



Research, part of a Special Feature on [Applying Landscape Science to Natural Resource Management](#)

## Collaborative Measurement of Performance of Jointly Managed Protected Areas in Northern Australia

*Natasha Stacey*<sup>1</sup>, *Arturo Izurieta*<sup>2</sup> and *Stephen T. Garnett*<sup>2</sup>

**ABSTRACT.** Responsibility for the management of many protected areas in the Northern Territory, Australia, is shared between the management agency and the aboriginal owners of that land. We describe (1) the creation and types of indicators developed by partners in a participatory process to measure management effectiveness, (2) the assessment method used to monitor progress, and (3) the results of the first cycle of evaluations in four jointly managed parks. Although each pilot park area has distinctive features, we were able to identify a set of twelve common indicators that were applied across the four park areas. The agreed indicators, which were scored using a color scale to indicate level of achievement, were primarily concerned with process rather than outcome, with particular emphasis on the strength of social relationships. Thus, there were indicators that assessed performance in governance and decision making, application and interpretation of cultural heritage and traditional ecological knowledge, expansion of social capital, human and financial resources, and visitors, with little emphasis on the biophysical outcomes of the management. The emphasis on the quality of the process of joint management was thought to indicate that the relationship between the joint management partners was relatively new, with trust only starting to develop. We discuss opportunities and difficulties for replication and adaptation of indicators to all jointly managed parks in the Northern Territory.

**Key Words:** *effectiveness; indicators; indigenous; joint management; national parks; participatory monitoring and evaluation; traditional owners*

### INTRODUCTION

For most of their history, national parks have been managed by government with little involvement from people who owned or occupied the land before it was protected (Wells and McShane 2004, West et al. 2006, Adams and Hutton 2007). However, in the last part of the 20th century there was a realization that those displaced by park decree not only had a moral right to an ongoing engagement or connection with their traditional lands, but also had traditional ecological knowledge that was relevant to effective management (Berkes et al. 2000, Bauman and Smyth 2007). We use the term traditional ecological knowledge to encompass a suite of similar terms.

Since Kakadu National Park was declared as the first jointly managed park in Australia in 1978, the number of parks that are jointly managed has been increasing steadily, along with the declaration of protected areas by indigenous people themselves, i.e., Indigenous Protected Areas, that they have then managed (Bauman and Smyth 2007). There are differing arrangements across the commonwealth, states, and territories for joint management including the hand back model of aboriginal freehold land and lease; state lease back; and state hand back/aboriginal freehold land.

In 2005, the Northern Territory (NT) Government passed legislation, Parks and Reserves (Framework for the Future) Act, to clarify the tenure of 27 national parks and reserves that had previously been declared without recognizing the rights of traditional indigenous owners (Dillon and Westbury 2007). Amendments to this Act also provided the partners, i.e., the Territory government, the Parks and Wildlife Service, and the

traditional aboriginal owners, with authority to be responsible for the management of the park or reserve. This process was achieved by assigning the parks to one of three schedules depending on the status of their land and/or native claim, and park titles were either transferred to the traditional owners or leased back with payment.

The objectives and principles for joint management include the requirement “to jointly establish an equitable partnership to manage and maintain the park or reserve” (Moyses and Panton 2008:12) to benefit both the traditional aboriginal owners of the park or reserve and the wider community, protect biological diversity, and serve visitor and community needs. The principles underlying joint management also include recognizing, valuing, and incorporating aboriginal culture, knowledge, and decision making processes, utilizing the combined land management skills and expertise of both joint management partners, and recognizing and addressing the need for institutional support and capacity building of the joint management partners (Moyses and Panton 2008, NTG 2007). Ideally, the jointly managed parks are expected to deliver equitable governance arrangements that result in genuine indigenous influence on decision making in the parks and reserves, improved training, and employment opportunities (Fraser et al. 2008).

Monitoring the effectiveness of protected area management is increasingly recognized as an essential element for achieving management goals (Hockings et al. 2006, Lockwood et al. 2006, Leverington et al. 2010). Although there has been increasing investment in the assessment of management

<sup>1</sup>CDU, <sup>2</sup>Research Institute for the Environment and Livelihoods, Charles Darwin University

effectiveness for protected areas (Leverington et al. 2008, Dudley and Stolton 2009), the emphasis has generally been on assessing biophysical performance rather than on social and cultural outcomes and processes. Also the international community is increasingly looking to assess how social and cultural values are being sustained by biodiversity conservation (IUCN-TILCEPA 2010, UNEP 2013).

Participation of local stakeholders in assessments has increasingly been applied not only in protected area management, but also in natural resource management in general (Evans and Guariguata 2008) to provide better opportunities for local people to contribute meaningfully to the management of resources on which they rely for survival (von Korff et al. 2010).

However, the literature on indicators to measure sustainability of natural resources largely describes the assessment of predetermined indicators without considering their local applicability (Garcia and Lescuyer 2008, Mahanty et al. 2007). The discussions also tend to overlook the challenges in creating equitable management partnerships between an often-powerful government agency on the one hand, and indigenous peoples, on the other (Brosius 2004, Brockington and Igoe 2006, Borrini-Feyerabend et al. 2007). The roles partners play in the process of assessing management effectiveness are rarely equal, and indicators are unlikely to have the same meaning for both parties. Further, the history of interaction and institutions varies widely so that, although the qualities of good indicators are defined (e.g., Manning 2007), these always have to be contextualized locally. This is particularly true for indicators that work for indigenous communities, each of which have a unique history and particular issues, such as language barriers (Mahanty et al. 2007). In joint management, the cultural and social outcomes and processes are as important as the biophysical outcomes (Olsson et al. 2004, Ross et al. 2005, Izurieta et al. 2011). Joint management arrangement is a continuous, long-term social process of adaptive comanagement (Robinson et al. 2006, Plummer and Armitage 2007, Berkes 2009).

We described a joint management monitoring and evaluation program developed with the Northern Territory Parks and Wildlife Service and aboriginal traditional owners in four jointly managed parks in the Northern Territory, Australia, in collaboration with the Northern and Central Land Councils as statutory agencies that assist indigenous people in Australia. We considered (1) the development/identification of indicators and the types selected by partners in a participatory monitoring and evaluation process to measure joint management effectiveness, (2) an assessment method in which the parties to the joint management agreement used these indicators to monitor progress, and (3) the results of the first cycle of evaluations.

## METHODS

### Study sites

The study was conducted in four jointly managed protected areas of the Northern Territory. Of these, Flora River Nature Park and Dammin National Park (collection of five sites) are in the northern part of the Northern Territory, while Watarrka National Park and the East MacDonnell Parks (three sites) are located in central Australia. These parks account for 10 of the 27 protected areas that entered into joint management agreements in 2005 (Dillon and Westbury 2007).

Aboriginal connections with the land and environmental features in these park areas are ancient (Roberts et al. 1994). People have responsibility under customary laws and traditions to care for their country or traditional estates. The park areas contain sites of cultural significance to aboriginal people. Many of these sites, registered under the Northern Territory Aboriginal Sacred Sites Act 1989, are significant components of the parks' cultural values. Characteristics of each of the protected areas and associated traditional aboriginal owners are summarized in Table 1.

