managing visitor use of protected areas were not strongly evident from this study and warrant attention in any further work – cultural and non-Indigenous heritage and visitor risk management and safety.

Economic concerns and associated indicators identified from all sources were the contribution of protected area tourism to the economy and the costs and revenue associated with management. The workshop participants also identified these concerns, with the profitability and satisfaction of tour operators their third key concern. Most of the economic focus was at the corporate and, to a lesser extent, park level. Indicators and associated measures were generated for all three key economic issues. The suggested measure for economic value was the value of visitor use relative to GDP. For cost and revenue, a simple equation was proposed: the total cost of visitor services minus the revenue generated, divided by the total number of visitors per annum. For profitability and satisfaction of tourism operators the suggested measure was the level of satisfaction compared to a baseline level.

To evaluate the principal focus of these indicators, each was placed in the IUCN World Commission on Protected Areas evaluation framework (a framework developed to assist in the evaluation and management of protected areas and currently being used in state-of-the-park reporting in several States). Within this framework, it is recommended that indicators be developed to report on different aspects of the management cycle including context, planning, inputs, processes, outputs and outcomes in order to build a comprehensive picture and enable an adaptive approach to management. The majority of indicators identified, including those derived at the

¹ 'Tourism resource units' is the term given to ecological elements that attract visitors to an area, for example cave formations, seal populations or sea bird colonies (Hughey & Ward 2003)

workshop, were output and/or outcome focused (consistent with current interests in reporting on achievement of objectives). This narrow focus suggests possibilities for the broader consideration and selection of indicators, in future work, to address other elements of the framework.

Many of the indicators provided at the workshop and from the literature review and email survey appear suitable for consideration and refinement for inclusion in the Earthcheck™ benchmarking system. The system generally relies on quantitative measures for ease of reporting and to enable comparisons between similar organisations and businesses.

Recommendations for Future Research (Addressing Knowledge Gaps)

An integrated research project and three complementary sub-projects are proposed to progress the development of indicators for the sustainable management of visitor use of protected areas. The sub-projects aim to fill the knowledge gaps identified by this scoping project. An expanded industry reference group should advise on the further development and execution of this research. Details on the integrated project and three sub-projects follow.

Integrated project

The integrated project involves developing, field-testing and benchmarking a core and supplementary set of indicators for managing visitor use of protected areas in a sustainable manner.

This overarching project proposes the further development of indicators for the environmental, social and economic components of sustainability. The core and supplementary indicator sets developed should be field-tested and benchmarked in at least three states and within a number of associated organisations. The IUCN WCPA evaluation framework is recommended to guide indicator development, thereby providing both a conceptual basis and maximising integration with existing monitoring and reporting activities in protected area agencies.

Sub-project 1

The sub-project 1 involves developing ecological indicators for the sustainable management of visitor use.

The need for ecological indicators that monitor the effects of visitor use on ecological communities in protected areas was emphasised by workshop participants and has been noted by others (Buckley 2003). As such, it is recommended that a sub-project be established that examines indicators that clearly report on the effects of visitor use on the condition, structure and function of ecological communities. This will be a move beyond current efforts in recreation ecology where the focus has been predominantly on site-level resource impacts such as vegetation trampled, erosion of tracks, site cleanliness and so on.

Sub-project 2

The sub-project 2 involves standardising and refining the measurement of visitor satisfaction.

Reporting on visitor satisfaction is an important component for most protected area agencies; however its measurement often provides managers with little indication of what aspects of their management are good, adequate or require improvement. It also does not take into account the different requirements of different visitors (e.g. day use and overnight) and their subsequent satisfaction with their experience. Recent research (Griffin & Archer 2001; Horneman, Beeton & Hockings 2002) has begun the process of improving such measurement and reporting. This sub-project proposes building on this existing work to provide a standardised methodology for collecting and evaluating visitor satisfaction data relevant to the needs of protected area managers and other key stakeholders.

Sub-project 3

Sub-project 3 involves evaluating and reporting on the economic value of visitor use of protected areas.

Due to a lack of accurate, readily available information, the economic importance of tourism in protected areas is often underrated. Recent studies (e.g. Carlsen & Wood 2004) have begun to redress this shortcoming and will provide the basis for this sub-project, directed towards developing a set of simple, agreed indicators for the economic value of protected areas.

Chapter 1

INTRODUCTION

Background and Scope

The history of protected area agencies managing and conserving the natural environment, while still providing opportunities for recreation, is long and varied (Ryan & Sterling 2001). This dual mandate for protection and use was a feature of the early establishment of protected areas in the United States and many other countries including Australia, and balancing these two competing interests has continued to challenge managers since that time (Wright & Mattson 1996). This same mandate underpins the current management of Australian protected areas, with an emphasis on both the conservation and protection of natural and cultural heritage and the provision of recreational opportunities (Ervin 2003; Hockings 2003; Tourism and Transport Forum 2004).

The demand for recreation and the closely allied tourism experiences has increased to the extent that there are growing concerns about the impacts that visitors may have on the natural and cultural resources of protected areas (Shafer & Inglis 2000). Impacts will appear wherever visitor use occurs, therefore the question that managers of protected areas face is how much use and what type of change in the natural resources of the area is acceptable (McCool 2002). With protected areas in Australia receiving over 80 million visitors a year and covering 10% of the continental land mass, it is important that these areas are managed in a sustainable manner so that they can continue to be enjoyed by future generations and that the primary purpose of protected areas, the conservation of natural and cultural heritage, is achieved (Newsome, Moore & Dowling 2002; Ryan & Sterling 2001; Tourism and Transport Forum 2004).

In the face of this increase in visitor use, managers still have a primary obligation to protect the environmental values of protected areas. At the same time they are facing increasing public scrutiny and the associated need to be publicly accountable for their actions. Performance reporting has emerged as a response to meet accountability requirements. The basis of such reporting is the monitoring and reporting of the achievement of specified management objectives (Moore, Smith & Newsome 2003). The extent to which objectives have been achieved is assessed through the use of performance indicators (ANZECC 1997; Moore et al. 2003). Indicators have three important roles: they depict existing conditions; evaluate the performance of management actions; and alert management agencies to impending changes in conditions or systems (McCool & Stankey 2004). Selection of meaningful indicators requires a thorough understanding of the objectives of management as well as the system being managed.

Visitor management lacks a precise definition, however, the process seeks to protect and conserve the natural and cultural heritage in the area being visited, assist visitors in the enjoyment of their visit, and maintain and improve the associated economic benefits of tourism (Edwards 1996). These three elements of visitor management can easily be related to the concept of sustainability and its associated triple bottom line (environmental, social and economic) (Elkington 1997). Sustainability has numerous definitions, however a recent one that is useful in the context of this project is 'balancing the complex relationships between current economic, environmental and social needs in a manner that does not compromise future needs' (Global Reporting Initiative 2002, p.8). One such future need is meeting the objectives of the Convention on Biological Diversity in the context of increasing visitor use of protected areas. Expectations for the conservation of cultural heritage and sites of significance to communities also prevail. Of central interest in current sustainability research and practice is the development of indicators to report on the sustainability of various human activities, including visitor use and management in protected areas (McCool & Stankey 2004; Pepper 2002).

This 7-month scoping project was commissioned to begin the task of developing sustainability indicators and most importantly to recommend future research directions to the Board of the Sustainable Tourism Cooperative Research Centre (STCRC). This project narrowly and explicitly focuses on indicators for measuring the sustainability of visitor use, rather than the much broader suite of indicators needed to report comprehensively on protected area management (Worboys 2004). Other facets of protected area management beyond managing visitors, such as maintaining ecological integrity and the economic and social contributions of protected areas to local communities, although acknowledged here as essential in any consideration of sustainability, was not the focus of this project.

The STCRC as part of the commissioning process requested that indicators be developed for potential inclusion in the Earthcheck™ benchmarking system. Earthcheck™ is the environmental management and benchmarking system underpinning the Green Globe 21 Certification Program (McNicol, Worboys & Shone

2002). Green Globe 21 is an international organisation, which in partnership with STCRC, developed Earthcheck™ Pty Ltd. The latter is wholly owned by the STCRC. Based on Agenda 21 principles, Green Globe aims to promote and create a sustainable tourism and travel industry through the use of certification. To gain certification, businesses must develop and implement an environmental management system where their performance is measured via Earthcheck™ indicators (Font & Buckley 2001; McNicol et al. 2002).

Certification of protected areas was one of a number of options considered prior to the World Parks Congress in 2003, as a way of progressing effective management of protected areas. Additionally, certification was recognised as encouraging the use of best practice in protected area management and the development of ongoing, consistent approaches to data collection (Stolton & Dudley 2000). However, discussions before, during and after the Congress have not produced a viable system (Hockings, Ervin & Vincent 2004).

The Earthcheck™ system, as part of Green Globe 21, provides one possible system into which sustainability indicators for visitor use of protected areas could be incorporated. To date indicators have been developed within Earthcheck™ to measure 10 key performance areas for businesses. These areas include energy consumption, solid waste production and social impacts. Measurement relies on quantitative 'ratio' indicators (e.g. amount of energy consumed in kilojoules relative to benchmark level of energy use) providing a standardised measure of performance. Using a ratio allows comparisons over time and between similar businesses of different sizes. Benchmarking allows agencies and organisations to track the performance of indicators against a recognised, acceptable standard and forms a core part of the Earthcheck™ system (McNicol et al. 2002). Indicators have been developed and applied to accommodation, administration offices, communities, ecotourism, tour operators and visitor centres.

The indicators available for use by protected area agencies and businesses operating in protected areas, such as accommodation providers and tourism operators, are predominantly 'brown', focusing on reducing resource consumption and minimising waste production (e.g. monitoring the amount of greenhouse gases produced). The need to develop 'green' indicators for protected areas and associated businesses, advocated by a number of researchers (e.g. Buckley 2003), underpinned the commissioning of this project. This need is complemented by the strong interest in developing certification programs for protected areas (Stolton & Dudley 2000).

Evaluating the effectiveness of protected area management requires more than a set of indicators. Researchers such as Lockie et al. (2002), who were involved in Australia's recent National Land and Water Resources Audit, emphasise that indicators can only be successfully developed and implemented from within a clearly articulated, robust conceptual framework. A framework provides a means of identifying and organising the key elements of complex systems as well as organising and presenting the associated information (Alexandra, Higgins & White 1998). In protected area management, frameworks can provide a way of linking planning and evaluation to determine the effectiveness of management strategies and processes (Hockings 1998). While protected area evaluations on an agency-wide basis are improving, judgements about the effectiveness of management programs and strategies against the achievement of objectives are not widespread (Hockings, Stolton & Dudley 2000).

Of direct relevance to protected areas is the recently developed IUCN World Commission on Protected Areas (WCPA) evaluation framework (Hockings et al. 2000) (see Table 1). Its development was based on a worldwide review of evaluation systems currently used for protected areas and consultation through workshops of protected area managers and researchers with experience in this field. The framework aims to assist managers in developing systems and associated indicators for evaluating the effectiveness of their management of protected areas (Hockings et al. 2000). It is based on a 'management cycle approach' where evaluation focuses on both the processes and outcomes of management (Caulley 1993; Auditor General of British Columbia 1996). As such, the IUCN WCPA evaluation framework includes design issues (i.e. context and planning) associated with protected areas, the management systems and processes in place (i.e. inputs and processes) and the delivery of objectives (i.e. outputs and outcomes) (Hockings et al. 2000). Worboys (2004) has further divided the subjects associated with each evaluation element (see Table 1) into 43 subject areas to assist in selecting indicators (Appendix A).

Table 1: IUCN WCPA evaluation framework for protected area management

Management effectiveness components	Evaluation element	Explanation	Evaluation subjects
Design issues	Context	<i>Where are we now?</i> Puts management decisions into context	Significance Threats Vulnerability National context
	Planning	<i>Where do we want to be?</i> Assessment of design and planning	Protected area legislation and policies Protected area system design Reserve design Management planning
Appropriateness of management systems	Input	<i>What do we need?</i> Adequacy of resources	Resourcing of agency Resourcing of site Partners
	Process	<i>How do we go about it?</i> Adequacy of management processes and systems	Suitability of management processes
Delivery of protected area objectives	Output	<i>What were the results?</i> Extent to which targets have been met	Results of management actions Services and products
	Outcome	<i>What did we achieve?</i> Whether management has been successful with respect to objectives	Impacts: effects of management in relation to objectives

Source: Hockings, Stolton and Dudley (2000)

Recognising the importance of such a framework for indicator development, this scoping project has used the IUCN WCPA evaluation framework to analyse where current and potential indicators are located in the management cycle and the associated implications for their future development. Several other features of this framework, in addition to its reliance on a management cycle approach, make it suitable for application here. First, the framework has been specifically developed for protected area management. Second, it recognises that indicators are needed for the context, inputs and planning components of management as well as for the more widely-recognised and monitored areas of outputs and outcomes. Third, this framework can be applied to the whole protected area system or to individual protected areas. As such, indicators developed for visitor use should readily fit into broader evaluation systems. Lastly, application of the IUCN WCPA framework is timely given its centrality in state-of-the-parks reporting underway by the New South Wales Parks and Wildlife Division and Parks Victoria.

