CHAPTER 8

MANAGING PROTECTED AREAS

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CONTENTS

IUCN WCPA WORLD COMMISSION ON PROTECTED AREAS Convention on Biological Diversity

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TITLE PAGE PHOTO

Entrance to Kayangan Lake, Coron Island, Philippines, a formal 'ancestral domain' of the Tagbanwa people, one of the oldest ethnic groups in the Philippines: the protected area is also recognised as a national reserve and a marine reserve
Source: Ashish Kothari

Introduction

'Managing protected areas' is a fundamental chapter for protected area practitioners and policymakers. As with governance (Chapter 7), it is a basic building block of supporting information essential for the professional management of protected areas. This chapter primarily focuses on large protected area management organisations including government agencies, non-governmental organisations (NGOs) and private organisations. In adopting this focus, we recognise that for many Indigenous Peoples' and Community Conserved Territories and Areas (ICCAs), management is less formal, with planning undocumented and part of everyday decisions by communities that are evolving, informal and intuitive (Kothari, pers. comm.). The principles and practices described in this chapter are, however, broadly relevant to all protected areas, and we indicate specific aspects that are relevant to ICCAs, individual land managers and those acting for small organisations. This chapter also emphasises, for all governance types, the need for active protected area management to achieve conservation outcomes.

The chapter presents some management theory in providing a definition for management that includes its four core functions. We introduce strategic management considerations, planning frameworks and many support tools and frameworks to assist practitioners to improve management effectiveness and inspire further innovation. Management for national systems of protected areas is considered. These systems may include government and private protected areas and ICCAs. For individual protected areas, management guidance has been provided for each of the six International Union for Conservation of Nature (IUCN) protected area management categories. Management considerations for working with officials and other people who are living, working and using protected areas are also presented. Different governance arrangements need different approaches to management, and the management associated with four governance types recognised by the IUCN is described, including working and operating within a government protected area system, shared governance arrangements, and introductions to private protected areas and ICCA governance arrangements. Protected areas are also established in special contexts, and reserves within or near urban areas, such as Category II protected areas, are also described.

The need for management

In mid 2014, some 15.4 per cent of the terrestrial surface of Earth and 3.4 per cent of global ocean area, which included 8.4 per cent of marine areas under national jurisdiction, had been officially recognised as protected areas (UNEP-WCMC 2014). These protected areas need constant and effective management to respond to multiple issues and land and sea management responsibilities. Such management is an investment in healthy environments, biodiversity conservation, other natural heritage conservation, cultural heritage conservation and healthy people.

Active management

Protected areas constantly face threats such as climate change effects, introduced species, visitor impacts, vandalism, poaching, pollution events, development and extractive activities, civil unrest, incidents such as extreme storms and wildfire events and other issues. Being responsive in a planned and effective way is critical. Protected area practitioners undertake many other tasks such as species management, anti-poaching patrolling, providing for visitor services, dealing with emergencies, research and monitoring, and restoration work. At the government policy level, responses to development threats to protected areas need to be made. Social, economic and environmental outcomes from active and responsive protected area management benefit visitors, neighbours, researchers, local communities, businesses, private organisations, governments and future generations.

Land-use changes

With the growth in the number of protected areas, and recommendations by the Convention on Biological Diversity (CBD) for further increases, there are usually social and political issues associated with such land-use change that need to be managed. Protected areas are a relatively new concept (Chapter 2), and in the 2010s there are many individuals, neighbours and communities who are directly experiencing this land use for the first time. This is a change for people, and settling in a new protected area land use will take time. Acceptance for some may be immediate or it may take time and active on-ground management, and constantly working with and participating in management with communities and neighbours will be critical. For other areas such as ICCAs, securing protected area status would probably mean conservation land-use practices undertaken for

generations would be sustained. Additional protection provided by protected area status would help community members to deter unwanted developments.

There are historical insights to such land-use changes. For visitors to the more than a century old Royal National Park in Australia, Banff National Park in Canada and Yosemite National Park in the United States, there can be a feeling of enormous gratitude towards those who had the foresight to protect such exceptional areas. There is also latent appreciation for the active conservation management of generations of professional park managers who have kept these lands intact (albeit with evolving management emphasis over time), for the natural beauty of these parks is (effectively) the same now as it was in the 1870s.