### Indicator development, monitoring, and evaluation

The Northern Territory Parks and Wildlife Service and the Northern and Central Land Councils, as statutory representatives of the traditional owners, agreed that a participatory approach to monitoring and evaluation could provide opportunities to improve joint management. Partners collaboratively defined a framework to monitor and evaluate joint management of four parks. The work was undertaken using a participatory action research approach (Greenwood et al. 1993, Kemmis and McTaggart 2005) to ensure equity and collaboration in the development of the joint management monitoring and evaluation framework, and to generate positive change as a result of the research (Coghlan and Brannick 2005). Participatory monitoring and evaluation combined with adaptive management were used to strengthen the partnership (Sayer et al. 2007, Fernandez-Gimenez et al. 2008).

Participatory monitoring and evaluation activities at each of the four parks were undertaken over three years, from 2008 to 2010. The activities involved four phases:

Phase 1. Identifying representatives, meetings and workshops with partners to develop the participatory approach, identification of the management outcomes and indicators to be monitored, sources and methods of information collection, training of partners, and development of a scoring system;

Phase 2. Data collection through semistructured key informant interviews, stakeholder group interviews, and review of documents;

Phase 3. Analysis of data, scoring of indicators, and interpretation of results and recommendations;

**Table 1.** Social and physical characteristics of four jointly managed national parks for which joint management performance indicators were collaboratively developed and evaluated in the Northern Territory, Australia, and the number of interviewees for each park evaluated for performance.

Characteristic	Flora River Nature Park	Daminmin National Park (Adelaide River Parks)	Watarrka National Park	East MacDonnell Ranges Parks
Location	120 km southwest Katherine (Northern)	80 km southeast of Darwin (Northern)	450 km southwest of Alice Springs (Southern)	85 km east of Alice Springs (Southern)
Area (km <sup>2</sup> )	77	109	1056	23
Physical characteristics	Mixture of tropical savanna and associated habitats. The main feature is the springs along the river	A cluster of five small reserves and conservation areas. Mostly tropical savanna and wetland	Mostly comprised of ancient sandstone formations in a dry desert environment	A cluster of three small protected areas characterized by red sandstone rock formations with ephemeral water holes
Traditional owners	Wardaman people	Wulna people	Anangu people	Arrernte people
Distribution of the traditional owners	Most live in indigenous communities near Katherine. Some live out on their country near Flora River Nature Park	Most live in Darwin. Some live in one indigenous community on their country near the parks	Most live in nearby communities outside the park. Some have relocated to Alice Springs	None of the Arrernte people live inside any of these protected areas. Most live in Alice Springs. Some live in a nearby indigenous community on country near the parks.
Indigenous Representative Organization	Northern Land Council (office in Darwin and Katherine)	Northern Land Council (Darwin)	Central Land Council (Alice Springs)	Central Land Council (Alice Springs)
Assessment Period	October 2007 to April 2009 (17 months)	January 2008 to October 2009 (22 months)	January 2008 to July 2009 (18 months)	January 2008 to October 2009 (22 months)
Aboriginal traditional owners	17	8	14	11
Parks staff	4	6	5	7

Phase 4. Feedback and validation of the assessment to the partners.

The project allowed for completion of one full evaluation of each park over a period of 17 to 22 months. The assessment period was lengthy because it was the first evaluation, and so not only did the indicators need to be tested, but evaluators needed to be trained, and sources of relevant data uncovered.

The participatory action research process involved participation facilitated by external researchers, and regular validation of all outputs and outcomes at all phases of the research. Participatory methods and tools were used to engage partners, such as mixed and separate stakeholder focus groups; oral, visual, and written tools; and, for some aboriginal participants, assistance with translation from English into local languages. Meetings were held in either formal office settings, such as a parks service office, in workshops, or, more informally, with partners out at parks or in indigenous communities. The selection of aboriginal representatives participating in various phases of the research were determined by the Land Councils, based on legal determination of traditional ownership, and in consultation with senior aboriginal landowners for each park. The Land Councils were also largely responsible for providing transport, meals, and daily fee payments to traditional owners to participate in the meetings and workshops. Parks participants included junior

and senior rangers responsible for the four parks and park planners, and included both indigenous (two men from Flora River and one from Daminmin Park were traditional owners employed by the park service as rangers) and nonindigenous staff, although these were in the majority (Table 1). Each phase involved a team comprising Parks Service staff, Land Council staff (nonindigenous), aboriginal traditional owners, and a facilitator, which was a role played by Charles Darwin University researchers. Team size varied between parks depending on the requirements for aboriginal representation and the involvement and availability of the aboriginal family group members, Parks Service staff, and Land Council staff.

#### Identification of indicators and scoring system

In Phase 1, which was broadly similar for all parks, a list of management outcomes and indicators, associated with each of the four management themes, i.e., governance, managing country, benefits to traditional owners, and managing visitors, was developed by researchers on the basis of previous discussions with and involvement of researchers in park planning meetings. All previous documents relating to monitoring and discussions regarding the statutory management plan were also reviewed. The outcomes and indicators were presented, discussed, negotiated, modified, and agreed to by the partners. Some changes to indicators were made subsequently, as part of the process of adaptive

management, where partners felt there was repetition, inappropriate wording, or a lack of clarity in meaning, but their essential character was agreed to in Phase 1. During the engagement/training workshops, discussions occurred on indicators to be used, the monitoring and evaluation team were trained in data collection, and semistructured questions were developed for individual and group interviews with government parks' staff and aboriginal traditional owners.

Also in Phase 1, the participants agreed that assessments of progress should be made against a colored assessment scale similar to that used elsewhere in northern Australia (Izurieta 2007). The performance of each indicator was assessed against a scale of 1 to 4 that was color coded, where 1 was bad (red), 2 was not so good (orange), 3 was good (yellow), and 4 was very good (green). In Watarrka National Park, the traditional owners chose to use blue instead of yellow for "good." We encouraged people to choose a four-level assessment scale because the even number discouraged assessors from choosing a medium assessment rating too frequently (Izurieta 2007).

#### **Data collection**

In Phase 2, the current performance in joint management for each of the parks was assessed through individual key informant and group interviews, as well as through a review of documents relating to each park and its management, including plans, minutes, operational plans, visitor surveys, and cultural heritage information. Participants decided who was to be interviewed from the partner organizations. Between 8 and 17 aboriginal traditional owners, and 4 and 7 parks' staff were interviewed by the monitoring and evaluation team for each park (Table 1). In most cases, Land Council staff and researchers interviewed the traditional owners, and the researchers interviewed parks' staff. Traditional owners participated primarily as interpreters because they felt more confident in this role rather than as interviewers, particularly given that this activity was new to them and people were generally more comfortable speaking in their aboriginal language.

#### **Interpretation and evaluation**

In Phase 3, the raw data for each of the performance indicators was analyzed, color ratings were assigned to indicators, and recommendations were identified. Partners sometimes applied different assessments for one indicator or different aspects of that indicator. An indicator with many green scores indicated that partners were happy with the results. Areas with red or orange indicated that some aspects needed attention. A red rating could also mean that a certain indicator or condition could no longer be improved despite management efforts, e. g., where control of an exotic pest was ineffective. In some cases, partners deemed it too early in the partnership to assess the status of an indicator because of lack of data. And finally, in Phase 4, the results of the assessment and the recommendations were presented to all partners and discussed jointly to form the final validated scoring for each park.