To ensure the relevance of this scoping project and its recommended future research directions to potential end users, the project was guided by an Industry Reference Group. Membership was based on informal expressions of interest and the targeting of key individuals. Members included managers of visitor services from a number of protected area agencies from around Australia, plus the general manager of Earthcheck™ (Appendix B). This range of membership was satisfactory for this project, but further research must draw on a broader range of expertise and interests, in particular members of the tourism industry working in protected areas (such as tour operators, staff from state tourism organisations), local community members and indigenous interests.²

Methods

The aims of this scoping project were:

- To review indicators (core and supplementary sets) for the sustainable management of visitor use of protected areas; and
- To develop detailed research proposals jointly with protected area managers to progress the development and adoption of suitable indicators.

² This need was raised and acknowledge by members of the Industry Reference Group.

To clearly define the extent of this scoping project, a number of research objectives were generated. These were:

- Identify significant management issues in relation to visitor use of protected areas;
- List indicators currently in use by management agencies relevant to the sustainable management of visitor use of protected areas;
- Identify, with the Industry Reference Group, potential indicators for the sustainable management of visitor use of protected areas, for the issues of greatest importance to them;
- To progress indicator development and adoption by placing these indicators within the IUCN WCPA evaluation framework and commenting on their suitability for further development as part of the Earthcheck™ benchmarking system; and
- To develop research proposals jointly with protected area managers to undertake indicator development for identified priority issues.

This study's focus is predominantly terrestrial, although marine issues and indicators were also considered (but not in great detail).

Methods used to address the research objectives included a literature review, an email survey of Australian protected area agencies and a one-day workshop. The literature review aimed to identify the issues faced in managing protected areas for visitor use and the associated indicators. Key sources included the websites and associated web-based literature of protected area agencies and organisations, such as the National Park Service (United States), Parks Canada, Dartmoor National Park Authority (United Kingdom), World Commission on Protected Areas (WCPA) and World Parks Congress. Agency sites from across Australia were also accessed. Other sources included journal articles, guidelines, frameworks and similar studies completed in other countries. Identification and sourcing of literature was conducted via searching journal databases and internet search engines using terms such as 'indicators', 'issues', 'protected areas', 'ecological', 'social', 'economic', 'sustainable' and 'visitor use', with the literature reviewed predominantly directed towards protected area management.

The email survey was sent to 12 Australian protected area agencies (State, Commonwealth and Territories) (Appendix C). The survey was sent to managers responsible for tourism, recreation or visitor services. Its purpose was to obtain two types of information. First, information was requested on environmental, social and economic issues and concerns regarding visitor use of protected areas. Second, respondents were asked for indicators currently in use by the agency, again organised into environmental, social and economic categories, as well as the management level (i.e. site, park and corporate) at which the monitoring was conducted. These categories were used because they are widely accepted as collectively encompassing the triple bottom line of sustainability (Elkington 1997). In the survey form, 'environmental' was specified as 'ecological' to encourage managers to focus on the 'green' rather than 'brown' elements of environmental management. This was to help progress the development of 'green' indicators, given the perception that much better progress has been made in developing 'brown' indicators for protected areas (Buckley 2003).

Information regarding the management level was collected as the needs of managers and the issues they face often vary between levels. Thus, the associated requirements for indicators are likely to be similarly variable. Site level indicators relate to a particular site or area within a protected area, for example, campgrounds, day use sites, roads and walk trails. Park level indicators relate to a whole park or protected area and are often specified in park management plans. Corporate indicators refer to those used for corporate reporting purposes, such as annual reports and for reporting on agency performance.

A one-day workshop attended by the authors of this report and Industry Reference Group members was held halfway through the project to clarify and prioritise key issues and develop associated indicators for visitor use of protected areas. To provide a basis for discussion, a set of background papers summarising the issues and indicators identified from the literature review and email survey were drafted and distributed. The workshop was also used to generate research proposals for further indicator development. The Industry Reference Group, as well as contributing via the workshop, provided advice and guidance on all stages of this scoping project. Members commented on the project brief, facilitated responses to the email survey and reviewed the final draft of this report.

Chapter 2

IDENTIFICATION OF ISSUES

The process of issue identification provided essential background for this project. Most importantly, it provided a means of focusing the consideration of indicators around what is important to those associated with visitor use of protected areas. Issues were identified from the reviewed literature and the email survey and then discussed with workshop participants to identify the issues of most importance. In terms of the email survey, 10 of the 12 agencies contacted provided responses (see Table 2).

Table 2: Visitor management issues identified from literature review, email survey and workshop

Literature review	Mgmt level*	Email survey	Mgmt level*	Workshop ⁺	Mgmt level*
Environmental (ecological) issues					
Walk track and site degradation	S	Physical site disturbance	S	<i>Ecological communities</i>	S, P, C
Physical site alteration	S	Wildlife and bird disturbance	S, P	<i>Naturalness</i>	S, P, C
Disturbance to animals	S, P	Walk track condition	S	<i>Tourism resource units</i>	S, P
Harvesting	S, P	Water quality	S, P	Environmental performance	S, P, C
Pollution and waste	S, P	Alien species	S, P	Water quality	S
Alien species	S, P			Indicator species	S, P
				Soil quality	S, P
				Air quality	S, P
Social issues					
Visitor experiences (crowding and satisfaction)	S, P, C	Community issues	P, C	<i>Local communities</i>	P
Visitor planning and management	P, C	Conflicting visitor uses	S, P	<i>Visitor satisfaction (measurement)</i>	S, P, C
Local communities	P	Crowding	S	<i>Indigenous heritage issues</i>	S, P, C
		Risk management	S, P, C	Diversity of recreation opportunities	S, P, C
		Visitor experience, satisfaction & expectations	S, P, C	Risk and safety	S, C
		Inappropriate marketing	S, P	Visitor behaviour	S
				Stakeholder attitudes	P, C
				Infringement	P
				Satisfaction benchmarks	P, C
				Satisfaction, expectation and marketing	P, C
				Benefits	P, C
Economic issues					
Sources and generation of revenue	C	Sustainable, viable industry	C	<i>Values to economy</i>	P, C
Contribution of tourism to economy	C	Cost of providing and maintaining facilities	P, C	<i>Costs, revenue to agencies</i>	C
Costs of management	P, C	Costs of management	P, C	<i>Profitability and satisfaction of tour operators</i>	P, C
Local communities	P			Infrastructure costs	P, C
				Credible figures	C
				Economic costs of compliance	P, C

*Mgmt level = Management level, S= site, P = park, C = corporate. These levels are as assigned by the authors.

⁺ Italicised issues are those of most importance as identified by workshop participants.

Environmental (Ecological) Issues

The majority of environmental issues identified from the reviewed literature and the protected area agency websites were associated with the impacts of visitors and associated activities on the natural resources of protected areas (see Table 2), for example trail and recreation site degradation (Dartmoor National Park Authority 2004; Farrell & Marion 2001). Cole and Landres (1996) identify five categories of environmental impacts resulting from recreation:

1. physical site alteration and disturbance of biota;
2. removal and redistribution of materials;
3. disturbance of native animals;
4. harvesting of plants and animals; and
5. pollution of water via human wastes.

Sources such as the World Parks Congress, Dartmoor National Park Authority (UK), the National Park Service (US), Parks Canada and the World Commission on Protected Areas (WCPA) note similar issues.

A number of sources identified human and solid waste (including litter) as important issues (Cole & Landres 1996; National Park Service 2004; Pickering, Hill & Johnson 2005; Shuib & Abidin 2002). Concern was not only the presence of litter and waste, but also the contamination and pollution of water sources and the biological impacts associated with its disposal (e.g. nutrient build-up in soil) (Cole & Landres 1996; National Park Service 2004; Shuib & Abidin 2002).

Another issue raised by a number of sources was the introduction and spread of alien species (National Park Service 2004; Parks Canada 2003; Pickering et al. 2005; Woodley 1993; World Parks Congress 2003). Often intentionally or unintentionally visitors can become vectors for these species and studies have shown that there is often a high correlation between populations of alien species and visitor nodes (Buckley & King 2003). Acting against pathogens as well as the more 'visible' alien species was identified as an emerging issue at the World Parks Congress held in 2003 (World Parks Congress 2003).

One-third of the total number of issues provided by respondents to the email survey were environmental (Appendix D), with the majority related to the potential impacts of visitors on the natural resources of protected areas (Table 2). Examples included disturbance to wildlife, erosion of riverbanks and localised trampling of vegetation. There was a general concern with physical disturbance to sites, for example the erosion and widening of tracks and increases in the number of informal tracks. Water quality issues were noted as was the potential for pest introduction and spread. Pests are having serious impacts on the conservation values of many protected areas. For example the pathogen *Phytophthora cinnamomi*, or dieback, is a major problem in many protected areas in Australia. This fungus can be spread from infected to uninfected areas via shoes or tyres and once established is almost impossible to eradicate (Buckley & King 2003; Newsome et al. 2002).

The environmental issues of greatest concern to workshop participants were ecological communities, naturalness and tourism resource units (Table 2). With ecological communities, the focus was the potential effects of visitor use on the structure, function and condition of these communities, particularly impacts to threatened and endangered species. Naturalness, in this context, relates to visitors' perceptions of the extent of modification of the landscape and what is aesthetically pleasing. For example the natural quality of Kosciuszko National Park is regarded as the most important attribute underpinning its the tourism and recreation value (Worboys & Pickering 2004). The concept of tourism resource units derives from a recent New Zealand report (Hughey & Ward 2003), which proposes a monitoring system based on the specific resource units that draw visitors to an area, for example seal populations or shore bird colonies. By monitoring the resource units attracting visitors, impacts of visitors can be monitored and the resources important to them can be maintained.

Social issues

The majority of social issues identified through the literature review were related to visitor experiences, ranging from crowding to satisfaction (Table 2). Crowding, encounters and over-use are prominent issues in North America with a number of studies conducted on determining acceptable encounter and crowding levels (Farrell & Marion 2000; National Park Service 2004; Stewart & Cole 2001). Other complementary studies have examined new ways of surveying and measuring visitors' responses to visitor numbers (Manning, Lime, Freimund & Pitt 1996). Sites receiving high levels of use and their management were another focus of concern (Dartmoor National Park Authority 2004).

Another leading issue for North American as well as other protected area agencies around the world, including Australia, has been the measurement of visitor satisfaction (Borrie & Birzell 2001; Ryan & Cessford 2003). This is often a key part of reporting requirements from protected area agencies, with maintaining visitor satisfaction regarded as being of great importance (National Park Service 2004; Ryan & Cessford 2003). Planning for visitors and their requirements was also identified as an issue. A common problem faced by

protected area managers is not being sure who they should be managing for (McCool 2002). A manifestation of this problem is not knowing what experiences visitors are seeking and hence what type of facilities to provide.

A number of social issues were also identified relating to the effects of tourism and visitor use on local communities surrounding protected areas and other tourism sites. These included the provision of seasonal jobs, non-locals taking jobs from locals, and migration in and out of communities as well as complaints by locals about tourism and associated visitor numbers (Sirakaya, Jamal & Choi 2001). The impacts of visitors on local customs and indigenous communities was also considered an important issue (Eagles, McCool & Haynes 2002; Sirakaya et al. 2001).

One third of the issues identified from the email survey of protected area managers related to social concerns (Appendix D). They ranged from community issues to inappropriate marketing (Table 2). Conflicting visitor uses, crowding and risk management were also cited as issues. Conflicting visitor use concerns the types of activities visitors participate in and the relative tolerance of other visitors to these activities, for example motorised transport users may be in conflict with non-motorised transport users (Cole 2001). Another concern was matching the recreation opportunities provided with visitor experiences. Several respondents noted that inappropriate marketing (i.e. marketing creating unrealistic expectations regarding the opportunities available) compromised managers' abilities to satisfy visitors while protecting an area's natural values.

For the workshop participants, the social issue of greatest concern was the cost and benefits to local communities (Table 2) including the displacement of locals by visitors, the number of local residents employed in visitor-related opportunities and the rights of local communities to access protected areas. The issues listed under the heading of 'satisfaction' were various – its meaningful measurement, the ability to differentiate between different 'types' of visitors and associated satisfactions, and gaining a better understanding of the influences of the behaviour of others on visitor satisfaction. Indigenous heritage concerns were the potential impacts (e.g. vandalism) of visitors on sites of Indigenous significance, incorporating Indigenous heritage in visitor education and interpretation, and involving Indigenous communities in managing visitor use.