Management leadership

Protected area practitioners will be acutely aware of the need for active, effective and responsive management. Indecisive or incompetent management responses—or even worse, inaction—can lead to a 'paper park' scenario and, regrettably, to the exploitation and degradation of a reserve. Strong leadership and effective protected area management underpinned by the best professional management expertise, experience and tools available are needed in the 21st century. In this chapter, we provide information that will assist such professional management and we begin by introducing some important theoretical information about the concept of management.

Management: Definition and functions

What is management? It has been described as 'the process of assembling and using sets of resources in a goal-directed manner to accomplish tasks in an organisation' (Hitt et al. 2011:4). This makes good sense in the context of protected areas. Each of the key words and phrases of this definition is important (Worboys and Winkler 2006a; Hitt et al. 2011).

- **Process:** This is about undertaking four functions of management and the activities and operations that are associated with them. The four functions are 'planning', 'organising', 'leading' (implementing) and 'controlling' (evaluating), each of which is discussed further below.
- **Assembling and using resources:** These resources include people and their individual competencies, skills and lived experiences; financial resources; plant and equipment; and quality and relevant information from a range of sources. The task of assembling resources to accomplish management is aided by the protected area organisation, how it is governed (Chapter 7) and how it is structured.
- **Goal-directed manner:** This recognises there is clarity of direction provided by a protected area organisation. The activity being managed has a purpose and direction within a strategic management context and aims to achieve a certain level of desired results.
- **In an organisation:** This identifies management that is undertaken by people with different functions within a protected area organisation and that is structured and coordinated to achieve predetermined common purposes. It also reflects that conserving biodiversity at the scale of protected areas and protected area systems is a team effort. Management organisations for ICCAs and many private protected areas will be very different in size, structure and process from government agencies or large NGOs.

Historical Banff Springs Hotel, Banff National Park, Canada: the national park, Canada's oldest, was established in 1885 and the privately owned hotel was opened to the public in 1888

Source: Graeme L. Worboys

Undertaking 'a process of management' includes undertaking four functions of management, whether overtly or intuitively. These functions provide the underpinning of protected area management frameworks described in this chapter. The four functions are described here from the perspective of larger protected area organisations.

The 'planning' function

Planning is a key function of management. It is based on the very best environmental, social, cultural, historical, managerial and political context information and, by including modelling and analysis of data, planning can identify both preferred futures and the circumstances and conditions within which they may be facilitated. Three levels of planning are recognised for large protected area organisations.

1. **Strategic planning:** Typically these plans are whole-of-protected area organisation in their application and define the long-term goals sought.
2. **Tactical plans:** These plans help to implement a strategic plan. They provide order and priorities in implementing organisational goals for a functional area or a geographic part of a protected area system.
3. **Operational plans:** These are quite specific documents. They may be prepared to implement individual projects or the actions of a protected area organisational unit consistent with the organisation's goals and priorities.

Planning is typically undertaken for most protected area management activities and it is specifically discussed in Chapter 13 and within chapters including planning for visitors (Chapter 23), operations (Chapter 24) and incidents (Chapter 26).

The 'organising' function

A management action needs to be thoroughly planned, but it is the 'organising function' that efficiently and effectively marshals and coordinates the expertise, material resources, equipment and support services such as transport, accommodation and safety support, which are necessary to undertake an action. The routine operations of protected area managers require them to be constantly responding to visitor services, cooperative actions with neighbours and communities, policing tasks and incidents and emergencies. Governance arrangements, especially organisational structures, should support this ongoing need.

For organisations managing national systems of protected areas, five competency levels have been recognised by the IUCN (Box 8.1). In organising staff as part of a management response, appreciation of these five levels is most important. For the purposes of this chapter, we have described key protected area staff as frontline staff (field-based staff of at least Level 2); middle-level staff (middle-level experienced staff who have supervisory responsibilities or technical specialist competencies,

Box 8.1 Global protected area competencies

The IUCN has initiated a Global Partnership for Professionalising Protected Area Management Development and part of its work has been the development of international competence standards for five levels of protected area professionals (Chapter 9).

Level 5 Executive

Competencies relate mainly to activities that involve strategising and directing for an entire protected area system and promoting and supporting the system nationally and internationally. These competencies involve processes more than individual skills. Responsibilities would include national and regional policy development and spatial and strategic planning. They would be responsible for the direction of complex programs and plans.