#### **Analysis**

The indicators were assessed against two performance frameworks. The Sustainable Livelihoods Framework assesses trends in five capital assets: natural capital, such as biodiversity and ecosystem services; human capital, such as health, education, and skills; social capital, such as institutional arrangements; physical capital, such as infrastructure and built assets; and financial capital, such as money and funds available (Sayer et al. 2007, Scoones 1998). The World Commission on Protected Areas management effectiveness framework (Hockings et al. 2006) classifies indicators according to six different elements of the protected area management cycle: context, planning, inputs, process, outputs, and outcomes. For each framework, the indicators were allocated to one of the categories. Because the number of indicators was uneven, percentages were calculated for each category to allow comparison.

An average for each park was derived by allocating a number to each color (red=1, orange=2, yellow/blue=3, green=4). Colors were then reallocated by rounding to the nearest integer. The indicators assessed were also classified against the livelihoods asset classes and the management effectiveness elements. Geometric means were calculated for all scores in each category.

### **RESULTS**

#### **Indicators**

Flora River had nearly twice as many indicators as the other sites because this was where the system was trialed (Izurieta et al. 2011). For subsequent parks, participants agreed to limit the number of indicators because the Flora River experience suggested too many indicators was confusing (Izurieta et al. 2011). Up to five outcomes were identified for each park, or set of parks, which fell into four broad themes relating to governance, managing country, that is, natural and cultural heritage, benefits to traditional owners, and visitor management. Within these, between 12 and 27 indicators were identified for each park (Flora River 27, Adelaide River 12, East MacDonnells 14, Watarrka 13) and were then grouped into 17 classes of indicators.(Appendix 1)

Eleven indicator classes were common to all four parks, an additional three were common to three parks, with the remainder being identified for just one or two parks (Table 2). When the indicators were classified into the five capitals used to classify community assets under the Sustainable Livelihoods Framework and Protected Area Management Cycle (Fig. 1), there was a strong bias toward particular assets and management cycle elements. In the former, most of the indicators could be classified as measuring changes in either social (41%) or human (33%) capital. In the latter, the majority concerned process (52%), although a substantial proportion aimed to measure outcomes (21%).

**Table 2.** Spread of indicators across outcome classes (the number of crosses indicates the number of indicators in that class).

Joint Management Theme and Indicator classes	Flora River	Adelaide River	Watarrka	East MacDonnells
<b>Theme 1: Governance</b>				
Relationships and communications among partners	2	1	1	1
Decision making and process satisfaction	4	1	1	1
Representation and participation satisfaction	4	1	1	1
External partnerships	1	0	0	1
Governance training	1	1	1	1
<b>Theme 2: Managing country (cultural and natural heritage)</b>				
Cultural site protection	1	1	1	1
Natural resource and biodiversity management	1	1	1	1
Traditional knowledge transfer	0	1	1	1
Combined use of traditional and western knowledge	3	0	1	1
Resource use and availability	0	1	3	3
Infrastructure availability	1	1		1
Park management training	1	1	1	1
<b>Theme 3: Benefits to traditional owners</b>				
Employment levels	2	1	1	1
Associated enterprises	3	1	1	1
Business training	1	1	1	1
<b>Theme 4: Managing visitors</b>				
Information availability	2	1	1	1
Visitor satisfaction	1	1	1	1

**Status of joint management**

Overall, performance was patchy with the overall status of joint management in the four parks at the time of the assessment being below average (Fig. 2; for clarity “good” is always shown in yellow). The lowest ratings overall were in the areas of employment, training in business, governance and park management, enterprise development, use of traditional knowledge in park management, and satisfaction with the cultural information provided to visitors. There were also low assessments in two parks in the area of communication, and one park scored very low for decision making processes. Areas in which partners considered the status to be “very good,” were for indicators in Flora River concerning communication between partners, decision making processes for joint management, cultural site protection, combined use of traditional and western knowledge, human resources, infrastructure, and employment levels. Adelaide River also achieved “very good” status in areas of infrastructure availability. In central Australia, only one park scored a “very good,” with regard to decision making process satisfaction during management planning activities. There were no

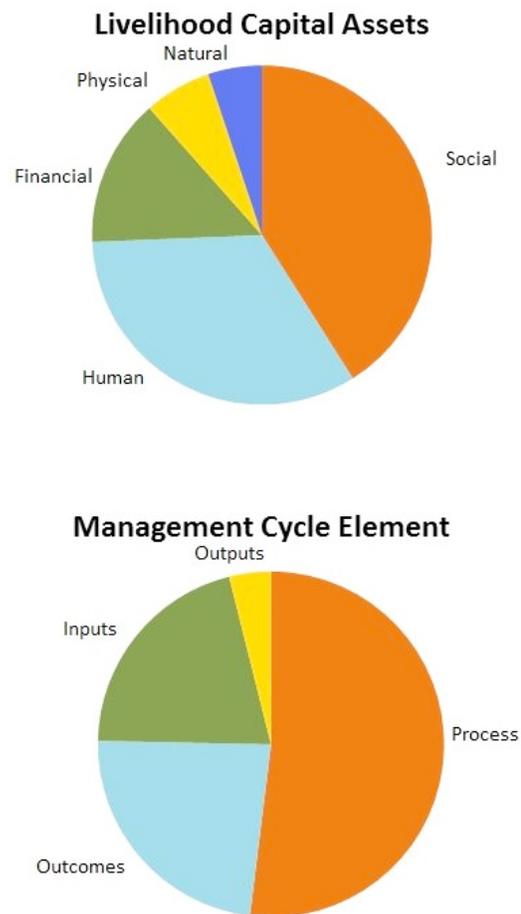
substantial differences, however, in overall scores for the different capitals or the management effectiveness elements (Table 3).

**DISCUSSION**

**Types of indicators**

The indicator sets common to all parks had three main themes: communication, trust, and benefits. However, there was a desire to measure outcomes for biodiversity and other natural values as well as the operations of each park, and this was to be expected given the statutory function of the Parks Service and the reason for which the parks were declared in the first place. The importance of protecting cultural sites was also well recognized in both legislation relating to protected areas in the Northern Territory and associated publicity. However, the

**Fig. 1.** Joint management indicators categorized by sustainable livelihood capital category and elements of the protected area management cycle.



**Table 3.** Average indicator scores across four parks in the Northern Territory, Australia, categorized by sustainable livelihood capital category and elements of the protected area management cycle.

Capital Asset	Mean score	No. Indicators assessed
Social	2.5	8
Physical	2.7	6
Human	2.1	5
Financial	2.3	3
Natural	2.5	1
<b>Management Cycle Element</b>		
Process	2.6	13
Inputs	2.2	5
Outputs	2.1	3
Outcomes	2.8	2
<b>Average</b>	<b>2.3</b>	<b>22</b>

concern of all groups that their culture was presented to visitors in a way that they found satisfactory was a novel assertion of control in park management that had previously been lacking. Control of the narrative about culture is a major part of maintaining a culture that is distinct and owned.