Economic Issues

Sources and the generation of revenue for protected area management were clear themes across the websites and literature reviewed (World Commission on Protected Areas 1998; World Parks Congress 2003). As there are numerous costs associated with visitor management including constructing and maintaining visitor facilities, staff wages and site rehabilitation, and with funding from governments for conservation often limited, other sources of revenue and income need to be generated (World Commission on Protected Areas 1998). Following on from this, where there is an increase in visitor use, there is often a subsequent increase in demand for facilities and services of protected areas, requiring managers to provide additional personnel and facilities adding to management costs (Eagles et al. 2002). In response to decreasing funding from government treasuries for protected area management, a number of agencies have introduced entry and user fees. The fees charged, however, are often low and only cover a portion of management costs (Eagles 2002).

A number of economic issues were also identified relating to the effect of visitors and tourists on local communities (Lindberg 2001). The more common issues were jobs, income and profit, but issues such as reduced access to resources and leakage of profits to areas outside of the local community were also raised (Lindberg 2001; World Commission on Protected Areas 1998). Another prominent issue was determining the economic value of tourism and visitor use of protected areas (Carlsen & Wood 2004; Eagles et al. 2002). At present, the majority of economic studies focus on the tourist destination as a whole area or region, rather than the individual resource (e.g. national park). In many cases existing studies have used different approaches to data collection producing incomparable results (Carlsen & Wood 2004). Consequently the economic benefits of park tourism and visitor expenditure for local, regional and national economies are poorly understood resulting in a lack of community appreciation of the importance of protected areas (Eagles et al. 2002; World Commission on Protected Areas 1998).

The responses to the email survey showed an array of concerns (Appendix D), centring on ensuring a sustainable tourism industry and the costs of providing and maintaining visitor facilities and infrastructure (Table 2). The lack of information on the direct and indirect economic benefits of tourism to local, state and national economies also emerged as an issue in the email survey. Costs of management, including costs of rehabilitating degraded sites and providing services and park staff (e.g. rangers, field services, administration, etc) were also noted as issues in the email responses.

The economic issues of greatest concern to workshop participants were value to the economy, cost of services and facilities and revenue to agencies, and the profitability and satisfaction of tourism operators (Table 2). In the associated discussion at the workshop, participants emphasised that the economic benefits of visitor use of protected areas to surrounding areas need to be highlighted to show these areas contribute to local, regional and national economies. Participants emphasised the need to be able to determine and obtain credible

figures to illustrate these benefits. There has also been an increasing imperative for protected area agencies to become more 'business like' in their financial management. Part of being more business-like was identified as managing costs of facilities and services and revenues in accountable and transparent ways. The profitability and satisfaction of tour operators was also of interest to a number of workshop participants. Tour operators are an integral part of many protected areas and make valuable contributions to these areas, including revenue and visitor services. Consequently, their continued profitability and satisfaction are important both from an economic and broader sustainability standpoint.

Discussion of Issues

This discussion reviews the results from the literature review, email survey and workshop to provide context for the next chapter on indicators as well as synthesising the findings to provide a basis for recommendations for future research in the report's last chapter. In keeping with the approach in earlier parts of this report, the discussion of environmental issues is restricted to ecological concerns.

When these ecological issues from the literature review and email survey responses are examined, a number of similarities are apparent. Issues of common interest included physical site alteration or disturbance, track, trail and site erosion, disturbance of animals and the introduction and spread of alien species (Table 2). These issues reflect a focus on the negative aspects of visitors on the natural resources at sites they are using. The key ecological issues from the workshop on the other hand, centred on measuring and maintaining the ecological condition of protected areas. Ecological communities and the effects of visitor use on their structure, function and processes were a particular focus. Key, indicator and threatened species were also part of this concern. Tourism resource units are an extension of the key species concept with the emphasis on those elements of the natural environment attracting visitors such as seal or sea bird colonies (Hughey & Ward 2003).

This difference is a product of previous research and monitoring efforts and recent searching by managers to find measures of park and corporate performance, hence the interest in ecological communities. Much of the past and current research activity regarding visitor use and 'ecological impacts', reflected in the literature review and email survey responses, has addressed site-based resource impacts rather than broader, less site-specific concerns. The reasons for this are two-fold. First, most visitor management is site-based. Second, most research at the visitor-natural environment interface has been conducted by recreational ecologists with their interest being site-level resource impacts (see extensive research by David Cole, Jeff Marion, Yu-Fai Leung and others). The associated indicators report on site condition using environmental attributes of importance to visitors (e.g. erosion, vegetation removal) rather than those critical to ecological integrity. These indicators have been used in North American protected areas for number of decades, due in large part to the absence of more suitable indicators. Means for addressing visitor impacts on ecological communities remain poorly developed in the recreation ecology field, although work is underway in other areas to develop indicators of biodiversity and ecosystem health (Levy, Young & Fujita 2003; Vora 1997). Ecological communities seem favoured by managers as they potentially enable reporting at scales above the site-level.

Allocation of management levels (site, park and/or corporate) to environmental (ecological) issues provides an insight into the scales at which particular indicators could prove useful (Table 2). The resource impact related issues dominating the literature review and email survey have a site level focus. The issues identified at the workshop, although predominantly site and park based, also included corporate level concerns. For example, agencies are becoming increasingly interested in reporting, on a whole-of-agency basis, as to their performance with regards to protecting threatened species and communities and the diversity of ecological communities. Thus, although indicators are needed at all three management levels, these indicators may be very different, with an impact focus at site and park levels and a more community or ecosystem based approach at park and corporate levels.

For social issues, there appeared to be broader array of issues provided at the workshop than by the literature review and email responses. This difference is an artefact of the approach taken to analysis. The literature review focused on protected area agency websites and the North American protected area literature. The reliance on North American literature was necessary given the limited reporting on protected areas and visitor use issues from other countries such as Australia. Both sources have extensive information on visitor experiences and to a lesser extent on local communities, but pay limited attention to other concerns such as risk management. Although the email survey provided a broader array of issues, the number was reduced by omitting those not directly related to visitor use (e.g. community involvement). All the issues raised at the workshop, whether or not they were directly related to visitor use, were included in the report hence providing a broad range of issues (Table 2).

The workshop covered local communities, indigenous heritage, visitor risk and safety, and stakeholder attitudes and benefits. This enormous range clearly reflects concerns managers have about managing the diversity of stakeholders and interests, including visitors, associated with protected areas. All sources

emphasised visitor experiences as a central social concern and included issues such as crowding and conflict and the need for solitude, as well as a suite of concerns around satisfaction. These centred on the numerous, and often differing ways of measuring satisfaction, as well as managers' concerns regarding their ability to identify and control the many factors influencing it. A significant concern relating to measurement was the lack of information that overall satisfaction figures provide. In terms of the factors influencing it, more specific information on the park and site attributes affecting satisfaction is needed by managers if they are to actively manage it, including prioritising management actions and resource allocation (Griffin & Archer 2001).

Most of the social issues are relevant at all management levels, which was not the trend for the ecological issues (Table 2, management levels columns). For example, visitor satisfaction is of concern and reported at all three levels (Wardell & Moore 2005). Therefore, for issues such as satisfaction, experience and crowding, indicators are needed at all levels or at least indicators where the associated data can be aggregated or disaggregated as needed (Moore et al. 2003).

Economic issues received less attention in the email survey responses and workshop than did ecological and social. The reasons for this difference are not clear. Economic issues ranged from the need to know the costs and revenue attributable to visitor management and then adapt management accordingly, through to broader concerns with being able to clearly measure and communicate the economic value of protected areas to regional, state and national communities. Being able to provide an economic value for protected areas was noted as very important for engendering political support and maintaining or enhancing public funding for protected area management. This mix of concerns appeared across the literature review, email survey and workshop (Table 2).

Visitor use of protected areas can be a major contributor to regional, state and/or national economies. Parks Canada estimated that the economic impact of visitor use to all protected areas in Canada contributed C\$1.25 billion to the nation's gross domestic product (Eagles 2002). A limited number of studies in Australia confirm similar economic contributions. A study completed in New South Wales estimated that visitor use to the Dorrigo National Park contributed AU\$3,200,000 to the region's economy, while five world heritage areas in Australia (Great Barrier Reef Marine Park, Wet Tropics, Uluru National Park, Kakadu National Park and the Tasmanian Wilderness) were reported to have a tourism expenditure of AU\$1.372 billion (Bennett, Gillespie, Powell & Chalmers 1996; Eagles 2002). Seventeen travel cost studies for protected areas and their economic benefits have recently been completed (Worboys, Lockwood & De Lacy 2005).

Most if not all of the economic issues are corporate ones – garnering support for protected area agencies, ensuring financial accountability and transparency and having enough money to undertake core business. A number are also relevant at the park level where issues associated with the costs of management and revenue generation are important for the sustainable management of an individual park. Although it is also important to know site level costs and revenue, this is currently a lower priority.

Chapter 3

REVIEW OF INDICATORS

Indicators are currently being used by protected area managers and researchers to monitor changes in biophysical, social and economic conditions (Sirakaya et al. 2001). They can also be used to evaluate the performance of management actions (Dymond 1997; McCool & Stankey 2004). Indicators provide a cost effective way of obtaining information on complex systems by reducing monitoring and measurement to a limited number of variables (Dymond 1997; McCool & Stankey 2004). This chapter reviews the indicators currently being used in protected areas in Australia and elsewhere as well as reporting on the indicators developed at the workshop. As with the issues discussed in Chapter 2, reporting of environmental indicators is restricted to ecological aspects.

Environmental (Ecological) Indicators

Indicators identified from agency websites and associated literature were predominantly concerned with visitor impacts on and the condition of the natural resources in protected areas (see Tables 3 and 10). These concerns also dominated the research literature (see Tables 3 and 11). Reference was made in both sources to wildlife, alien species and water and soil quality. Most of the indicators were applicable at the site and park level, rather than corporate. Indicators for the consumption of key resources (e.g. water, energy, fuel), as provided by the research literature, was one of the few examples of a corporate ecological indicator.

Indicators obtained from the email survey were diverse, covering land tenure, legislative requirements, maintenance and condition of the natural heritage and the state of marine areas (see Tables 3 and 12). Legislative requirements concerned protected area management agencies complying with the national and international legislation applicable to parks and protected areas, such as the World Heritage Convention. Various measures of the condition of campsites were provided. Again the majority of indicators focused on the condition of and impacts on natural resources, with these indicators applicable at the park and/or site level. The small number of corporate indicators provided were concerned with reporting on the condition of the whole of the protected area system and included the maintenance of natural values, land tenure and threatened species.

A pivotal concern with regard to ecological issues is being able to separate the effects of visitor use from other impacts, such as pollution originating outside the protected area and the spread of pests and weeds due to non-visitor use related causes (Buckley 2003). To progress the consideration of a number of the above indicators as measures for the sustainable management of visitor use, there is a need to ensure that they reflect and capture the effects of visitors only. If the cause (visitors) and effect relationships are too ambiguous, the indicators will not be suitable for assessing visitor impacts.

Table 3: Environmental (ecological) indicators from literature review and email survey

Source	Summary of types of indicators	Mgmt lvl*	WCPA framework elements
Agency literature	Land subject to conservation	C	Planning
	Areas designated as Wilderness	C	Planning
	Resource protection (reefs)	P, C	Outputs/Outcomes
	Impacts on natural resources	S, P	Outputs/Outcomes
	Changes in plants and animals	S, P	Outputs/Outcomes
	Disturbance of native animals	S, P	Outputs/Outcomes
	Problem, alien species	S, P	Outputs/Outcomes
	Soil condition	S, P	Outcomes
	Water quality	S, P	Outputs/Outcomes
	Rehabilitation of degraded areas	S, P, C	Outcomes
Research literature	Key resource consumption	C	Outputs
	Condition of vegetation	S, P	Outcomes
	Change in vegetation	S, P	Outcomes
	Wildlife behaviour	S, P	Outcomes
	Wildlife populations	S, P	Outcomes
	Problem, alien species	S, P	Outcomes
	Threatened or endangered species	S, P	Outcomes
	Air quality	S, P	Outcomes
	Water quality	S, P	Outcomes
	Soil condition	S, P	Outcomes
	Condition of campsites	S, P	Outcomes
Email survey	Land tenure	P, C	Planning
	Legislative requirements	P	Planning
	Maintenance of natural values	C	Outcomes
	Monitoring of environmental issues of importance	P	Outputs
	State of marine areas	S, P	Outcomes
	Condition of vegetation near campsites	S	Outcomes
	Native animal interactions	P	Outcomes
	Problem, alien species	S, P, C	Outcomes
	Threatened or endangered species	C	Outcomes
	Geological sites	P	Outcomes
	Water quality	S, P	Outcomes
	Trampling	S, P	Outcomes
	Soil condition	S, P	Outcomes
	Condition of trails	S, P	Outcomes
Condition of campsites	S	Outcomes	

*Mgmt lvl = Management level, S = site, P = park, C = corporate.