Level 4 Senior manager

Competencies relate mainly to activities that involve planning, managing and decision-making. Level 4 staff may direct and manage medium-sized organisations. Their work could include the planning and management of projects and programs within strategic frameworks and they may conduct and implement specific and technical assignments according to technical specialty that requires a combination of technical and theoretical training and the opportunity to apply what has been learnt in the workplace in the course of a management cycle.

Level 3 Middle manager, technical specialist

Competencies relate to groups of technical skills and tasks that require organisation, supervision and decision-making. They are responsible for the organisation and leadership of technical sections and teams implementing plans and projects. They may complete specific and technical assignments requiring some technical ability and responsibility, which will require technical and theoretical training followed by opportunities to practise and gain experience in the workplace.

Level 2 Skilled worker with some supervisory responsibilities

Competencies relate to single or relatively small sets of practical skills that could be taught or learnt in the workplace or on short courses. Workers complete mainly practical tasks and assignments requiring some technical ability and responsibility.

Level 1 Unskilled labourer

Unskilled labourers complete practical tasks under continuous supervision.

Source: Appleton (2013)

typically at Level 3); and top-level staff who ultimately have responsibility for parts of an organisation or an entire organisation (Levels 4 and 5) (Box 8.1). It should be noted also that this book has focused on providing information in support of protected area practitioner Levels 2 to 5 (see Chapter 1). These staff may operate in any governance setting, but the information supplied is particularly targeted to formal protected area organisations. Additional practical, vocational-based capacity development and approaches taken by communities in managing ICCAs would complement the information provided by this book.

The 'leading' (directing) function

The leading function involves people influencing other people to assist achieving tasks and actions that help meet an organisation's objectives. This function has also been described as the 'directing' function (Hitt et al. 2011), though this title is perhaps too militaristic for contemporary protected area management. The leading function may be manifest in many ways at a person-to-person level depending on the nature of the management action, the situational context for the action and the background, experience and competencies of the people concerned (Chapter 12). A leader may use a range of approaches that includes motivation, communication and working with groups or teams. At the whole-of-organisation level, the leading function may be guided by a range of considerations such as judgment in decision-making and the inherent characteristics of institutions to enable the adaptive capacity of society and the potential for institutional design improvement (Gupta et al. 2010).

For any given action, protected area management staff appreciate being briefed on the strategic organisational context of a proposed action, why it is important, what their role is and what outcomes are expected. This communication is typically inspiring, since staff appreciate that they have been briefed, that their work contribution is meaningful and that it will be 'value-adding' to the organisation's mission. Even with some cultural traditions that are highly respectful of organisational hierarchies, this two-way protected area leadership communication is wise, since experienced staff responsible for undertaking tasks nearly always have contributions that improve the implementation. This interactive and teamwork focus for protected area leadership is common and helps to spawn creativity and innovation in the workplace. It also strongly reflects the necessity of protected area staff to work as teams in responding to matters such as threats (Chapter 16), incidents (Chapter 26), park operations (Chapter 24) and dealing with visitors (Chapter 23).

Protected area staff, Phong Nha-Ke Bang National Park World Heritage Property, Vietnam: these protected area practitioners play a key role in protecting the forest from illegal logging as well as other duties

Source: Graeme L. Worboys

This leadership is also manifest by top-level and middle-level staff taking an interest in the progress of operations, including talking to frontline staff and receiving firsthand feedback and potentially even resolving immediately small but annoying perturbations in an otherwise smooth project implementation.

The 'evaluating' function

Planning for management actions should identify an evaluation process that reviews the progress of implementation against predetermined objectives and standards. The evaluation function responds to this requirement. Evaluation may identify if milestones have been met during the course of an action or whether an output or outcome has been achieved. These milestones could, for example, be framed according to financial management targets; operational milestones; safety, construction and quality standards; efficiency and effectiveness of management processes; and environmental sustainability indicators. Such assessment measures should be planned before a project commences, with evaluation data collected as a management action

is implemented. This constant (routine) reviewing of performance against predetermined standards or objectives provides the basis for any necessary corrective actions to be implemented.

The evaluation function is important whether the action is undertaken as part of a large protected area organisation's program or whether it is a private protected area or an ICCA. How it is undertaken will vary between these different governance environments.