The ability to maintain the dialogue between traditional owners and the government park service also suggested that this may have been a facet of joint management that had previously been lacking and needed to be monitored if it was to be maintained. That the quality of communication was seen as something that needed to be monitored suggested some lack of trust, which was not surprising given the often contested history of interaction between government and traditional owners. The other reason for mistrust may have been that, although there was great stability among the traditional owners for each of the parks, both as individuals and in their relationship to the country, the same could not be said for government parks' and Land Council staff. This flux was characteristic of the Northern Territory and was typical of a resource-based economy (Carson 2011).

There was also much emphasis given to the benefits that might have arisen for the traditional owners. Although traditional owners from some parks received royalties as part of the lease back agreement, there was a desire for a more active involvement in park management with proper remuneration for work undertaken. This may also have reflected a concentration of the aspirations for many of the traditional owner groups into the area that was to be jointly managed. All groups involved in the project had traditional lands extending beyond the boundaries of the parks. For the most part, they had been dispossessed of these lands since the arrival of Europeans and had not been able to use them to generate an economic return, either because the land was under a tenure that did not permit indigenous traditional owner activity, or

**Fig. 2.** Indicator scores for four jointly managed parks in the Northern Territory, Australia, assessed January 2008 to October 2009 (green = very good; yellow = good; orange = not so good; red = bad; white = no data).

Indicators	Flora River	Adelaide River	Watarrka	East MacDonnells	
				Traditional Owners	Parks staff
Communication	between partners (formal meetings)	orange	yellow	yellow	yellow
	between partners (between meetings)	white	orange	orange	orange
	amongst partners	yellow	orange	yellow	white
Decision making process	with other stakeholders	orange	white	white	orange
	management planning	yellow	red	green	yellow
satisfaction	joint management	green	red	yellow	white
Satisfaction with representation and participation in meetings		orange	yellow	white	white
Training in governance	orange	yellow	orange	red	orange
Cultural site protection	green	orange	yellow	white	white
Natural resource and biodiversity management	yellow	orange	orange	white	white
Traditional knowledge transfer	white	white	white	white	white
Combined use of Traditional and western knowledge	green	orange	orange	orange	orange
Resource use and availability	financial	yellow	white	yellow	white
	human	green	orange	white	orange
Infrastructure availability	infrastructure	green	green	yellow	orange
	equipment	white	green	white	yellow
Training in park management	white	orange	orange	red	orange
Employment levels	green	orange	orange	orange	orange
Associated enterprises	red	orange	orange	red	red
Training in business		red	orange	orange	white
	cultural	yellow	white	orange	orange
Visitor information	natural, safety	yellow	white	white	yellow
	hunters	white	red	white	white
<b>Average</b>	yellow	orange	orange	orange	orange

because the lands that were under their control lacked productive capacity. A level of control in park management, therefore, represented a major opportunity to generate an income from land that they had always believed was theirs anyway.

Overall, the indicators placed greatest emphasis on the development of social and human capital, suggesting that it was only when these aspects were considered adequate that more detailed indicators for some of the more conventional measures of protected area performance (Hockings et al. 2006) would be appropriate. Similarly, there was a great emphasis on process, on doing things in the right way. Nevertheless, the traditional owners did want to see biophysical outcomes, which are features too rarely measured when seeking to assess performance of conservation investments (Lindenmayer et al. 2012).

It should also be recognized that these indicators were developed jointly, not by the traditional owners alone. Thus some results appear to reflect the views of parks' staff as much as, if not more than those of the traditional owners. For instance, one wonders whether the traditional owners of each of the central Australian parks were really deeply concerned with a need for "Accessing other financial resources to complement NRETAS [parks service] existing resources," one of the indicators included, with similar wording, for both Watarrka and the East MacDonnells. One might also wonder how the source of other funds could be seen as a successful aspect of joint management performance.

### **Correspondence between indicators and joint management principles**

Under the Territory Parks and Wildlife Conservation Amendment (Joint Management Park) Act 2007, the objective of a jointly managed park is to cooperatively establish an equitable partnership to manage and maintain the parks/reserves for three main purposes: to benefit both the traditional aboriginal owners of the park or reserve and the wider community, to protect biological diversity, and to serve visitor and community needs for education and enjoyment. Measurement of partnership arrangements is represented across the four parks by indicators under the governance outcome, by measuring partner communication, representation and participation in meetings and other governance activities, the decision making body operations and its processes, and, in one of the parks, external relationships with other stakeholders. With the exception of one park, all parks identified the same number of indicators to measure elements of the joint management partnership. The objective "to provide benefit to aboriginal owners" was addressed by three indicators: to assess the level of employment opportunities, the uptake of those opportunities and the associated training, and increased business opportunities.

The objective to protect biological diversity of the area was well represented in all four parks by the status of management of biodiversity through effective fire, weed, feral animal, and native species management outcomes. This was also represented by a focus on how the objective should be achieved through traditional knowledge and culture transfer among aboriginal people, and using this knowledge along with western knowledge to manage the park's biodiversity. The objective "to provide benefits to the wider community" was only identified by one park, Flora River, with an indicator on "visitor satisfaction" under the set of indicators relating to "visitor management" in Phase 1. In the assessment phase, this indicator was not given a rating because of a lack of current data.

Of the seven principles underlying the objectives of joint management in the NT, we found that only three principles were represented in the suite of indicators identified and assessed by the partners: (1) recognizing, valuing, and

incorporating aboriginal culture, knowledge, and decision making processes; (2) utilizing the combined land management skills and expertise of both joint management partners; and (3) recognizing and addressing the need for institutional support and capacity building of the joint management partners. Two of the principles pertained to the issue of indigenous control of lands around the park: (4) recognizing that community living areas in, or in close proximity to parks and reserves are an integral part of the natural and cultural resource management of parks and reserves; and (5) managing parks and reserves may include cooperative management agreements for areas of land outside parks and reserves. This omission is commonly referred to as a 'whole of country management approach' in Australia. For the Parks Service, this omission probably occurred because staff see the traditional lands beyond park boundaries as outside their legislative responsibility, whereas traditional owners view the Parks Service as representing the whole of government, since legislation binds the government not just the Parks Service. The other two principles: (6) involving continuing statutory responsibilities and functions of the minister with respect to parks and reserves; and (7) establishing a process for the consideration of applications for mining and petroleum, also appeared not to have been seen by the partners as directly relevant to assessing management effectiveness.

### **Comparisons with international parks**

Systems for monitoring comanagement outcomes have also been developed for Canadian (Timko and Satterfield 2008) and South African (Cundill and Fabricius 2010) national parks. All three systems have indicators that assess changes in benefits for indigenous people through commercial opportunities and maintenance of culture, employment opportunities, capacity building and training, financial resources, participation and representation in governance, and communication among partners. However, there are differences in context among the three countries that affect the indicators chosen. Thus, in Canada, the system emphasizes rights of access and tenure, features that are no longer disputed in the Northern Territory where indigenous ownership of parks and subsequent lease back or joint management arrangements with government is now embedded in legislation. The Canadian system also has far greater emphasis on governance and details of the types of economic benefit, but has few indicators of the effectiveness of natural or cultural management. In South Africa, as in Canada, tenure security is monitored. The South African system also has many measures of willingness to change that are absent from the system developed in the Northern Territory. Neither the Canadian nor the South African systems include equivalent measures for training, cultural site protection, infrastructure, or visitor management (see Appendices 2 and 3 for detailed comparisons).