Agency literature sources: CALM (2003a and 2003b); Dartmoor National Park Authority (2001); Department of Conservation (2002); Department of Infrastructure, Planning and the Environment (2003); Department of the Interior (2003); Great Barrier Reef Marine Park Authority (2003); National Park Service (1995); Parks and Wildlife Service Tasmania (2000); Parks Canada (2000); Parks Victoria (1992); and Parks Victoria (2003). Research literature sources: Graefe, Kuss & Vaske (1990); Hughes (2002); Mandis Roberts Consultants (1997); Merigliano (1990); Morin, Moore & Schmidt (1997); Obua and Harding (1997); Roggenbuck, Williams & Watson (1993); Sirakaya, Jamal & Choi (2001); Smith & Newsome (2002); Stankey, Cole, Lucas, Petersen & Frissell (1985); Watson and Cole (1992); and Watson and Roggenbuck (1996).

The identification of ecological communities, naturalness and tourism resource units as the three most important issues by workshop participants led to the suggestion of a suite of associated indicators (Table 4). Participants gave considerable thought during discussions of ecological indicators as how to best measure the condition of ecological communities and the effects of visitor use on them. Measuring both condition and threats were proposed (Table 4). To make these indicators as effective as possible, participants suggested developing models within which visitor impacts and ecological susceptibility could be related and appropriate measures selected. Also suggested was the need to identify and rank, at park and site levels, the most important risks to ecological communities.

Table 4: Indicators for key environmental (ecological) issues from workshop⁺

Key Issue	Indicators	Mgmt lvl*	WCPA framework elements
Ecological communities	Extent to which visitor use is fragmenting ecological communities	P, C	Outcomes
	How many ecological communities at each visitor site are being monitored for change	S, P, C	Outputs
	Total number of threats caused by visitors to ecological communities	P, C	Outcomes
	Proportion of individual ecological communities impacted by visitors	P, C	Outcomes
	Identification of threats caused by visitors to ecological communities	S, P	Context
Naturalness	Proportion of total area within park that is wilderness; natural or modified	P, C	Planning
	Number of sites where the view shed shows no evidence of human alteration (such as roads, buildings, agriculture, clearing for forestry, dams)	P	Outcomes
	Degree of visual alteration using condition class ratings such as those developed by Frissell (1978) and Cole (1983)	S	Outcomes
Tourism resource units	None provided	NA	

⁺ Terms used for indicators and measures are as given by the workshop participants.

*Mgmt lvl = Management level, S = site, P = park, C = corporate.

Although participants found it difficult to provide a definition for the degree of naturalness, three indicators were generated including land use classification, evidence of human alteration, and the use of condition class ratings systems such as those developed by Frissell (1978) and Cole (1983) (Table 4). These systems monitor environmental aspects such as trampling and amount of vegetation loss to provide a rating of the condition of a particular site (Cole 1983; Frissell 1978). Indicators for tourism resource units were not discussed. The indicators generated at the workshop appear to be predominately applicable at the park and corporate levels, in contrast to the site and park level indicators from the literature review and email survey.

Social Indicators

Most of the social indicators identified from the agency websites and associated literature as well as the research literature, were concerned with monitoring and measuring visitor numbers, satisfaction and experiences (Table 5). Numerous measures were provided for these (Tables 13 and 14). For the agency material, indicators additional to those principally concerned with visitors included the number of facilitated programs, extent of public support and universally accessible facilities. These indicators were mainly focused at park and corporate levels, in contrast to those from the research literature where the levels of application were predominantly site and park. The research literature had a strong focus on the impacts of visitors at a site-level, for example the loss of vegetation or the presence of erosion at campsites (Table 14). Although these indicators deal with ecological aspects (Table 3) they are also included in the social indicators as they derive from visitor perceptions.

The email survey showed a similar focus on visitor numbers, satisfaction and experiences (Table 5), with a strong park and corporate focus. This trend in management levels was also seen in the other social indicators provided by the respondents to the email survey (Table 5). The focus here was one of strategic management and reporting rather than site level impacts. Similarly to the literature review results, numerous indicator measures exist and were provided in the responses to the email survey (Table 15). For example for visitor satisfaction, measures included calculating a satisfaction index, satisfaction with visitor experience, and number of complaints received. For community support, measures were level of community awareness, perceptions of park management, and the number of volunteers.

Table 5: Social indicators from literature review and email survey

Source	Indicator	Mgmt lvl*	WCPA framework elements
Agency literature	Visitor numbers	S, P, C	Outputs
	Visitor satisfaction	P, C	Outcomes
	Visitor experiences	P	Outputs/Outcomes
	Visitor understanding	P	Outcomes
	Facilitated programs	C	Outputs
	Public support	C	Outputs
	Universally accessible facilities	C	Outputs
Research literature	Visitor numbers	S, P	Outputs
	Visitor satisfaction	S, P	Outcomes
	Visitor experience	S, P	Outputs/Outcomes
	Campsite use	S, P	Outputs
	Campsite development by visitors	S, P	Outputs
	Campsite development by agency	S, P	Outputs
	Condition of campsite	S, P	Outcomes
	Litter and waste	S, P	Outputs/Outcomes
Email survey	Visitor numbers	S, P, C	Outputs
	Visitor satisfaction	S, C	Outputs/Outcomes
	Visitor experience	P	Outputs/Outcomes
	Visitor centres	C	Inputs
	Visitor facilities	P	Inputs
	Visitor safety	P	Outcomes
	Visitor impacts at visitor nodes	P	Outcomes
	Public support	C	Inputs/Outputs
	Community support	P, C	Inputs/Outputs
	Activities and programs	P	Outputs
	Litter and waste	S	Outcomes
	Recreational vessels	S, P	Outputs

Mgmt lvl* = Management level, S = site, P = park, C = corporate

Agency literature sources: CALM (2003b); Dartmoor National Park Authority (2003); Department of Conservation (2002); Department of Infrastructure, Planning and the Environment (2003); Department of the Interior (2003); Great Barrier Reef Marine Park Authority (2003); National Park Service (1995); Parks and Wildlife Service Tasmania (2000); Parks Canada (2000); Parks Victoria (1992); and Parks Victoria (2003). Research literature sources: Graefe et al. (1990); Mandis Roberts Consultants (1997); Merigliano (1990); Morin et al. (1997); Roggenbuck, Williams & Watson (1993); Smith & Newsome (2002); Stankey et al. (1985); Watson & Cole (1992); and Watson & Roggenbuck (1996).

The three key social issues identified at the workshop were local communities, measuring satisfaction and Indigenous heritage. Accordingly, the discussion of indicators centred on these issues with indicators suggested for local communities and Indigenous heritage (Table 6). For satisfaction, participants commented that satisfaction was a complex issue and required more time for discussion than the workshop allowed. Consequently, no indicators were generated. Participants suggested that future use of satisfaction as a sustainability measure should include importance or expectation to provide context for managers. The segmentation of satisfaction results to acknowledge the diversity of visitors who frequent protected areas was also recognised as important. The concern expressed was that satisfaction measures currently in use are too broad and/or vague to provide meaningful results for middle and lower level managers. The need for a standardised methodology has also been raised by other sources (ANZECC 1997) because agencies are unable to compare satisfaction figures that have been collected using different measures.

Within the key issue of local communities, several sub-issues and associated indicators were provided. These included indicators relating to employment, tourism operators and community involvement through volunteering (Table 6). These indicators sought to reflect the positive effects or potential benefits of visitor use of protected areas on local communities and as such are closely related to the economic indicators reviewed below. The indicators were applicable at park and/or corporate levels.

A number of sub-issues and associated indicators were also identified for Indigenous heritage. Indicators were related to satisfaction, employment, place names, vandalism and co-management (Table 6). Again these indicators were concerned with the effects of visitor use on others, such as Indigenous communities and their heritage. Two of the five indicators suggested for Indigenous heritage could be applied at all three levels of management while the remaining two are relevant at the park and/or corporate levels (Table 6).

Table 6: Indicators for key social issues from workshop⁺

Key Issue	Indicators	Mgmt lvl*	WCPA framework elements
Satisfaction	None provided	NA	Outcomes
Local communities	Number of locals employed in protected area visitor management	P, C	Outputs
	Number of staff who live within designated radius of protected area	P, C	Process
	Number of tourism operators who live/work locally compared to total number of operators	P, C	Process
	Number of volunteers relative to local population	P, C	Outputs
	Number of volunteer hours relative to staff hours	P, C	Inputs
Indigenous heritage	Indigenous communities level of satisfaction with: dialogue; relationship with management agency; the amount of co-management; and the level of cultural heritage protection	P, C	Outcomes
	Number of indigenous people employed in protected area visitor management	P, C	Outputs
	Number of special sites with place names	S, P, C	Process/ Outputs
	% of vandalised indigenous sites (by total number of sites and by setting)	S, P, C	Outcomes
	Degree of co-management to total claimable	P, C	Outputs

⁺ Terms used for indicators and measures are as given by the workshop participants

*Mgmt lvl = Management level, S = site, P = park, C = corporate

Economic Indicators

The economic indicators identified from the agency-based and research literature were predominantly concerned with monitoring the costs of management and associated revenue at a corporate and (less often) park level (Tables 7, 16 and 17). Two of the associated measures for revenue are applicable at the park level, including the total gross domestic product (GDP) for a region (Table 16). This particular measure was sourced from the Dartmoor National Park Management Plan (Dartmoor National Park Authority 2001), which uses the GDP of the region as a surrogate for park revenue. Such a calculation seems reasonable for this location, given that a number of permanent residents within the park's boundary operate tourism businesses, such as restaurants and accommodation, with the income from these businesses contributing to the region's GDP. It may be less relevant for many protected areas in Australia.

Indicators provided from the responses to the email survey were also concerned with the revenue and the costs of management. However, for the costs of management this included indicators for corporate, park and site levels (Table 7). Indicators were provided relating to the tourism industry and its operators and measures included trends in the number of operators as well as the benefits and value of the industry, predominantly at a corporate level (Table 18).

Table 7: Economic indicators from literature review and email survey

Source	Indicator	Mgmt lvl*	WCPA framework elements
Agency literature	Cost of management	C	Inputs
	Condition of assets	C	Outputs
	Revenue	P, C	Inputs/Outputs
Research literature	Profit of tourism operators	P	Inputs
	Level of investment	P, C	Inputs
	‘Profit’ of park	P, C	Inputs
Email survey	Costs of management	S, P, C	Inputs
	Tourism industry and operators	C	Outputs
	Revenue	P, C	Inputs

Mgmt lvl* = Management level, S = site, P = park, C = corporate.

Agency literature sources: CALM (2003b); Dartmoor National Park Authority (2001); Department of Infrastructure, Planning and Environment (2003); Department of the Interior (2003); National Park Service (1997); Parks Canada (2000); and Parks Victoria (2003). Research literature sources: Mandis Roberts Consultants (1997); and Watson & Cole (1992)

From the workshop, discussion of the three key economic issues of cost and revenue, value to the economy and tourism operators produced a single indicator for each issue applicable at park and corporate levels (Table 8). For cost and revenue, an equation was suggested based on the total costs of visitor services minus the revenue generated, divided by the total number of visitors per annum (Table 8). It was noted, however, that a good assets register as well as a workable financial system would be required for this indicator.

Table 8: Indicators for key economic issues from the workshop⁺

Indicator	Associated measure	Mgmt lvl*	WCPA framework elements
Costs/Revenue	(Total cost – revenue) / visitor numbers per annum	P, C	Inputs/Outputs
Value to economy	Economic value of visitor use relative to GDP	C	Outcomes
Tourism operators	Average level of satisfaction of tourism operators (compared to baseline level)	P, C	Outcomes

⁺ Terms used for indicators and measures are as given by the workshop participants.

***Mgmt lvl** = Management level, S = site, P = park, C = corporate.

Value to the economy involved calculating the economic value of visitor use relative to gross domestic product (GDP) (Table 8). Such an approach would require a standardised, repeatable method for determining the economic value of visitor use of protected areas. An indicator for the profitability and satisfaction of tourism operators was also suggested – measuring the satisfaction of tourism operators compared to a baseline. This indicator was favoured in preference to assessing their profitability due to the potentially sensitive nature of the data required.