Strategic management

Strategic management for a large protected area organisation is typically guided by an inspirational 'vision' of the desired future of the organisation and of the lands, waters and natural and cultural heritage for which the organisation is responsible. It is also guided by an articulated and clear purpose for its work (or a mission); a discrete set of management goals that succinctly articulate how the organisation's preferred outcomes will be achieved; and a suite of prioritised (strategic) whole-of-organisation actions that are designed to achieve the desired goals. Once established, this direction needs to be subject to ongoing scrutiny and, as appropriate, refinement and adjustment.

The strategic management positioning is based on careful thinking, careful research and considerable planning effort. For a large protected area organisation, in addition to a vision and a mission, it may include preparing strategic plans such as a corporate strategy, a business plan and functional strategies. We discuss these strategic management investments further.

Understanding the operating environment

Understanding a protected area organisation's operating environment includes:

- comprehending the historical, sociocultural, economic and political contexts
- identifying statutory legislation requirements, the needs of the government, board of management determinations and the needs of local communities
- identifying the natural and cultural heritage values to be protected and their significance
- assessing threats and the condition and trend in condition of the natural and cultural heritage resources to be managed
- reviewing the internal operating environment and the capacity of the protected area organisation to manage including considerations from all four functions of management
- researching and analysing trends in the operating environment
- responding to management effectiveness evaluation of protected areas such as state of the parks reporting, independent audits, government inquiries, parliamentary inquiries and the findings of court hearings
- a need to work nationally and internationally and to share and globalise conservation efforts to help achieve biodiversity conservation outcomes.

Vision statement

A vision statement answers the question 'what do we want to become?' (Lockwood 2006). It is the vision statement that communicates to staff and to others the very clear aspirational direction of an organisation. For example, New Zealand's Department of Conservation (DOC), which administers New Zealand's protected area system as well as other environmental and conservation responsibilities, expresses its vision statement in a positive and proactive way. Importantly, supplementary information also articulates the intended interpretation of the vision statement:

> New Zealand is the greatest living space on Earth
>
> *Kāore he wāhi i tua atu i a Aotearoa, hei wahi noho i te ao*
>
> By 'living space' we're talking about our physical environment and the people, plants and animals that it supports
>
> By 'greatest' we mean New Zealand being the best it can be—a country that prospers socially, economically and environmentally. (DOC 2013:1)

Mission statement

A mission statement is a statement of purpose that is enduring (Lockwood 2006). It differs from the vision statement by focusing exclusively on the organisation. Such a statement provides clarity for staff and for others about what a protected area organisation is trying to achieve and the scope of the organisation's products and services. It provides order, direction and organisational priorities. In continuing our example from New Zealand,

the DOC provides a statement of its purpose (mission), followed by a clarification of how this statement is to be interpreted:

> Conservation leadership for a prosperous New Zealand
>
> By 'prosperous New Zealand' we mean a country that is flourishing socially, economically and environmentally. (DOC 2013:1)

Strategic planning

Strategic planning underpins an organisation's strategic management and helps define organisational goals within the context of the vision and mission. Development of strategic plans involves protected area top-level managers and a planning process that may use a 'strengths, weaknesses, opportunities and threats' (SWOT) analysis. Given its useful role, SWOT analysis is described in Figure 8.1.

Three types of strategic planning documents may be developed by organisations which use such SWOT processes: a corporate strategy, a business strategy and functional strategies (Robbins et al. 2012).

Corporate strategy

A corporate strategy identifies the nature of a protected area organisation's priority goals in the context of its mission, vision and goals, and broader government goals. It identifies what the organisation wants to do and the roles different parts of the organisation will play. Continuing our New Zealand example, DOC's primary outcome is: 'New Zealanders gain environmental, social and economic benefits from healthy functioning ecosystems, recreation opportunities and living our history' (DOC 2013:1).

A corporate strategy may be used to guide expansion, renewal and revitalisation strategies, or it may also be an important document for guiding the status quo or a diminishment of services (Robbins et al. 2012). A corporate plan may, for example, guide a protected area organisation that has been requested by government to establish and manage new protected areas as part of an expanded reserve system.