Overall, however, the indicators agreed upon for the Northern Territory are consistent with findings from other countries in which the indicators reflected a perception that more has to be done to improve the social and economic benefits for indigenous owners of the parks, and that there is a need for greater equity among indigenous people (Timko and Satterfield 2008). Results from elsewhere also suggested that improving biodiversity outcomes was highly dependent on good relationships, communication, and levels of decision making among the partners (Timko and Satterfield 2008). Thus, we believe an approach based on measuring all outcomes of joint management arrangements, that is, governance, biodiversity, benefits to indigenous people and park users, provides the potential to show linkages and dependencies across classes of indicators without bias toward one set of outcomes, and can contribute to national parks that are “ecologically effective and socio-culturally equitable” (Timko and Satterfield 2008:252).

#### **Assessment methods**

There are few examples demonstrating evaluations of the joint or comanaged natural resources being tested on the ground (Cundill and Fabricius 2010). The system we devised and tested provided a set of indicators with which partners could identify, as well as evaluate what they considered the important elements of joint management. Some researchers suggested that the number of indicators should be determined by the needs or interests of stakeholders (Evans and Guariguata 2008), whereas others recommended that partners identify four to six indicators that would encapsulate changes to all the social, cultural, financial, and economic benefits likely to be generated, as well as the biophysical and conservation management elements of parks (Sayer et al. 2007). The number of indicators chosen to assess joint management progress in the Northern Territory (12 to 27 across all 4 management outcomes) is broadly similar to the number chosen in Canada (Timko and Satterfield 2008) and South Africa (Cundill and Fabricius 2010) where up to 20 governance indicators are used and as many as 39 indicators of social equity. However, we did find that partners worked together more effectively if the number of indicators was kept to a lower number. After completion of the first cycle of monitoring at Flora River, the partners decided that 27 indicators were unmanageable for measuring on an annual or biannual basis given human capacity, time, and financial resources.

For each indicator, the four-point colored rating scale used in this research was associated with the simple statements “very good,” “good,” “not so good,” and “bad,” and this was a culturally acceptable method for scoring the optimal condition for each indicator evaluating joint management, and for communicating the results. Aboriginal traditional owners preferred visual methods that are appropriate to the cultural context, and help promote social learning (Petheram et al. 2011). Visual approaches are becoming common in

participatory natural resource management (Petheram et al. 2012). In our case, some traditional owners had little experience with written documents (Izurieta et al. 2011), and there was an expectation that a participatory action research approach would deliver a simple visual method that was appropriate to the aboriginal context. Again, there are similarities with Canada (four-point scale including color coding adapted from Arias and Valery 1999) and South Africa (five-point scale).

#### **CONCLUSION**

The joint management indicators identified and measured in the four trial parks should be seen as a statement of the current status of joint management as much as standard measurements of performance. They are a starting point and one can expect evolution of both indicators and the performance against them as time progresses. The emphasis on indicators of progress in social and human capital, and on process, is indicative of both the history of relations between parks and traditional owners and the novelty of the relationship now developing. However, there is a strong emphasis on performance with respect to economic opportunities for the traditional owners. The number of jobs provided for traditional owners, and the number of traditional-owner-controlled enterprises associated with the parks will provide concrete evidence of whether joint management is delivering the benefits for which people are hoping. This will not be an easy aspiration to meet. Experience at the far more richly endowed Commonwealth government parks of Kakadu and Uluru, also in the Northern Territory, suggests that economic returns to traditional owners, beyond royalty payments, develop slowly and fitfully.

Finally, one of the defining characteristics of participatory action research and participatory monitoring and evaluation is the recognition that the process of developing and measuring the indicators is as important as the final outcomes. It is in that process that trust is developed, and many of the opportunities and constraints of performance are discussed. The final scores/ colors are not just measured, they are negotiated. However, there are some major challenges in maintaining the relationships that were engendered through the research process. Nevertheless, we hope the benefits from assessment can be recognized and applied, with more participation from aboriginal people in participatory evaluations as participants and facilitators in protected areas, to realize greater equity in comanagement situations across the region.

*Responses to this article can be read online at:*

<http://www.ecologyandsociety.org/issues/responses.php/5273>

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### Acknowledgments:

This research was conducted with financial support from the Australian Research Council (ARC), the Northern and Central Land Councils, the Northern Territory (NT) Department of Natural Resources, Environment, The Arts and Sport, and Charles Darwin University (CDU) as part of an ARC Linkage project "Does monitoring and evaluation improve joint management? The case of national parks in the Northern Territory." The research was conducted with approval from the CDU Human Research Ethics Committee (Number H08034). This research would have not been possible without the support from the aboriginal traditional owners of the four parks and reserves especially: Wardaman traditional owners of Flora River Park; Arrernte traditional owners involved in joint management of East MacDonnell Parks; and Wulna traditional owners engaged in joint management in Adelaide River region. Thank you also to all Anangu traditional owners of Watarrka for their participation. We thank the joint management staff from the Darwin, Katherine, and Alice Springs offices of NT Parks, NRETAS; The Northern Land Council, Central Land Council, and project Steering Committee members.

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### LITERATURE CITED

- Adams, W. M., and J. Hutton. 2007. People, parks and poverty: political ecology and biodiversity conservation. *Conservation and Society* 5(2):147-183.
- Arias, M. C., and A. I. Valery. 1999. *Evaluation of protected areas management effectiveness: analysis of procedures and outline for a manual*. WWF Centromerica, Turrialba, Costa Rica.
- Bauman, T., and D. M. Smyth. 2007. *Indigenous partnerships in protected area management in Australia: three case studies*. Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra, Australia.
- Berkes, F. 2009. Evolution of co-management: role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management* 90:1692-1702. <http://dx.doi.org/10.1016/j.jenvman.2008.12.001>
- Berkes, F., J. Colding, and C. Folke. 2000. Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications* 10:1251-1262. [http://dx.doi.org/10.1890/1051-0761\(2000\)010\[1251:ROTEKA\]2.0.CO;2](http://dx.doi.org/10.1890/1051-0761(2000)010[1251:ROTEKA]2.0.CO;2)
- Borrini-Feyerabend, G., M. Pimbert, M. Taghi Farvar, A. Kothari, and Y. Renard. 2007. *Sharing power: a global guide to collaborative management of natural resources*. Earthscan, London, UK.
- Brockington, D., and J. Igoe. 2006. Eviction for conservation: a global overview. *Conservation and Society* 4(3):424-470.
- Brosius, J. P. 2004. Indigenous peoples and protected areas at the World Parks Congress. *Conservation Biology* 18 (3):609-612. <http://dx.doi.org/10.1111/j.1523-1739.2004.01834.x>
- Carson, D. 2011. Political economy, demography and development in Australia's Northern Territory. *Canadian Geographer/Le Géographe canadien* 55:226-242. <http://dx.doi.org/10.1111/j.1541-0064.2010.00321.x>
- Coghlan, D., and T. Brannick. 2005. *Doing action research in your own organization*. Second edition. Sage, New Delhi, India.
- Cundill, G., and C. Fabricius. 2010. Monitoring the governance dimension of natural resource co-management. *Ecology and Society* 15(1): 15. [online] URL: <http://www.ecologyandsociety.org/vol15/iss1/art15/>
- Dillon, M. C., and N. D. Westbury. 2007. *Beyond humbug: transforming government engagement with indigenous Australia*. Seaview, West Lakes, South Australia, Australia.
- Dudley, N., and S. Stolton. 2009. *The protected areas benefits assessment tool: a methodology*. WWF, Gland, Switzerland.
- Evans, K., and M. R. Guariguata. 2008. *Participatory monitoring in tropical forest management: a review of tools, concepts and lessons learned*. Center for International Forestry Research (CIFOR), Bogor, Indonesia.
- Fernandez-Gimenez, M. E., H. L. Ballard, and V. E. Sturtevant. 2008. Adaptive management and social learning in collaborative and community-based monitoring: a study of five community-based forestry organizations in the western USA. *Ecology and Society* 13(2): 4. [online] URL: <http://www.ecologyandsociety.org/vol13/iss2/art4/>
- Fraser, F., P. Donohoe, and P. Donohoe. 2008. Realising opportunities and recognising constraints: jointly managed parks in the Northern Territory. Pages 19-30 in D. Smyth and G. K. Ward, editors. *Protecting country: indigenous governance and management of protected areas*. Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra, Australia.
- Garcia, C., and G. Lescuyer. 2008. Monitoring, indicators and community based forest management in the tropics: pretexts or red herrings? *Biodiversity and Conservation* 17:1303-1317.
- Greenwood, D. J., W. F. Whyte, and I. Harkavy. 1993. Participatory action research as a process and as a goal. *Human Relations* 46(2):175-192. <http://dx.doi.org/10.1177/0018726-79304600203>
- Hockings, M., S. Stolton, F. Leverington, N. Dudley, and J. Courrau. 2006. *Evaluating effectiveness: a framework for assessing management effectiveness of protected areas*. Second edition. International Union for Conservation of