IUCN WCPA Framework and Earthcheck

Throughout this chapter, indicators have been allocated to one or more elements of the IUCN WCPA framework (i.e. context, planning, inputs, process, outputs and outcomes). These elements appear in the final column of Tables 3 to 8. Most indicators are output or outcome directed, locating them towards the end of the management cycle. This reflects a widely held view that performance reporting and improvement is best achieved by monitoring achievement of objectives (Hockings et al. 2000; Jones 2000) which equates to measuring outputs and outcomes within the IUCN WCPA framework. Although outcomes are a primary basis for assessing management effectiveness, indicators for other elements of the framework can provide agencies with a complete picture of the management process allowing for understanding of factors affecting management effectiveness and hence providing the basis for adaptive management (Hockings et al. 2000; Margoluis & Salafsky 1998). This is closely aligned with quality assurance approaches and the notion that improvement to all parts of the management system is necessary to ensure improvement in performance, including the achievement of

objectives (British Standards Institute 1994). As such, further work in this area should actively pursue identification of indicators that can reflect on performance earlier in the management cycle. Managers may find that by monitoring indicators for all elements in the WCPA framework and intervening at appropriate places in the management cycle, performance will be enhanced, not only in relation to those indicators but also against delivery of objectives.

A number of the indicators either being used or proposed by the workshop participants appear suitable for inclusion in the Earthcheck™ benchmarking system (Table 9). To be considered for inclusion, indicators must be expressible as a quantitative ratio to allow for easy comparison within and between agencies, business and organisations (McNicol et al. 2002). This table provides a starting point for further work but must not be regarded as an endpoint in itself. It is the product of a scoping study directed towards focusing future research, not towards providing a comprehensive, fully researched and field-tested product.

Table 9: Indicators potentially suitable for inclusion in Earthcheck™

KEY ISSUES (INDICATORS)	ASSOCIATED MEASURES	MGMT LEVEL*	SOURCE
Environmental (Ecological)			
ECOLOGICAL COMMUNITIES (Ecological communities [ECs], threats and endangered species)	Percentage (%) area of ECs fragmented by visitor use	P, C	a
	Percentage (%) of ECs where visitor use is causing impacts	P, C	a
	Number of threats caused by visitors relative to total number of threats to ECs	P, C	a
	Number of threatened or endangered species at visitor use sites	S, P, C	b
PERCEPTION OF NATURALNESS (extent of wilderness, unaltered landscapes, site impact index)	Proportion of a protected area system that is wilderness, natural and modified	P, C	a
	Proportion of visitors who perceive they are in a natural/wilderness environment (also a social indicator)	S, P	b
	Proportion of natural vista occupied by visitor related infrastructure	S, P	b
	Degree of visual alteration using condition class ratings such as those developed by Frissell (1978) and Cole (1983)	S	a
TOURISM RESOURCE UNITS (effects of visitors)	Number of injuries or death of resource unit species caused directly by visitor behaviour relative to total number of deaths or injuries	S, P, C	c
	Extent of obvious avoidance, defensive or habituated behaviour by resource unit species towards visitors	S, P	c
	Changes in breeding rates per annum related to visitor use	S, P	c
Social			
VISITOR SATISFACTION (satisfaction with experiences, satisfaction with management)	Percentage (%) of visitors satisfied with recreational/tourism experiences	P, C	d
	Percentage (%) of community satisfied with adequacy of recreation/tourism opportunities	P, C	e
	Percentage (%) of visitors satisfied with management of protected area(s)	P, C	d, e
LOCAL COMMUNITIES	Percentage (%) of residents to visitors at visitor sites	S, P	b
INDIGENOUS HERITAGE (damage to sites of Indigenous heritage)	Percentage (%) of vandalised indigenous sites relative to the total number of indigenous sites	P, C	a
	Number of reports of visitor-related damage to Indigenous heritage sites	S, P	b

Table 9: Indicators potentially suitable for inclusion in Earthcheck™ (contd)

KEY ISSUES (INDICATORS)	ASSOCIATED MEASURES	MGMT LEVEL*	SOURCE
Economic			
COSTS AND REVENUE (costs of visitor services, visitor-generated revenue)	(Total cost of visitor services – total revenue)/visitor numbers per annum	P, C	a
	Total cost of visitor services relative to total visitors	C	f
	Maintenance costs associated with visitor-related infrastructure relative to total visitors	P, C	f
	Level of investment in visitor-related infrastructure and services relative to total visitors	P, C	b
	Revenue collected from concession activities relative to total revenue	P, C	d
	Number of park passes sold and entry fees	P, C	f
	Total cash contributions (donations) from visitors	P, C	g
VALUE TO ECONOMY (economic value of visitor use)	Average daily visitor expenditure x average length of stay x total number of visitors	P, C	h
	Direct and indirect benefits of visitor use	P, C	f
	Level of direct visitor-related employment	P, C	b
SATISFACTION OF TOUR OPERATORS (operator profitability, satisfaction)	Annual total profit of tourism operators relative to total visitors (operator clients)	P, C	b
	Change in revenue of tourism operators	P, C	b
	Profitability of tourism operators	P, C	b
	Number of tourism operators relative to total visitors (operator clients)	P, C	b
	Satisfaction ranking relative to established baseline	P, C	a

*Mgmt lvl = Management level, S = site, P = park, C = corporate.

Sources: a – workshop
 b – Mandis Roberts Consultants (1997)
 c – Hughey and Ward (2004)
 d – Agency documents (Table 13)
 e – Parks Victoria (2004)
 f – email survey responses
 g – Agency documents (Table 16)
 h – Carlsen and Wood (2004)

The issues identified by workshop participants, which guided development of Tables 4, 6, 8 and 9, capture only a sub-set of protected area manager concerns and may or may not reflect the broader concerns of those outside protected area agencies.

Discussion of Indicators

This discussion draws together the results from the literature review, email survey and workshop to provide a synthesis of the current application and concerns regarding indicators for visitor use of protected areas.

Most of the ecological indicators provided were concerned with the condition of natural resources as well as the presence or the extent of impacts, with these being applicable at the park or site level (Tables 3 and 4). Ecological communities, however, were discussed as a corporate and park level issue. The attention to corporate level indicators reflects the current interest and search for indicators for protected areas that extend beyond site-based monitoring of the environmental effects/impacts of visitor use, to reporting on the overall condition and management of the resource within their care (Buckley 2003; Parks Canada 2003).

For workshop participants, a central interest was in developing indicators that separate the effects of visitor use from other sources of impacts. However, no indicators were developed for the key ecological issue of tourism resource units (Hughey & Ward 2003). There was enthusiasm within the workshop about taking the concept into the next phase of research, given that such units provide a clear focus for the measurement of the effects of visitor use on natural resources. The continued attention in this scoping study to ecological indicators rather than the broader suite of environmental indicators means that further indicator development must also draw on the wealth of ‘brown’ indicators available from within the Earthcheck system and elsewhere (Buckley 2003).

For social indicators, the focus of all sources was visitor numbers, satisfaction and experiences (Table 5). Visitor numbers and satisfaction are currently widely measured to provide data for input to management plans

and to satisfy corporate reporting requirements (Archer, Griffin & Hayes 2001). This focus on visitors reflects the direct mandate for protected area agencies to provide opportunities for visitors and to monitor the effectiveness of this provision. Clearly, indicators of this type need to appear in any final indicator set for visitor use of protected areas.

It is more difficult to determine which of the other types of indicators apparent from this study are directly relevant to managing visitor use of protected areas in a sustainable manner. Potential indicators include those associated with local community support and benefits from protected areas, cultural heritage (Indigenous and non-Indigenous) and visitor safety. The last is clearly relevant while the first two are less clearly so. Local community support is essential for the long-term political survival of protected areas but is not necessarily an element of sustainable visitor use. Indigenous sustainability warrants attention in its own right. Aspects of this issue, such as protection of sites and quality of interpretation, are clearly part of sustainable visitor use. Lack of a direct relationship between visitor use and indicators such as extent of community support and extent of indigenous involvement, means they may not be suitable as indicators of sustainable visitor use.

There is an enormous variety of management levels for social indicators (Tables 5 and 6). All of the sources, except the research literature, provided indicators that are applicable at site, park and corporate levels. The message seems to be that all levels are important, particularly with regard to issues of visitor management and satisfaction.

The number of economic indicators from all sources was limited in contrast to the number provided for ecological and social. Almost all of the economic indicators, independent of their source, address the park and corporate, but not site level. Most focused on costs associated with management and the generation of revenue. With public funds being limited, budgets for the management of protected areas are often insufficient and alternatives sources of funds need to be found (Tourism and Transport Forum 2004). Therefore it is not surprising that the majority of economic indicators identified focused on these aspects. A more critical economic imperative than costs and revenue-raising is justifying economically the importance of protected areas to local, regional, state and national economies (Carlsen & Wood 2004). This concern was clearly articulated as one of the key economic issues in the workshop (Table 8).

The other focus in the workshop, apart from management costs and economic values, related to tourism operators specifically their profits, revenue, satisfaction and benefits. Tourism operators and protected area managers have a unique relationship in that they each provide a range of benefits to the other, especially in regard to visitor management. Tourism operators can contribute to visitor management, interpretation and education as well as marketing and publicity opportunities for protected areas. Protected area managers provide tourism operators with publicly-funded infrastructure as well as the provision of access to natural resources on which their operations depend (Tourism and Transport Forum 2004). Therefore it is essential to ensure that the next stage of indicator development involves these key stakeholders.

Chapter 4

RECOMMENDATIONS FOR FUTURE RESEARCH

Given the scoping nature of this project, this report concludes with recommendations for future research. These recommendations were generated at the workshop and subsequently refined through consideration of current research and practices, plus comments by Industry Reference Group members on the final draft of the report. Further investigation should be progressed via an integrated, overarching research project and three complementary sub-projects addressing specific knowledge shortfalls.

Integrated Research Project

Sustainability by its very nature depends on integration. Therefore, for the completion of this project and provision of indicators for the sustainable visitor use of protected areas, integration across indicator development and with existing and developing monitoring systems is essential. For this integration to occur, an overarching project is needed to continue the advancement of a core and supplementary set of indicators which address environmental, social and economic issues. It would also coordinate three complementary sub-projects, that aim to fill important knowledge gaps with regard to suitable ecological indicators; better, standardised ways of measuring and reporting on visitor satisfaction; and developing simple measures for the economic valuation of protected areas. In addition to these problematic areas, the integrated project would also need to identify and refine other indicators that are needed to ensure the sustainable management of visitor use.

The integrated project would also field-test a refined indicator set. Field-testing should be the traditional ‘go out and measure it’ to establish whether the indicators can be applied in a practical sense as well as determining whether the indicators can operate in the institutional and administrative settings found in different protected area agencies and organisations associated with protected area tourism. If the methods do not work administratively as well as ‘in the field’ they are unlikely to be adopted. Given the level of investment in this project and the complexity and diversity of Australia’s natural environment, field-testing seems warranted in at least several states and associated organisations. Part of the field-testing will include determining if benchmarks can be developed and agreed upon. If successful, this project will provide a set of indicators and accompanying benchmarks for inclusion in the Earthcheck™ system.

Workshop participants commented that any further research in this area must be complementary to current reporting methods and monitoring frameworks so that the results can be readily integrated into these systems. This integrated project intends to deliver visitor use information that can be included in broader protected area management systems, where they exist. Additionally, development of this project needs to take into account the visitor information systems in existence or currently being developed by protected area agencies. Another STCRC project, soon to be commissioned, will examine these systems and the opportunities for standardisation. Synergies between this visitor information project and the proposed integrated project should benefit all concerned.

Further research into indicators for sustainable visitor use must clearly demonstrate the benefits of indicator adoption. Workshop participants noted that integration with existing and developing agency systems is critical for gaining agency and broader government support and increasing the chance of adoption by both managers and the tourism industry more generally. They also discussed whether the methods developed should be for Australia-wide or for individual agency adoption and modification. Concern has been raised regarding Australia-wide approaches developed in the past (e.g. ANZECC visitor standards) and their lack of adoption (Wardell & Moore 2005). However, participants suggested that such problems could be overcome if a number of agencies are involved in the development and testing of indicators.

The integrated project should generate and establish indicators from within some form of conceptual and/or reporting framework (Lockie, Lawrence, Dale & Taylor 2002) that also complements current and developing approaches within protected area agencies. The IUCN WCPA evaluation framework can provide both. Its current application to state-of-the-park reporting within Australia, and to a number of protected areas internationally, should assist greatly in complementing existing protected area agency activities. The synergies possible with current state-of-the-park reporting should be a core element of this integrated component. Work currently underway by Graeme Worboys at Griffith University analysing management effectiveness evaluations usually undertaken (or needed) by Australian and global protected area agencies (Worboys 2004), also has potentially important synergies with this project.