Business plan

A national protected area organisation is, typically, a big business. Millions of people may visit protected areas, commercial services are provided and local and even national economies are dependent on them being both well managed and accessible. Business management is an integral part of many modern protected areas, and a business plan, developed in the context of a protected

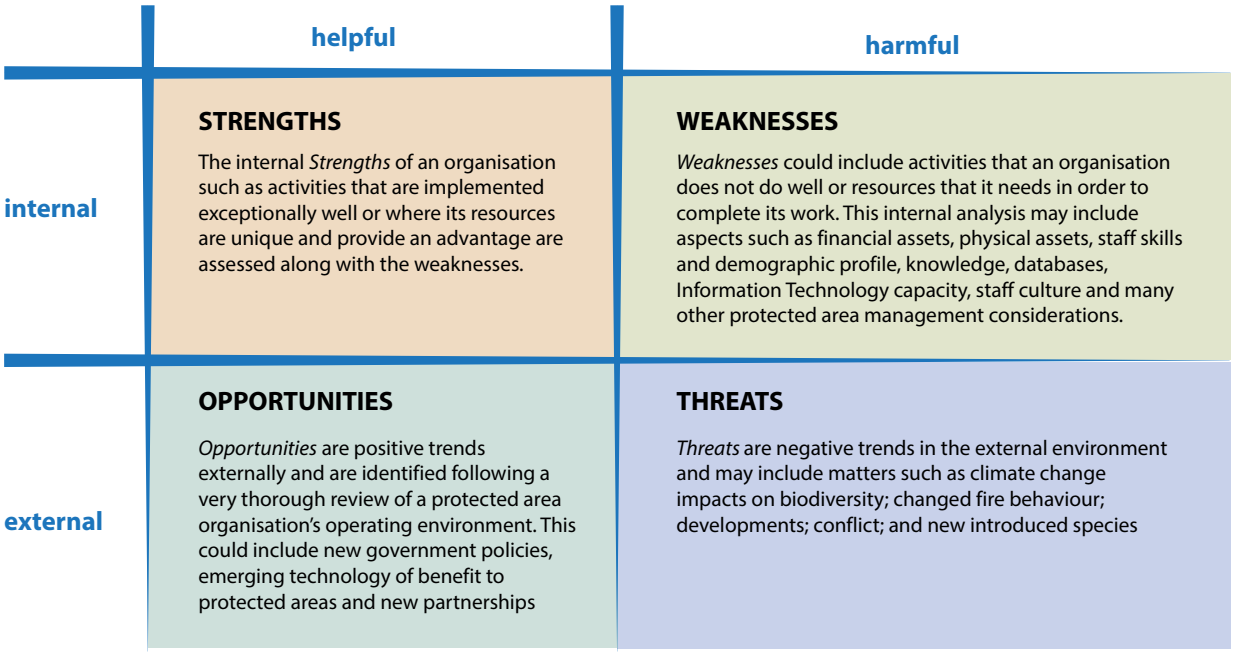

Figure 8.1 Strengths, weaknesses, opportunities and threats analysis

Source: Adapted from Robbins et al. (2012)

area organisation's corporate plan, is an important tool. The primary reasons for developing a business plan are to:

- provide a clear, practical blueprint for an organisation's future development
- enable everyone in the organisation to agree upon and share common goals
- ensure the participation of key stakeholders
- ensure the organisation's goals can be achieved with the available resources
- identify key risks and put plans in place to mitigate these
- achieve a smooth handover at times of staff change (UNESCO 2008).

A business plan may also:

- support applications for financial support
- inform strategies for particular capital or revenue initiatives
- review organisational structure, approaches to training and personnel management, technological resources or monitoring procedures (UNESCO 2008).

At the individual protected area level, a business plan is different from but complementary to a management plan. The management plan sets out the objectives of management and actions needed to respond to the purpose of a protected area and the business plan focuses on the financial and organisational dimensions. It documents how to resource the delivery of the management plan (UNESCO 2008). Business planning at the level of an individual protected area is further outlined in Box 8.2.

Box 8.2 Business planning

Robust business planning will help ensure that every component of a protected area—from internal staff and programs to third-party partners and commercial service operators—is working towards the same mission and within the same parameters.

Business plans and the plan of management

Business plans take on many forms depending on the size and complexity of the protected area, but they should be based on a long-range (10 or more years) plan of management that defines the area's mission and desired state (Chapter 13). The guiding plan of management should contain an assessment of the key features of the protected area, including critical habitats, cultural and historical resources, and sensitive ecosystems; it should have been developed with community involvement and should have been based on objective science. This will have resulted in a plan that delineates either no development at all in the protected area or some appropriate development and use intensity in very carefully selected and zoned areas.