Nature - World Commission on Protected Areas, Gland, Switzerland. <http://dx.doi.org/10.2305/IUCN.CH.2006.PAG.14.en>

International Union for Conservation of Nature-Theme on Indigenous Peoples, Local Communities, Equity and Protected Areas (IUCN-TILCEPA). 2010. *Joint PAEL-TILCEPA workshop on protected areas management: evaluation and social assessment of protected areas*. IUCN, Gland, Switzerland.

Izurietta, A. 2007. *Evaluation framework for collaborative management of protected areas: a cross-cultural case study in Queensland, Australia*. Dissertation. School of Natural and Rural Systems Management, University of Queensland, Brisbane, Australia.

Izurietta, A., B. Sithole, N. Stacey, H. Hunter-Xenie, B. Campbell, P. Donohoe, J. Brown, and L. Wilson. 2011. Developing indicators for monitoring and evaluating joint management effectiveness in protected areas in the Northern Territory, Australia. *Ecology and Society* 16(3): 9. <http://dx.doi.org/10.5751/ES-04274-160309>

Kemmis, S., and R. McTaggart. 2005. Participatory action research: communicative action and the public sphere. Pages 271-330 in N. Denzin and Y. Lincoln, editors. *Handbook of qualitative research*. Third edition. Sage, Thousand Oaks, California, USA.

Leverington, F., M. Hockings, H. Pavese, K. L. Costa, and J. Courrau. 2008. *Management effectiveness evaluation in protected areas - a global study. Supplementary report No.1: overview of approaches and methodologies*. The University of Queensland, Gatton, TNC, WWF, IUCN-WCPA, Australia.

Leverington, F., K. Lemos Costa, H. Pavese, A. Lisle, and M. Hockings. 2010. A global analysis of protected area management effectiveness. *Environmental Management*. 46:685-698 <http://dx.doi.org/10.1007/s00267-010-9564-5>

Lindenmayer, D. B., P. Gibbons, M. Bourke, M. Burgman, C. R. Dickman, S. Ferrier, J. Fitzsimons, D. Freudenberger, S. T. Garnett, C. Groves, R. J. Hobbs, R. T. Kingsford, C. Krebs, S. Legge, A. J. Lowe, R. McLean, J. Montambault, H. Possingham, J. Radford, D. Robinson, L. Smallbone, D. Thomas, T. Varcoe, M. Vardon, G. Wardle, J. Woinarski, and A. Zerger. 2012. Improving biodiversity monitoring in Australia. *Austral Ecology* 37(3):285-294. <http://dx.doi.org/10.1111/j.1442-9993.2011.02314.x>

Lockwood, M., G. Worboys, and A. Kothari. 2006. *Managing protected areas: a global guide*. Earthscan, London, UK.

Mahanty, S., N. Stacey, P. Holland, A. Wright, and S. Menzies. 2007. Learning to learn: designing monitoring plans in the Pacific Islands International Waters Project. *Ocean and*

*Coastal Management* 50(5-6):392-410. <http://dx.doi.org/10.1016/j.ocecoaman.2006.09.004>

Manning, R. 2007. *Parks and carrying capacity: commons without tragedy*. Island Press, Washington, D. C., USA.

Moyses, M., and B. Panton. 2008. Indigenous partnerships in Northern Territory protected areas: joint management of national parks and support for indigenous protected areas. Pages 9-18 in D. Smyth and G. K. Ward, editors. *Protecting country: indigenous governance and management of protected areas*. Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra, Australia.

Northern Territory Government (NTG). 2007. *Territory Parks and Wildlife Conservation Amendment (Joint Management Park) Act 2007:Section 25AB*. NTG, Darwin, Northern Territory, Australia.

Olsson, P., C. Folke, and F. Berkes. 2004. Adaptive comanagement for building resilience in social-ecological systems. *Environmental Management* 34(1):75-90. <http://dx.doi.org/10.1007/s00267-003-0101-7>

Petheram, L., C. High, B. M. Campbell, and N. Stacey. 2011. Lenses for learning: visual techniques in natural resource management. *Journal of Environmental Management* 92:2734-2745. <http://dx.doi.org/10.1016/j.jenvman.2011.06.013>

Petheram, L., N. Stacey, B. M. Campbell, and C. High. 2012. Using visual products derived from community research to inform natural resource management policy. *Land Use Policy* 29:1-10. <http://dx.doi.org/10.1016/j.landusepol.2011.04.002>

Plummer, R., and D. Armitage. 2007. A resilience-based framework for evaluating adaptive co-management: linking ecology, economics and society in a complex world. *Ecological Economics* 61:62-74. <http://dx.doi.org/10.1016/j.ecolecon.2006.09.025>

Roberts, R. G., R. Jones, N. A. Spooner, M. J. Head, A. S. Murray, and M. A. Smith. 1994. The human colonisation of Australia: optical dates of 53,000 and 60,000 years bracket human arrival at Deaf Adder Gorge, Northern Territory. *Quaternary Science Reviews* 13(5-7):575-583. [http://dx.doi.org/10.1016/0277-3791\(94\)90080-9](http://dx.doi.org/10.1016/0277-3791(94)90080-9)

Robinson, C., H. Ross, and M. Hockings. 2006. *Development of co-management arrangements in the Great Barrier Reef: an adaptive management approach*. Technical report 55. CRC Reef Research Centre, Townsville, Australia.