These integrating activities should also include the development and application of selection criteria. An important feature of indicator development and associated frameworks is using criteria to aid in indicator selection (Newsome et al. 2002). The value of selection criteria lies in their ability to reduce lists of indicators to a manageable number as well as ensuring that they are relevant and appropriate to the task at hand (McCool & Stankey 2004). A number of sets of such criteria already exist, with two in particular developed specifically for protected areas.

The IUCN WCPA evaluation framework is accompanied by a set of criteria which includes the selection of indicators that are: unambiguous, predictable and have a verifiable relationship with the attribute being assessed; sensitive to change in the attribute being assessed; able to integrate environmental effects over time and space; able to reflect changes and processes of significance to management; able to reflect changes at spatial and temporal scales relevant to management; cost-effective in terms of data collection, analysis and interpretation; simple to measure and interpret; and able to be collected, analysed and reported in a timely fashion (Hockings et al. 2000). The Visitor Experience and Resource Protection (VERP) framework, developed specifically for managing visitor use in protected areas, uses selection criteria in a slightly different way (National Park Service 1997). It has a set of primary and secondary criteria to help filter possible indicators. The primary criteria represent the characteristics of good indicators, while the secondary criteria are desirable traits that help evaluate a reduced set of possible indicators.

A final set of criteria worth mentioning, because of current interest in state-of-the-park reporting (although they have not been applied to protected area management), are those used for Australia's State of the Environment reporting (Alexandra et al. 1998). A 'SMART' approach was used to select indicators that are Simple, Measurable, Applicable, Relevant and Timely. The IUCN WCPA criteria include most of the VERP criteria and thus provide a firm foundation for the selection of indicators in the next phase of this research. This set should, however, be complemented by the SMART approach (Alexandra et al. 1998) which potentially gives an added corporate context to indicator selection.

In terms of project timing, this integrated project will need up to two years (18-24 months) to further develop and test indicators, especially given the need to address the knowledge shortfalls identified below. Significant progress towards benchmarking of suitable indicators should also be possible over this time. The indicators must be selected and developed within a framework regarded as useful by end users. Great care should be taken, however, in any future project planning, to remain focused on producing practical, pragmatic indicators that are easy to measure and meaningful to managers.³

The project should be guided by an industry reference group, comprised of protected area managers, tourism operators and staff from Earthcheck™ and state tourism organisations. Only if their needs are met are they likely to adopt the project outcomes. Sufficient funds should be allocated to allow this group to regularly meet to guide and review progress.

Sub-project 1: Ecological Indicators

Workshop participants considered that the development of meaningful and practical indicators of the condition of ecological communities was particularly difficult. Separating the effects of visitor use on these communities from other potential sources of impacts is also problematic (Buckley 2003). Extensive research in the field of recreation ecology provides a suite of indicators for reporting on site-based resource impacts (Leung & Marion 2000), although many of these measures have been selected because they relate to issues of interest to visitors rather than targeting the most ecologically significant issues. There is growing interest in park and corporate measures of performance and hence a need to identify indicators that can report on ecological condition at scales broader than the site level.

The focus for this sub-project is identifying and testing ecological indicators *that clearly report on the effects of visitor use on the condition, structure and function of ecological communities as a whole* particularly for park and broader scales. It will be essential to engage the expertise of ecologists, as they have the training and ability to identify and recognise crucial changes in plant and animal communities as well as other areas of skills and knowledge that could potentially be used (Buckley 2003). Extensive work has also been undertaken in disciplines such as conservation biology and restoration ecology on the development and selection of indicators and this work should be incorporated. This sub-project should begin by reviewing existing ecological monitoring frameworks and indicators to develop a list of potential indicators which can then be assessed for their relevance by ecologists, protected area managers, tourism operators and other stakeholders. Once assessed, these indicators will be ready for field-testing under the integrated project outlined above. The sub-project output will be indicators and associated benchmarks measuring the effects of visitor use on ecological communities in

³ This project should not become a vehicle for developing complex monitoring protocols or attempting to model and measure complex systems.

protected areas. These ecological indicators will form part of the suite of environmental indicators developed by the integrated project. In order to complete this research, a timeframe of 18-24 months is needed to allow adequate consultation with key stakeholders and field-testing. The nature of visitor use threats to ecological integrity forms an important part of this research.

A word of caution is necessary here – it may not be possible to develop generic indicators for ecological communities that are applicable Australia-wide. The variability of biomes and threats across Australia may be such that no generic indicators are possible. If this is the case, the final output may be a set of guidelines and criteria for selecting ecological indicators.

Sub-project 2: Visitor Satisfaction Indicators

Workshop participants identified visitor satisfaction as a social indicator of importance and requiring further research attention. A number of visitor satisfaction methodologies are given in the literature and used by protected area agencies in Australia, however, no consensus currently exists regarding the best method (Griffin & Archer 2001). Measurement of visitor satisfaction is vital for protected area agencies to monitor their effectiveness and performance in managing visitors (Hornback & Eagles 1999). It also provides an early warning system for problems and positive feedback that can help improve staff morale (Hornback & Eagles 1999; Manning 1986). However, management agencies require more information than simply whether visitors are satisfied; they require knowledge of issues affecting visitor satisfaction and an understanding of differences amongst visitor segments (Griffin & Archer 2001; Ryan & Cessford 2003). By measuring visitors' satisfaction with specific attributes of protected areas, managers can prioritise management actions and resource allocations (Hornback & Eagles 1999).

This sub-project recommends building on the existing work on measurement of visitor satisfaction (e.g. Griffin & Archer 2001; Horneman, Beeton & Hockings 2002) to develop a standardised method for collecting and evaluating visitor satisfaction data relevant to visitor use of protected areas. An important part of this project will be to develop methods that allow for the segmentation of satisfaction against visitor demographics, activities, experiences sought and so on. A number of researchers have noted the need for finer resolution in its measurement (Ryan & Sterling 2001; Wade & Eagles 2003). Considerable consultation with protected area managers, tourism operators and the tourism industry is required to determine what aspects of visitor satisfaction are of interest and associated preferences for data differentiation. Such consultation will also help determine appropriate methods for measuring and reporting on these different aspects of satisfaction.

Once determined, these indicators should be field-tested as part of the integrated project mentioned above. The sub-project output will be indicators and associated benchmarks for visitor satisfaction as well as a standardised approach to measuring and monitoring visitor satisfaction that can be segmented according to agency requirements. These indicators will form part of the suite of social indicators developed by the integrated project. A timeframe of 18-24 months is proposed for consultation with key stakeholders and field-testing.

Sub-project 3: Economic Value Indicators

Information on the economic value of protected areas is increasingly being sought by protected area managers to garner political support and increase budget allocations for the management of these areas. Protected areas often supply the major component of nature-based tourism in a region, but typically they do not receive much of the benefit (Eagles 2002). Due to a lack of accurate, adequate information, the economic importance of tourism in protected areas is often under-rated. This deficiency of credible, reliable information often means that visitor use and tourism to protected areas are not fully represented compared to other industries, such as mining and forestry, creating the impression in government and business circles that it is not a profitable land use (Eagles 2002).

To address this urgent need, the STCRC recently commissioned a study to develop a simple, accurate method for valuing protected areas. The recently completed report from this study (Carlsen & Wood 2004) presents a method that allows managers to determine the expenditure by visitors to protected areas on accommodation, transport, food and equipment. The required data are collected using visitor questionnaires with the end product a figure for visitor spending directly attributable to a protected area or areas.

Methods clearly exist, especially given this recent work by Carlsen and Wood (2004), to measure the economic benefits of protected areas. Their application and integration into the broader schemes of performance reporting is not as yet widespread. Therefore this sub-project aims to review and synthesise current evaluation activities and recommend a set of indicators, most likely linked to a preferred evaluation tool/approach, for inclusion in the broader set of economic indicators for field-testing via the integrated project. A timeframe of 3-6 months is suggested because another proposed STCRC project on field-testing methods for economic evaluation of protected area is likely to provide the necessary methodological base, making indicator development more straightforward.

APPENDIX A: EVALUATION ELEMENT SUBJECT AREAS STRUCTURED ACCORDING TO THE IUCN WCPA FRAMEWORK

(From Worboys 2004)

Context:

Significance

Natural biotic phenomena
Natural abiotic phenomena
Cultural, social and economic

Baseline condition

Natural heritage baseline
Cultural heritage baseline
Managerial baseline
Social and economic baseline

Threats

Threat issue and threat status
Physical threats
Biological threats
Direct human threats
Indirect human threats

Vulnerability

Legal status
Boundary demarcation
On-ground management status
On-ground social circumstances
On-ground potential for impacts

National Context

National policy context
National conservation performance

Planning

Legislation and policy

Adequacy of legislation
Adequacy of policy

Protected Area Systems

Adequate and representative system of protected areas
Landscape processes and ecosystem services

Design

Protected area design

Management Planning

Systems level management planning
Protected area planning

Inputs

Adequacy of resources

Financial resource inputs
Human resources
Equipment and infrastructure
Information resources

Application of resources

Resource allocation

Assessing partners

External partner investments

Process

Assessing management process

Managerial process
Administration support
Operations
Monitoring
Performance standard

Output

Products and Services

Delivery of products
Delivery of services

Work programs

Delivery of work programs

Outcomes

Objectives Achieved

Degree of threat
Change in condition
Management objectives achieved

APPENDIX B: INDUSTRY REFERENCE GROUP MEMBERS

Pamela Harmon-Price
Queensland Parks and Wildlife Service
Environmental Protection Agency
Queensland

Dianne MacDonald
Parks and Wildlife Division
Department of Environment and Conservation
New South Wales

Andrew Roberts
Parks and Wildlife Services
Department of Tourism, Parks, Heritage and the Arts
Tasmania

Hilary Skeat
Great Barrier Reef Marine Park Authority
Australia

Ian Walker
Parks Victoria
Victoria

Brett Waring
Queensland Parks and Wildlife Service
Environmental Protection Agency
Queensland

Melinda Watt
Earthcheck Pty Ltd
Australia

Vicki Winfield
Department of Conservation and Land Management
Western Australia

APPENDIX C: EMAIL SURVEY PARTICIPANTS

(R) Responded to email survey

Andrew Bridges
Department of Infrastructure, Planning and Environment
Northern Territory

Campbell Clarke (R)
Wet Tropics Management Authority
Queensland

Pamela Harmon-Price (for Brett Waring) (R)
Queensland Parks and Wildlife Service
Environmental Protection Agency
Queensland

Rod Hillman
Department of Environment
Australian Capital Territory

Dianne MacDonald (R)
Parks and Wildlife Division
Department of Environment and Conservation
New South Wales

Andrew Roberts (R)
Parks and Wildlife Services
Department of Tourism, Parks, Heritage and the Arts
Tasmania

Claire Savage (R)
Department of Environment and Heritage
South Australia

Hilary Skeat (R)
Great Barrier Reef Marine Park Authority
Australia

Ian Tranter (R)
Department of Industry, Tourism and Resources
Commonwealth

Melinda Watt (R)
Earthcheck Pty Ltd
Australia

Ian Walker (R)
Parks Victoria
Victoria

Vicki Winfield (R)
Department of Conservation and Land Management
Western Australia

APPENDIX D: ISSUES FROM EMAIL SURVEY

Environmental (ecological) issues

Physical site disturbance

- Visitor site physical disturbance e.g. localised trampling and damage
- Erosion of riverbanks
- Impact on karst formations and environments
- Effects of wildfire caused by escaped campfires and recreational fire lighting
- Loss of leaf litter due to firewood collection
- Habitat depletion due to collection of firewood (particularly in more remote areas)
- Damage to rare and threatened plants
- Trampling in threatened ecological communities
- Loss of soil quality associated with shortcutting
- Coastal landforms are particularly vulnerable in arid areas, especially visual impacts of degradation
- Nutrient input from human waste
- Ecological impacts associated with highly-visited iconic sites
- Protecting coral reefs and other habitats (e.g. seagrass) from anchor damage, poor diving practices, waste disposal, reef walking and collecting
- Scenic and aesthetic degradation

Wildlife and bird disturbance

- Wildlife disturbance
- Trampling of shore birds nests
- Disturbance of birds
- Road kill

Track condition

- Erosion and widening of tracks
- Mud formation on roads, tracks and campsites
- Proliferation of informal tracks due to off-track walking and driving

Water quality

- Loss of water quality
- Drainage and sedimentation input into water bodies from roads and walking tracks

Alien species

- Potential for pest/weed introduction and spread
- Phytophthora spread through boots and tyres