The business plan

The business plan itself fits within the long-term plan of management, focusing on operations in the short to medium terms. A business plan is specific and detailed enough to drive annual work planning within the protected area. An effective business plan must be:

- focused on a realistic time horizon—ideally two to five years
- data-driven and rigorous
- concise enough to be useful
- realistic and grounded in sound budget assumptions and projections.

Depending on the model through which commercial services are delivered (for-profit companies, not-for-profit organisations, or government-owned and operated services), a business plan's components may vary. In general, a business plan should include the following:

- a definition of the mission and legal basis for the protected area
- the current operating context, including the organisation structure, current budget, funding sources and historical trends and resource allocation (both budget and labour hours)
- planning program responsibilities and near-term goals and priorities
- financial and programmatic metrics that are tied to protected area priorities and that can be tracked over time to support performance management activities
- revenue projections that include both realistic assumptions of the near-term budget picture and an assessment of the relative stability/riskiness of each funding source
- cost scenarios that are based on priorities and potential staffing and investments
- strategies that link priorities to resource allocation and help the protected area close gaps between projected funding and costs.

— Jason Gibson, Program Manager, US National Park Service Business Management Group

Pod of humpback whales (*Megaptera novaeangliae*) offshore from Ben Boyd National Park, New South Wales, Australia, migrating southwards to Antarctic waters for summer. In New South Wales, National Parks and Wildlife Service staff are responsible for the safety and welfare of this protected species

Source: Graeme L. Worboys

Functional strategies

Achieving the implementation of a corporate strategy and a business plan across an entire organisation may require a series of what have been described as 'functional strategies' (Robbins et al. 2012). These functional strategies achieve a corporate standardisation of protected area operational matters and could include, for example, matters such as a human resources management manual, a signage design standard, an infrastructure standards manual, guidelines for facilities establishment and management, and a vehicle fleet management manual.

Change management

The implementation of innovative, new and strategic management may require changes in the way in which an organisation is structured to deliver its management goals. Implementing change respectfully, transparently and with clear purpose relative to the vision and mission of an organisation is critical, as is the professional management of the change process. Normally organisational change would be guided by a 'change management plan' and by staff with human resource management technical expertise. Organisations may need to adjust priorities, refocus investments and adapt to new and changing social, political and environmental circumstances. Effective change management is necessary if biodiversity and other heritage conservation actions are to succeed.

Biodiversity conservation priorities

Protected area organisations help conserve species and biodiversity in protected area systems and this is especially important given there have been marked declines in species around the world (Chapter 3). All-important strategic conservation implementation actions need to be achieved in addition to the routine implementation and seemingly endless protected area organisation governance and administration processes. Conservation responses need to be in the context of ecosystem process requirements, habitat needs and specific animal and plant species requirements (Chapter 21). This could include the conservation and restoration of habitats, the protection of animal migration routes, specialised breeding season conservation needs, guarding against any species vulnerabilities and dealing with threats. For the strategic management of protected areas, these actions are a fundamental priority. From such priorities the potential for implementation of other organisational programs can then be assessed.

Evaluation

Strategic management investments need to be evaluated. Such a whole-of-organisation assessment would preferably be completed in terms of outcomes for biodiversity and cultural heritage conservation as well as other evaluation

measures. For example, managers should seek to be in a position to answer basic monitoring questions such as: what native species are present in a protected area, what is their condition, what is the trend in their condition, what threats are present, what is the severity of these threats and what is the trend in severity of these threats?

These are fundamental questions and it is a legitimate aspirational mission for top-level managers to pursue adequate responses given they help to underpin the future strategic management of protected area systems. It is the type of organisational approach that Parks Canada has pursued by implementing its ecological integrity program (Chapter 21) and South African National Parks (SANParks) has pursued with its 'thresholds of potential concern' work pioneered in Kruger National Park (du Toit et al. 2003).