Ross, H., C. Robinson, and M. Hockings. 2005. Evaluation of indigenous co-management of natural resources. Pages 51-58 in J. A. Bellany, editor. *Regional natural resource management planning: the challenges of evaluation as seen through different lenses*. CIRM Monograph Series. Department of Natural Resources and Mines, Indooroopilly, Queensland, Australia.

Sayer, J., B. Campbell, L. Petheram, M. Aldrich, M. R. Perez, D. Endamana, Z.-L. Nzooh Dongmo, L. Defo, S. Mariki, N. Doggart, and N. Burgess. 2007. Assessing environment and development outcomes in conservation landscapes. *Biodiversity and Conservation* 16(9):2677-2694. <http://dx.doi.org/10.1007/s10531-006-9079-9>

Scoones, I. 1998. *Sustainable rural livelihoods: a framework for analysis*. IDS Working Paper 72. Institute of Development Studies, Brighton, UK.

Timko, J. A., and T. Satterfield. 2008. Seeking social equity in national parks: experiments with evaluation in Canada and South Africa. *Conservation and Society* 6(3):238-254. <http://dx.doi.org/10.4103/0972-4923.49216>

United Nations Environment Programme (UNEP). 2013. *Convention on Biological Diversity Article 8(j) - Traditional Knowledge, Innovations and Practices: Programme of Work*. UNEP, Nairobi, Kenya.

von Korff, Y., P. d'Aquino, K. Daniell, and R. Bijlsma. 2010. Designing participation processes for water management and beyond. *Ecology and Society* 15(3): 1. [online] URL: <http://www.ecologyandsociety.org/vol15/iss3/art1/>

Wells, M. P., and T. O. McShane. 2004. Integrating protected area management with local needs and aspirations. *Ambio* 33 (8):513-519.

West, P., J. Igoe, and D. Brockington. 2006. Parks and peoples: the social impact of protected areas. *Annual Review of Anthropology* 35:251-277. <http://dx.doi.org/10.1146/annurev.anthro.35.081705.123308>

**Appendix 1. Complete list of indicators developed for participatory management and evaluation of four jointly managed parks in the Northern Territory, Australia.**

<b>Outcome and Indicator classes</b>	<b>Flora River</b>	<b>Adelaide River</b>	<b>Watarrka</b>	<b>East MacDonnells</b>
<b><i>Joint Management Theme 1: Governance</i></b>	<i>Strong community ownership of joint management; Good working relationship between Parks and the Wardaman</i>	<i>Wulna Traditional Owners and Parks working together, making decisions together</i>	<i>Anangu involvement and employment</i>	
Relationships and communications among partners	Wardaman satisfied that their concerns are addressed during planning processes; Good relations between Wardaman and parks officials	Effective communication between and amongst partners (traditional owners and Parks);	Effective communication between and amongst partners (Anangu and Parks).	Effective communication between partners (traditional owners and Parks) and among partners.
Decision-making and process satisfaction	Wardaman are satisfied with Joint Management relationship and processes; Clarity of roles and responsibilities among all stakeholders; Strong and effective joint management committee; Good facilitation in the meetings	Joint decisions (between Parks and Wulna people) are implemented out on country	Satisfaction with decision-making processes; Satisfaction with governance structure (Joint Management Committee)	Satisfaction with Decision making process and planning; Satisfaction with the 'Decision making body' (Board, Committee, Core Management Group, etc) structure (working with the right people)
Representation and participation satisfaction	Level of Indigenous involvement in the on-country meetings; Number of on-country meetings held each year; Satisfaction gained from attending on-country meetings; Good attendance and participation in meetings (at PWS Katherine office) by Wardaman	Wulna people and Parks are satisfied with their participation in the joint management meetings.	Satisfaction with governance structure (Joint Management Committee)	Satisfaction with Decision making process and planning; Satisfaction with the 'Decision making body' (Board, Committee, Core Management Group, etc) structure (working with the right people)

<b>Outcome and Indicator classes</b>	<b>Flora River</b>	<b>Adelaide River</b>	<b>Watarrka</b>	<b>East MacDonnells</b>
External partnerships	Good partnerships with other key stakeholders in the park (i.e. stakeholders other than Parks and Wardaman).			Effective communication and relationship with other stakeholders/agencies/departments/neighbours
Governance training	Good involvement in and understanding of planning procedures	Training and skill-building opportunities are on-going for Traditional Owners and Park staff in relation to joint management (decision making/governance)	Ongoing training and skill-building opportunities for Traditional Owners and Park staff in relation to Joint Management	On-going training and skill-building opportunities for Traditional Owners (men, women, particularly young ones) and Park staff in relation to joint management governance and partnership
<b><i>Joint management theme 2: Managing country (cultural and natural heritage)</i></b>	<i>Joint management keeps Wardaman culture strong; Good park management</i>	<i>Protect and respect country: its animals, its plants and Wulna culture; Increase the scientific and traditional knowledge of all Adelaide River Parks</i>	<i>Country being looked after properly</i>	<i>The country and sacred sites are looked after properly for current and future generations</i>
Cultural site protection	Satisfaction among traditional owners about adherence to conditions for access to cultural sites and their protection.	Wulna sites of cultural significance are being protected	Sites of cultural significance are being well protected	Sacred sites being well protected
Natural resource and biodiversity management	Good biodiversity outcomes from the operational plan on fire, weeds, and feral animals	Meeting the annual management objectives for fire, weeds, feral animals, native species	Effective management of fire, weeds, feral animals, native species	Effective management of fire, weeds, feral animals, native species

<b>Outcome and Indicator classes</b>	<b>Flora River</b>	<b>Adelaide River</b>	<b>Watarrka</b>	<b>East MacDonnells</b>
<b>Traditional knowledge transfer</b>		<b>Young Wulna are getting out on country (reserves and conservation area) and learning culture from Elders</b>	<b>Elders have opportunities to share cultural knowledge with young Anangu out on the Park (country)</b>	<b>Elders have opportunities to transfer traditional knowledge to young traditional owners out on country</b>
Combined use of Traditional and western knowledge	Good examples of two way learning in the way the park is managed; Positive attitudes towards western knowledge among the Wardaman; Parks staff demonstrate high level of cultural awareness		Increased evidence of Traditional Knowledge together with western knowledge applied to park management	Increased incorporation of Arrernte knowledge (together with scientific western knowledge) applied to Park management
Resource use and availability		Sufficient people (Parks, traditional owners, volunteers etc) to carry out the annual planned management activities.	Efficient use of financial; and human resources to carry out the planned management activities; Accessing other financial resources to complement NRETAS existing resources.	Efficient use of financial (money); and human resources (people) to carry out the planned management activities; Access to other financial/human resources to complement NRETAS existing resources.
Infrastructure availability	Infrastructure in the park and around the camps and other areas is well maintained.	Appropriate and sufficient infrastructure (offices, ranger stations, vehicles, radios, boats, toilets, etc) to support the joint management of the reserves and conservation areas.		Appropriate and sufficient infrastructure and equipment in Trepina and N'Dhala Nature Parks to support Joint Management.