Other issues

- Firewood collection
- Campfire scarring and increased wildfire incidence
- Noise impacts e.g. 4WD and motorbikes
- Monitoring visitor impacts with limited budgets
- Providing users with minimal impact information to encourage impact reduction
- Sites of natural heritage significance
- Environmental management programs required to monitor impacts on sites, threatened endangered species, water quality, pest/weed management, etc
- Adherence to applicable national and international treaties and agreements (protected ecosystems)
- Ecosystems - % modified and unmodified
- Research studies undertaken or required to be undertaken
- Ensuring ecologically sustainable fishing

Social issues

Effects on communities

- Community support
- Locals who want access to areas that are not invaded by tourists
- Provision of facilities to meet broader community's needs (multi-cultural centres)

- Community consultation
- Informing community about protected areas and world heritage values
- Number of tourists and local residents using sites
- Displacement of local people from sites

Conflicting visitor uses

- Conflicting uses
- Communicating concept of a variety of recreation experiences that have different requirements in terms of access, facilities and skills
- Ensuring social equity when considering visitor demands

Crowding

- Crowding
- Lack of capacity at campsites, huts, tracks and car parks
- Mismatch in expectations of visitors over encounter levels

Risk management

- Risk management (potential for accidents and visitor injuries)

Visitor experience and satisfaction

- Providing visitor experiences that are accessible and meet expectations
- Ensuring quality recreational experiences
- Accommodating upgrading of facilities without displacing present users
- Reduction in recreational opportunity spectrum (e.g. decrease in free or low cost coastal camping)
- Visitor expectations in terms of visitor facilities not being met
- Loss of enjoyment and amenity due to littering and poor bush hygiene practices
- Smell associated with bush hygiene
- Activities participated in while in park
- Misbehaviour of visitors
- Positive health benefits to individuals of providing visitor and recreation opportunities

Inappropriate marketing

- Inappropriate marketing creating unrealistic expectations

Other issues

- Viewscape degradation
- Illegal activities (poaching, arson)
- Disturbance, destruction, theft of cultural artefacts
- Deliberate or accidental damage to heritage values
- Cost of restorative projects undertaken to minimise adverse impacts
- Visitor nodes requiring remedial work at higher than predicted rates due to visitor impacts
- Means of access
- Volunteer programs/volunteer hours
- Attitudes to parks and park users
- Day visitor needs versus longer-stay visitor needs
- Respecting cultural importance of PA to indigenous peoples
- Interpretive signage and information

Economic issues

Sustainable and viable tourism industry

- Ensuring a sustainable and viable tourism industry
- Costs to tourism operators
- Providing certainty to operators
- Concessionaires, leases and tour operators

Costs of providing and maintaining facilities

- Lack of resources to maintain sites and walks
- Visitor facilities and infrastructure provision
- Visitor facilities and infrastructure maintenance
- Cost of rehabilitation of degraded sites
- Cost of repairing effects of vandalism
- Maintaining infrastructure in condition that does not impact on environmental values (e.g. eroded

- tracks, sewerage treatment)
- High liability on deferred maintenance of assets

Costs of management

- Development and implementation of visitor programs
- Park staff (rangers, field services, administration, etc) and associated costs
- Systems to monitor visits, satisfaction levels, research across an extensive range and number of parks
- Cost to manage park (by type) per hectare
- Management costs escalate in more remote areas
- Cost of geo-technical assessment when visitor use increases
- Cost of provision of services
- Using volunteer labour to manage impacts
- Ensuring impact monitoring and remediation budgets as part of project development
- Visitor safety and risk management
- Cultural site heritage protections
- Interpretation including signage

Other

- Direct and indirect benefits of tourism
- User pays
- Economic studies of contribution of parks to regional economies undertaken or required to be undertaken
- Park Use Fee Capital Equipment
- Increasing visitation vs decreasing revenue from visitor fees
- Potential revenue raising opportunities not pursued so as not to upset local community
- Non-compliance with user-fees reduces revenue
- Positive economic benefit to the state of providing visitor/recreation opportunities
- Response to large-scale unpredictable events (e.g. fires)
- Economic capacity to address visitor impacts
- Impacts of decreases in water quality

APPENDIX E: INDICATORS AND ASSOCIATED MEASURES

Table 10: Ecological indicators from web-based agency documents ⁺

INDICATOR	ASSOCIATED MEASURES	MGMT LVL*	SOURCE
Land subject to conservation management	Area of land subject to conservation management as primary land-use	C	a, g
Wilderness areas	Acres designated as wilderness achieving wilderness character objectives as specified by statute	C	d
Parks with satisfactory outcomes	Parks with satisfactory outcomes in relation to fire, weeds, ferals and threatened species	C	a
Resource protection	Relative number of reefs that are healthy compared to not healthy as assessed by AIMS long term monitoring program	C	b
Disturbance of native animals	Human disturbance does not interfere with the successful completion of nesting attempts by sea birds	S, P	c
	Decrease or no increase in the number of reported disturbances regarding sea-lions	S, P	c
Problem and domestic species	No increase in the number of introduced animal or plant species	S, P	c, d, e, g, h
	Phytophthora and other plant diseases have not spread into unaffected areas	S, P	d
Soil loss	Gutters	S, P	e
	Increased sediment load in streams	S, P	e
Soil compactness	Bare ground	S, P	e, h
Water quality	Stream turbidity	S, P	e
	Increased bacterial levels	S, P	e
	Water quality in park has not deteriorated or has improved	S, P	d
	Trend in end of river pollution loads for key catchments	C	b
Changes in vegetation and wildlife	Reduced number of individuals	S, P	e, h
	Changes in species composition	S, P	e, h
	The natural biological diversity of indigenous flora and fauna within park has not changed	S, P	d
Rehabilitation of degraded areas	Damaged or degraded areas of park have been stabilised or rehabilitated and restored	S, P, C	d, f, h
Impacts on natural resources	Litter	S, P	e
	Deliberate damage	S, P	e
	Wear and tear	S, P	e
	Change in proportion of sites where visitor activity has significant adverse effects on natural heritage	C	g

⁺ Terms used for indicators and measures are as given in the literature

***Mgmt lvl** = Management level, S = site, P = park, C = corporate

Sources:

a = Department of Infrastructure Planning and Environment (2003)

b = Great Barrier Reef Marine Park Authority (2003)

c = CALM (2003a)

d = Parks and Wildlife Service Tasmania (2000)

e = Parks Victoria (1992)

f = Department of the Interior (2003)

g = Department of Conservation (2002)

h = National Park Service (1995)

Table 11. Ecological indicators from research literature⁺

Indicator	Associated measures	Mgmt level	Source
Key resource consumption	Amount of water, energy and fuel consumed	C	b
Condition of vegetation	Area of vegetation loss and bare ground	P, S	e, f, g, i, k
	Number of damaged trees, shrubs, stumps	P, S	e, f, g, i, k
	% vegetation cover	P, S	a, k
	Net coverage of natural vegetation within protected area	P	c
Wildlife behaviour	Evidence of wildlife displacement due to human presence	P, S	k
	Breeding rates of indicator species	P, S	c
	Evidence of habituated wildlife behaviours	P, S	k
Change in vegetation	Change in vegetation composition	P, S	a, k
	Rate of change due to human impact	P, S	k
	Number of ha of vegetation removed for visitor-related infrastructure	P, S	c
Exotic, alien species	Number of pest/rodent species	P, S	k
	Number of weed/exotic species	P, S	a, i, k
Condition of trails	Presence of erosion along trails	P, S	a, d, e, f, j, k
	Width of trails	P, S	e, h, i, k
	Presence of trail compaction	P, S	a, i, k
	Number of boggy portions of trail	P, S	j, k
Water quality	Amount of faecal material present	P, S	d, k
	Concentrations of selected nutrients (e.g. N, C)	P, S	d, k
	pH, alkalinity and temperature	P, S	d, k
	Plankton productivity	P, S	d, k
Water body structure	Change in stream structure	P, S	k
Air quality	Visibility (visual range)	P, S	d
	Ambient concentrations of selected chemicals	P, S	d
Soil condition	Amount of soil loss	P, S	k
	Change in soil structure	P, S	k
	Stability of soil	P, S	a, k
Threatened or endangered species	Population of threatened or endangered species	P, S	h, j, k
	Number of threatened or endangered species at sites impacted by tourists (visitors)	P, S	c
Wildlife populations	Number of positive wildlife encounters	P, S	a, g, l
	Presence of wildlife	P, S	e, g
	Changes in indicator species populations	P, S	h, k
	Abundance of selected species sensitive to humans	P, S	a, d

⁺ Terms used for indicators and measures are as given in the literature

*Mgmt lvl = Management level, S = site, P = park, C = corporate

Sources:

a = Graefe, Kuss & Vaske (1990)

b =Hughes (2002)

c =Mandis Roberts Consultants (1997)

d =Merigliano (1990)

e =Morin, Moore & Schmidt (1997)

f =Obua & Harding (1997)

g =Roggenbuck, Williams & Watson (1993)

h =Sirakaya et al. (2001)

i =Smith & Newsome (2002)

j =Stankey, Cole, Lucas, Petersen & Frissell (1985)

k =Watson & Cole (1992)

l = Watson & Roggenbuck (1996)

Table 12. Ecological indicators from email survey⁺

Indicator	Associated measures	Mgmt lvl*
Maintenance of natural values	Natural value program activities measured and recorded (State of Park Reporting)	C
Monitoring of issues of importance	Monitoring to identify trends in: - population size and abundance of threatened species - disturbance and integrity of endangered populations - condition of sites of geological importance	P
Geological sites	Number of sites of geological significance	P
Soil condition	Amount of track and site erosion	S, P
	% of bare soil	S, P
Condition of tracks and trails	Track width	P
	Depth of mud	P
	Number, direction and wear of tracks from campsites	S
Trampling	% or size area trampled	P
	Trampling associated with provision of safety canisters (rock fishing)	S
Campsites	Increase/decrease in camp size	S
	Number of campfire scars	S
Vegetation near campsites	Number of trees	S
	Canopy cover	S
	Tree damage	S
	Vegetation disturbance	S
	Leaf litter	S
	Live ground cover	S
	Exposed tree roots	S
Structure and condition of water bodies	Amount of soil loss through bank erosion	S
	Water turbidity	S
	Number of water quality studies undertaken	P
State of marine areas	Coral cover, density and disease	S, P
	Fish populations and health	S, P
	Dwarf minke whale behaviour	S, P
	Key performance indicators on state of the reef	C
Legislative requirements	List of relevant national and international treaties and obligations that are applicable on park	P
Land Tenure	% of world heritage area under protected land tenure	C
	Areas within park declared as wilderness, natural landscapes and modified natural landscapes	P
Endangered species	Number of taxa listed as threatened or endangered	C
Alien species	Number of weeds and feral species	S, P, C
Animal interactions	Native animal interactions	P

⁺ Terms used for indicators and measures are as given in the survey responses

*Mgmt lvl = Management level, S = site, P = park, C = corporate

Table 13. Social indicators from web-based agency documents⁺

Indicator	Associated measures	Mgt lvl*	Source
Visitor numbers	Number of visitors to a site(s)	S, P, C	b, c, h, j
	Number of visit days	P, C	d, k
	Number of visits	P	f
Visitor satisfaction	Number or % of visitors satisfied with overall visit	P, C	a, b, c, d, h, j
	Number or % of visitors satisfied with recreational opportunities	P, C	d, i, j
	Number or % of visitors satisfied with management of protected area(s)	P, C	d, e
Visitor experience	Recreational character of protected area is one of quietness and relaxation in attractive natural setting	P	e
	Opportunity to camp out of sight and sound of others	P	j
	Number of encounters with others	P	f, j
	Incompatible activities	P	f
Facilitated programs	Number of visitors served by facilitated programs	C	g
Public support	Extent to which public has shown support or interest	C	b, c, d
Universally accessible	Number of universally accessible facilities in relation to the total number of recreation areas	C	g
Visitor understanding	Visitors to protected area understand and appreciate significance of the area	P	j

⁺ Terms used for indicators and measures are as given in the literature

***Mgmt lvl** = Management level, S = site, P = park, C = corporate

Sources:

a = Department of Infrastructure Planning and Environment (2003) g = Department of the Interior (2003)

b = Great Barrier Reef Marine Park Authority (2003)

h = Parks Canada (2000)

c = CALM (2003b)

i = Department of Conservation (2002)

d = Parks Victoria (2003)

j = National Park Service (1995)

e = Parks and Wildlife Service Tasmania (2000)

k = Dartmoor National Park Authority (2001)

f = Parks Victoria (1992)