Frameworks and tools

There are a number of management frameworks and tools that assist protected area management organisations to undertake their operations. These frameworks and tools help provide an orderly and systematic approach to management across what may be a large, diverse and decentralised national or sub-national protected area system. Examples of useful management frameworks and tools available to protected area managers for a range of governance types are given in Table 8.1. The park management framework, for example, provides one valuable method for guiding management. The framework was developed by the National Parks and Wildlife Service (NPWS) of New South Wales, Australia, to guide an orderly approach to its management (DEC 2005) (Figure 8.2). It is based on the IUCN protected area management evaluation framework (Hockings et al. 2006) and includes the core functions of management. The NPWS organising its process of management around the park management framework has brought many benefits given it is logical, orderly and clear to all management personnel. In addition, it organises the NPWS's management effectiveness evaluation process so that it is consistent with the IUCN framework (Chapter 28). The key questions posed as part of the park management framework help to create an orderly approach to management (Figure 8.2).

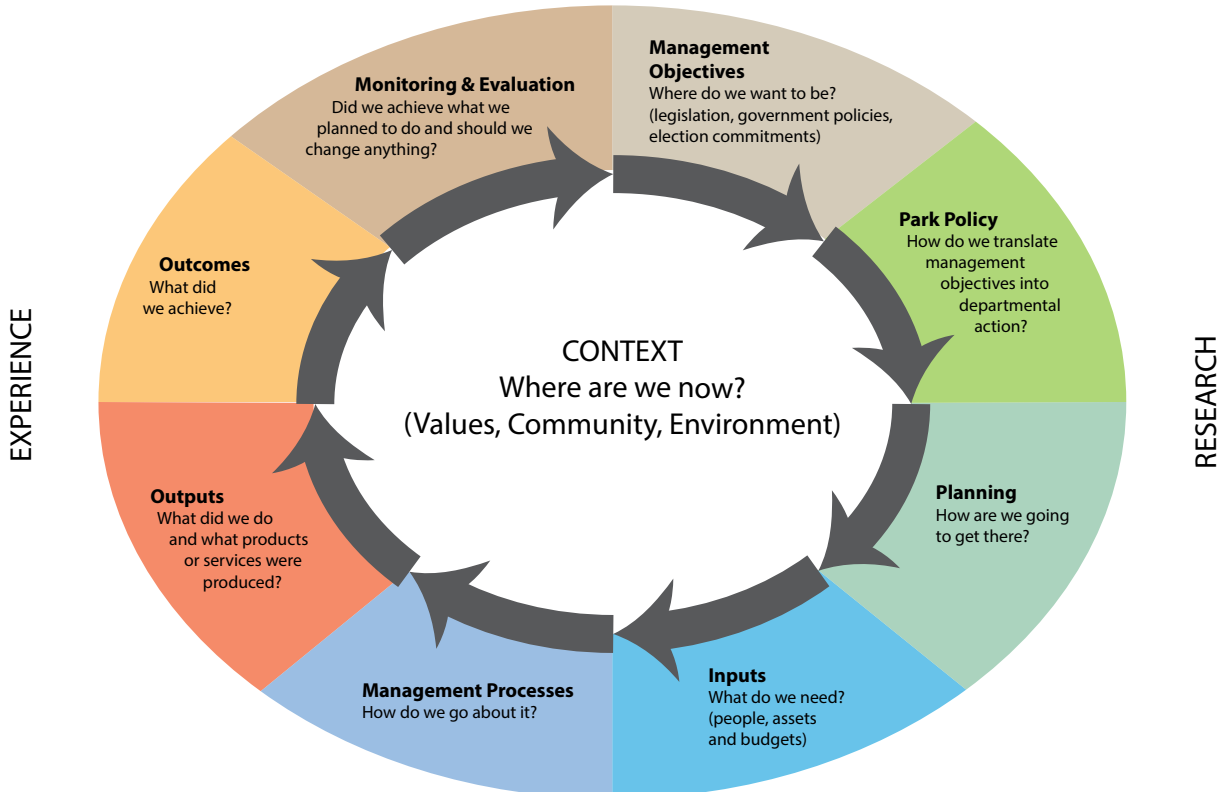

Figure 8.2 The park management framework used by the NSW NPWS

Source: Adapted from DEC (2005)

Table 8.1 Management frameworks and tools for assisting protected area management (organised by management function)