<b>Outcome and Indicator classes</b>	<b>Flora River</b>	<b>Adelaide River</b>	<b>Watarrka</b>	<b>East MacDonnells</b>
Park management training	Wardaman are satisfied with the amount of knowledge they hold on key aspects of park management	Training and skill-building opportunities are on-going for Traditional Owners and Park staff in relation to park management	Ongoing training and skill-building opportunities for Traditional Owners and Park staff in relation to park management	On-going training and skill-building opportunities for Traditional Owners (men, women, particularly young ones) and Park staff in relation to park management
<b><i>Joint management theme 3. Benefits to traditional owners</i></b>	<b><i>Real benefits accrue to the Wardaman from joint management</i></b>	<b><i>Establishing Wulna community rangers looking after country</i></b>	<b><i>Anangu involvement and employment</i></b>	<b><i>Traditional Owners are actively involved through jobs, training and business opportunities.</i></b>
Employment levels	Level of employment of traditional owners in meaningful jobs in the park; Satisfaction among Wardaman about the employment benefits associated with joint management	Wulna people are involved in the management of the park every year as park rangers, community rangers, contractors and cultural advisors/mentors	Anangu involvement in the management of the Park (including women and young traditional owners) every year as park rangers, contractors and on their own (unpaid work)	Traditional owners level of involvement in the management of Trepina and N'Dhala Nature Parks (including women and young traditional owners) every year as park rangers (full time or part time), contractors, casual workers or on their own (unpaid work)
Business training	Good involvement in and understanding of 'money story' among the Wardaman	Training and skill-building opportunities are on-going for Traditional Owners in relation to employment and economic business	Ongoing training and skill-building opportunities for Traditional Owners in relation to employment and business	On-going training and skill-building opportunities for Traditional Owners (men, women, particularly young ones) in relation to employment and business

<b>Outcome and Indicator classes</b>	<b>Flora River</b>	<b>Adelaide River</b>	<b>Watarrka</b>	<b>East MacDonnells</b>
Associated enterprises	Percentage allocation in the budget for traditional owner employment, projects and contracts; Level of satisfaction of both partners regarding the delivery of service contracts in the park; Satisfaction with outcomes of feasibility studies/assessments for enterprises in the park	Increase Wulna people engaged in economic business (e.g. tour guides, own tourism business, crocodile egg farming, etc.) related to the nature reserves and conservation areas.	Traditional Owner engagement in economic business (e.g. tour guides, cultural dancers, food/beverage vendors, etc)	Level of Traditional Owners engagement in economic business (e.g. tour guides, cultural dancers, art crafts, food/beverage vendors)
<b><i>Joint management theme 4: Managing visitors</i></b>	<b><i>Good park management</i></b>	<b><i>Tourists and other users enjoying, respecting and learning about Adelaide River Parks natural and cultural values</i></b>	<b><i>Strong culture shared with visitors</i></b>	<b><i>Visitors gain deeper understanding of the country and its people</i></b>
Information availability	Cultural information about the park is readily available; Partners are satisfied that messages and images of the Park are consistent with the Park's values	Tourists and other users of the reserves and conservation areas (hunters, scientists, etc) are well informed about the natural and cultural values of the reserves and conservation areas, are provided and complying with clear rules and guidelines; and feel safe when visiting and or using the reserves and conservation areas or reserves	Appropriate and accurate information (natural, cultural, safety and behavioural) provided to visitors and public in general	Appropriate and accurate information (natural, cultural, safety and behavioural) provided to visitors (tourists, scientists, film-makers, other users)
Visitor satisfaction	Visitors to the park are satisfied with the park			

**Appendix 2. Equivalence between joint management indicators for protected areas in the Northern Territory, Australia, and those for Canada (Timko & Satterfield 2008) and South Africa (Cundill & Fabricus 2010)**

<b>Northern Territory, Australia</b>	<b>South Africa</b>	<b>Canada</b>
<b><i>Theme 1: Governance</i></b>		
Relationships and communications among partners	Trust building; Willing to engage in collaborative decision making; Conflict resolution mechanisms; Compliance with rules and regulations	The co-management board is compensated for their work on the board (e.g. not necessarily pay but expenses for travel); Extent to which there is a respectful relationship between local indigenous community and the NP
Decision-making and process satisfaction	Common rules and norms	The legal framework of the NP clarifies opportunities for participation in decision making and NP governance; The joint or co-management board has genuine authority over decision making; There are conflicts between the co-management board members; The co-management board members are satisfied with their co-management board experience; Decisions are reached by consensus (vs majority rule)
Representation and participation satisfaction	There are common interest groups	The board is representative of the population of the region (indigenous majority preferable); There is satisfaction with co-management agreement/contract park agreement
External partnerships	No equivalents	There are other opportunities for public involvement in decision-making (e.g. NP forum, presentations, meetings etc.)
Governance training	No equivalents	The co-management board has the capacity to do the work they are tasked with
<b><i>Theme 2: Managing country (cultural and natural heritage)</i></b>		
Cultural site protection	No equivalents	No equivalents
Natural resource and biodiversity management	No equivalents	Damage causing animals are being addressed
Traditional knowledge transfer	Information flow and social networks; Arenas of collaborative learning	No equivalents

<b>Northern Territory, Australia</b>	<b>South Africa</b>	<b>Canada</b>
<b><i>Theme 2: Managing country (cultural and natural heritage: cont.)</i></b>		
Combined use of Traditional and western knowledge	Various sources of information are combined for making sense; Access to accurate and relevant knowledge and information	No equivalents
Resource (financial/human) use and availability	Financial and capacity support from higher levels of organisation; Funds are available for adaptive management	No equivalents
Infrastructure availability	No equivalents	No equivalents
Park management training	No equivalents	No equivalents
<b><i>Theme 3. Benefits to traditional owners</i></b>		
Employment levels	No equivalents	There are enough local employment opportunities and local recruitment for indigenous people in skilled (vs unskilled) positions; Local indigenous people are employed at upper level management levels (vs jnr staff); The NP has an employment policy for employing local indigenous people; The employees in the NP are representative of the regional population; Employment opportunities are permanent (vs seasonal or temporary); There is extra project funding (provided by the NP) for local initiatives
Associated enterprises	No equivalents	There are commercial opportunities for local indigenous people
Business training	No equivalents	There are capacity building and training opportunities provided by the NP
<b><i>Theme 4: Managing visitors</i></b>		
Information availability	No equivalents	No equivalents
Visitor satisfaction	No equivalents	No equivalents

**Appendix 3. Indicators for jointly managed protected areas in Canada (Timko & Satterfield 2008) and South Africa (Cundill & Fabricus 2010) that had no equivalent among those identified as relevant to the Northern Territory, Australia**

<b>South Africa</b>	<b>Canada</b>
Security of tenure over the resources of concern	There is compensation for damage-causing animals
Economic or other incentives from collective action	There is satisfaction with compensation for damage causing animals
Willingness to learn from mistakes	Local indigenous people must pay access fees for the NP
Willingness to accept a diversity of institutions	Access rights are specified
Maintaining options for adaptation	Access has been negotiated
Enabling legislation is in place, is accessible and is understood	Access permits required by indigenous people including guides
Leadership	There is access for hunting/fishing
Being prepared for change	There is access for medicinal food/plants
	There is access for timber/trees
	There is access for cultural/ceremonial reasons
	There is satisfaction with access
	There is an ability for local indigenous people to maintain their cultures and livelihoods and where benefits are reinvested in the community
	Local indigenous communities indicate support for conservation in general

1. Some indicators on resolution of tenure and ownership omitted as beyond scope of this study