Table 14. Social indicators from research literature⁺

Indicator	Associated measures	Mgmt level*	Source
Visitor numbers	Number of groups encountered	P, S	a, d, e, g, h
	Number of people per group	P, S	a, d, e, h
Visitor satisfaction	Extent to which visitors are satisfied with visit	P, S	a, h
	Satisfaction of visitors leaving protected area	P, S	c
	Time spent waiting	P, S	h
	Number of complaints from visitors	P, S	a, h
	Degree to which expectations are met	P, S	b
Visitor experience	In sight or sound of others	P, S	c, d, e, g, h, i
	Opportunity for solitude	P, S	i
	Offensive odours	P, S	h
	Amount of noise	P, S	e, h
	Presence of vandalism	P, S	h
Campsite use	Intensity of campsite use	P, S	h
	Occupancy rates of campsites	P, S	h
	Number of campsites	P, S	g, h
Campsite development by visitors	Past modification of campsites by visitors	P, S	h
	Presence of visitor-induced change at campsites	P, S	h
	Number of new visitor-created sites	P, S	h
Campsite development by agency	Level of campsite development	P, S	f, h
	Campsite area	P, S	g, h
	Number of new agency-created campsites	P, S	k
Condition of campsite	Condition of campsite	P, S	g, h
	Campsite cleanliness	P, S	g, h
Litter and waste	Amount of litter	P, S	c, d, e, f, h
	Change in the amount of litter	P, S	b
	Adequate disposal of human waste	P, S	d, h

⁺ Terms used for indicators and measures are as given in the literature

***Mgmt lvl** = Management level, S = site, P = park, C = corporate

Sources:

a = Graefe et al. (1990)

b = Mandis Roberts Consultants (1997)

c = Merigliano (1990)

d = Morin et al. (1997)

e = Roggenbuck et al. (1993)

f = Smith & Newsome (2002)

g = Stankey et al. (1985)

h = Watson & Cole (1992)

i = Watson & Roggenbuck (1996)

Table 15. Social indicators from email survey⁺

Indicator	Associated measures	Mgmt lvl*
Visitor numbers	Visitor numbers, total and by park location	P, C
	Visitor numbers by: - recreation type - person visit - visitor days	P
	Trends in the number of visitors	S, P, C
	Number of visits to parks	C
Visitor satisfaction	Visitor satisfaction index	C
	Visitor satisfaction of actual visitors within park system	C
	Trend in satisfaction with experience	C
	Number of complaints received	S
Visitor experience	User displacement due to recreational succession	P
	Interactions with others	P
Visitor centres	Number of staff and visitors to visitor centres	C
Visitor facilities	Facilities and signage	P
	Number of facilities designed to accommodate elderly, less mobile and disabled visitors	P
Visitor safety	Number of activities undertaken to reduce risk to users	P
Visitor impacts at visitor nodes	Number of nodes that require remedial work at higher than predicted rates due to visitor impacts	P
Community and public support	% community awareness and support for management agency	C
	Number of volunteers or volunteer days	P, C
	Number of Wildcare groups registered	C
	Visitor and wider community perception of park management	C
	Number and range of agreements between community and agency to allow use for cultural purposes	P
Tourism operators	Trends in number of tourism operators	S, P
Activities and programs	Number and range of recreational activities undertaken	P
	Number and range of educational and other visitor programs	P
	Number of education program participants	P
Recreational vessels	Trends in number of recreational vessel registrations	S, P
Cleanliness	Amount of litter and human waste	S

⁺ Terms used for indicators and measures are as given in the survey responses

*Mgmt lvl = Management level, S = site, P = park, C = corporate

Table 16. Economic indicators from web-based agency documents⁺

Indicator	Associated measures	Mgmt lvl*	Source
Costs of management	Cost per visitor	C	d
	Cost per visit	C	b
	Cost per hectare of land managed	C	a
Condition of assets	Condition of contemporary assets	C	c, e
Revenue	Revenue collected from concession activities	C	d
	Total gross domestic product (GDP) for region	P	g
	Total cash contributions (donations, grants, etc)	P	f

⁺ Terms used for indicators and measures are as given in the literature

*Mgmt lvl = Management level, S = site, P = park, C = corporate

Sources:

- a = Department of Infrastructure Planning and Environment (2003) e = Parks Canada (2000)
 b = CALM (2003b) f = National Park Service (1995)
 c = Parks Victoria (2003) g = Dartmoor National Park Authority (2001)
 d = Department of the Interior (2003)

Table 17. Economic indicators from research literature⁺

Indicator	Associated measures	Mgmt lvl*	Source
Tourism operator profit	Annual total profit of tourism operators in protected area	P	c
	Change in rate of revenue of tourism operators	P	c
Level of investment	Level of investment in visitor infrastructure and services	C, P	c
Revenue	Ratio of total cost of services to operating revenues	C, P	k

⁺ Terms used for indicators and measures are as given in the literature

***Mgmt lvl** = Management level, S = site, P = park, C = corporate

Sources:

a = Mandis Roberts Consultants (1997)

b = Watson & Cole (1992)

Table 18. Economic indicators from email survey⁺

Indicator	Associated measures	Mgmt lvl*
Costs of management	Cost per visit	C
	Total cost of visitor services	C
	Total cost of environmental programs	C
	Cost per hectare of land managed	P, C
	Total salary of park staff	P
	Maintenance costs associated with infrastructure	S, P, C
	Replacement value of park infrastructure	C
Tourism industries	Direct/indirect benefits of tourism	C
	Value and input of industries	C
	Trends in number of tourism operators	C
Revenue	Seasonal park passes sold	P, C
	Number of bed/nights	P
	Amount of revenue generated from business activities	P

⁺ Terms used for indicators and measures are as given in the survey responses

***Mgmt lvl** = Management level, S = site, P = park, C = corporate

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AUTHORS

Joanna Tonge

Joanna Tonge coordinated this project, as a research officer in Environmental Science at Murdoch University. Her research expertise includes the sustainable visitor use of protected areas, both terrestrial and marine. Her research has focused on the development of sustainability indicators and using importance-satisfaction analyses to guide visitor management. She completed her honours (first class) in Environmental Science in 2003. Joanna's thesis examined cost-effective ways of monitoring visitor use of the small, urban Swan Estuary Marine Park, in Perth, Western Australia. Email: jtonge@essun1.murdoch.edu.au

Dr Susan A. Moore

Susan Moore is a senior lecturer in Environmental Science at Murdoch University. Her extensive research experience includes protected area planning and management, nature-based tourism and natural resource management policy and practice. She has over 100 publications on environmental policy, natural resource management and natural area tourism in journals, books and reports including the journals of *Environmental Management*, *Environmental Impact Assessment Review*, the *Journal of Sustainable Tourism* and the *Australian Journal of Environmental Management*. Her most recent book *Natural Area Tourism: Ecology, Impacts and Management* is used worldwide as a teaching and research text. Email: s.moore@murdoch.edu.au

Dr Marc Hockings

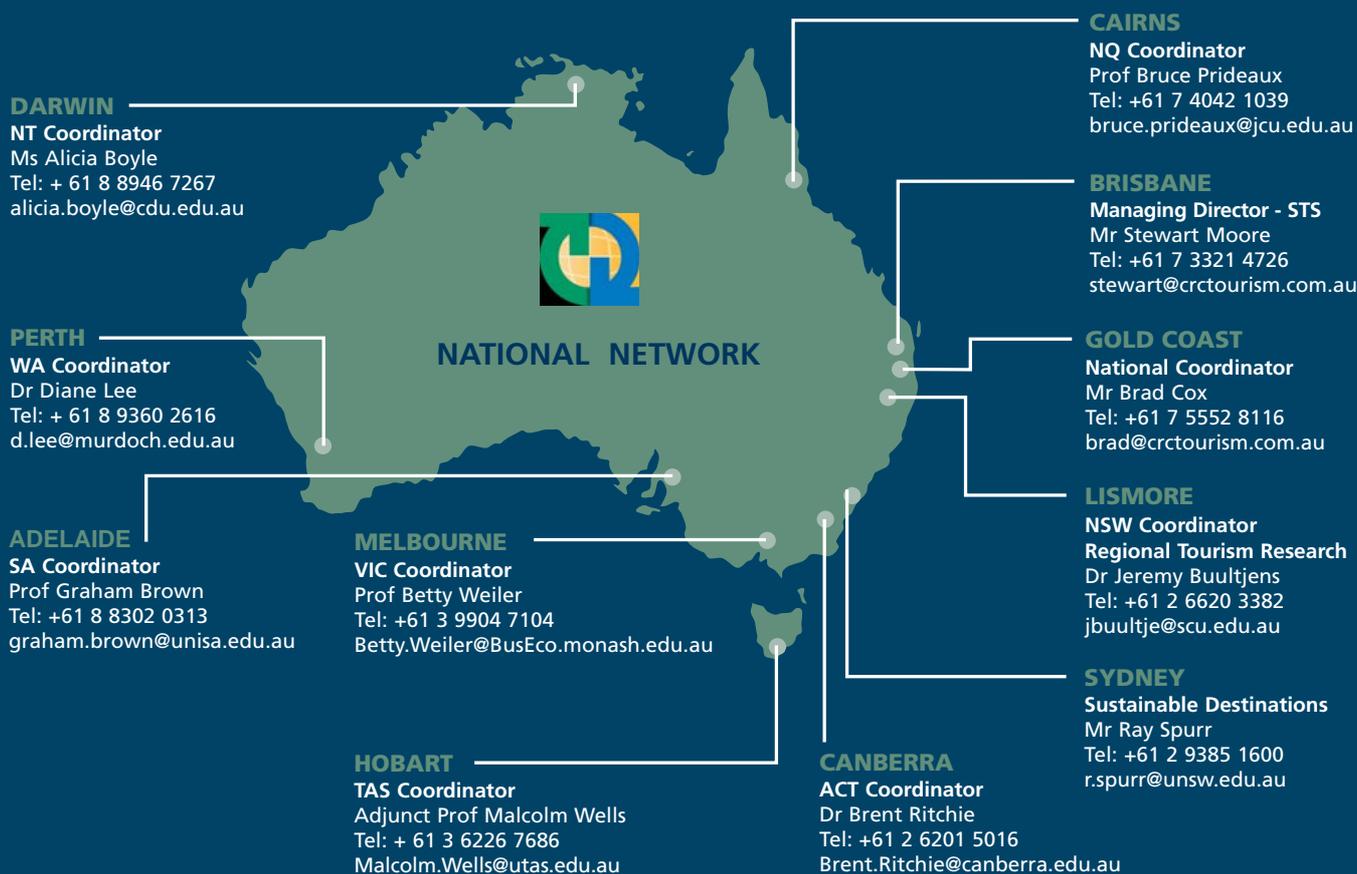
Dr Marc Hockings is a senior lecturer in the School of Natural and Rural Systems Management at the University of Queensland. Marc is a Vice-Chair of the IUCN World Commission on Protected Areas, a World Heritage advisor to the IUCN and a member of the Commission's Global and Australian Steering Committees. He is a member of the Fraser Island World Heritage Area Scientific Advisory Committee. Marc was the principal author of the IUCN's best practice guidelines on evaluation of management effectiveness in protected areas. He is currently managing a joint United Nations Educational, Scientific and Cultural Organization (UNESCO)/IUCN project that is applying these guidelines in ten World Heritage sites in Africa, South Asia and Latin America. Email: m.hockings@uq.edu.au

Graeme Worboys

Graeme has worked in environmental management for 32 years and in particular as a Ranger, Park Superintendent, Regional Manager and Executive Director with the New South Wales National Parks and Wildlife Service. He has worked as an environmental consultant in many countries, and in 2004, on behalf of the IUCN he completed a World Heritage evaluation mission to South Africa. Graeme is Vice-Chair (Mountains) for the IUCN World Commission on Protected Areas. He is currently completing his Doctorate studies at Griffith University on the subject of protected area management effectiveness evaluation. Email: g.worboys@bigpond.com

Dr Kerry Bridle

Kerry Bridle is a research fellow in the School of Geography and Environmental Studies, University of Tasmania. She is a plant ecologist, specialising in applied community ecology. Kerry's research focuses on monitoring change in natural environments, particularly in alpine and peatland ecosystems. She has completed two STCRC projects looking at visitor impacts (human waste disposal) along walking tracks in Tasmania. Kerry liaises with regional staff in Tasmanian National Parks to develop park/site based research projects addressing particular management issues. Email: kerry.bridle@utas.edu.au



CRC for Sustainable Tourism Pty Ltd
 [ABN 53 077 407 286]

PMB 50
 GOLD COAST MC QLD 9726
 AUSTRALIA

Telephone: +61 7 5552 8172
 Facsimile: +61 7 5552 8171

Email: info@crctourism.com.au
<http://www.crctourism.com.au>