Management tool or framework	Background notes and reference	Chapter cross-reference (where applicable)
Planning		
Natural Heritage Charter	Developed in Australia, the Natural Heritage Charter describes a 10-step process for conserving natural heritage. It provides a planning process in detail and provides guidance information for each step. It is a very valuable tool for assisting with the conservation planning of a natural heritage site or place (CoA 2003)	
International Council on Monuments and Sites (ICOMOS) cultural heritage charter	ICOMOS provides planning guidance to heritage conservation professionals for their work. This guidance includes the Charter for the Protection and Management of Cultural Heritage. More specific ICOMOS guidance has been prepared such as Australia's Burra Charter (Marquis-Kyle and Walker 1992)	Chapter 22
Conservation action planning	The Nature Conservancy's Conservation Action Planning (CAP) method is a framework to help practitioners focus their conservation strategies on biodiversity elements or conservation targets and associated threats and to measure success to permit adaptation and learning over time (TNC 2007)	Chapter 13
IUCN framework for connectivity conservation management	The IUCN WCPA developed a framework for providing a systematic approach to connectivity conservation management that accommodates the multi-tenured landownership, multi-sectoral land use, different spatial scales of operating and situational and dynamic operating environment of a large connectivity conservation area (corridor) (Worboys et al. 2010)	Chapter 27
Wildlife Institute of India planning tool	A guide for planning wildlife management in protected areas and managed landscapes has been prepared by the Wildlife Institute of India; each protected area is meant to follow these guidelines (Sawarkar 2002)	
A toolkit to support conservation by indigenous peoples and local communities	A guide for building capacity and sharing knowledge for Indigenous Peoples' and Community Conserved Territories and Areas (ICCAs) that includes management planning, monitoring and evaluation, communication, finance and values (Corrigan and Hay-Edie 2013)	Chapter 7
Environmental management systems	Environmental management systems such as ISO 14001 establish a process by which organisations can minimise their environmental impacts. The International Organisation for Standardisation (ISO) is located in Geneva. ISO 14001, for example, is based on a system of continuous improvement that includes 'plan' (set objectives); 'do' (implement the task); 'check' (monitor performance) and 'act' (improve the performance) (EPA 2013)	Chapter 24
Environmental impact assessment	Environmental impact assessment is a means to protect and conserve the environment. It is a procedure that evaluates the effects of activities on the environment with the assessment findings influencing decisions about whether a development should proceed as proposed, proceed with conditions or not proceed (Thomas 2001). Its application in protected areas may be guided by legislation	Chapter 24
Recreation opportunity spectrum planning tool	The recreation opportunity spectrum was developed by the US Forest Service for managing recreation in natural areas. It is a powerful planning tool for a protected area manager that distinguishes a range of recreational settings that offer visitors a range of recreation opportunities. It provides strong guidance for the nature and limits of services and facilities for settings that guarantee recreation types are retained (Clarke and Stankey 1979)	Chapter 23

Management tool or framework	Background notes and reference	Chapter cross-reference (where applicable)
Public use measurement and reporting system	Prepared by Kenneth Hornback and Paul Eagles for the IUCN WCPA, this tool assists managers to prepare a comprehensive approach to collecting information, undertaking analysis and reporting public use of protected areas (Hornback and Eagles 1999)	
Design standards tool	Many protected area organisations establish corporate design standards for their logos, park furniture design, park building design and other assets. It is also common for them to utilise approved industry design standards for disabled access and for the safety of structures such as viewing platforms and buildings. International design symbols may be used to assist visitors with a range of languages. Organisations may develop a design standard toolkit for use	
Organising **Administration and staff support tools**		
Financial management systems	Financial management systems in the 21st century are almost always computerised, with off-the-shelf applications such as SAP™ enterprise applications commonly used. Systems are useful that: 1) track inputs with outputs and outcomes, and 2) track assets maintenance and service delivery needs. The financial system of some protected area organisations may form part of much larger government systems and such systems would usually need to be customised further to deal with the 24-hour-a-day and seven-day-a-week on-ground operations of protected areas	
Staff management systems	Staff management and payroll systems are computerised (and usually linked to financial management systems) and use off-the-shelf products like SAP™. Corporate reporting of staff demographics, competencies, training completed and levels of fitness may be important for organisations whose staff face regular physically demanding operations such as remote area work, work in extreme weather and incident response operations	
Staff induction systems	Staff induction is an important investment and systems may include personal introductions and vocational training associated with equipment, vehicles, wildlife, incidents, law enforcement, employee rights and entitlements, computer software applications and other organisational processes and systems	
Staff counselling services	These services may be contracted out, but they are an important part of dealing with the daily pressures of protected area management. Incidents involving people such as wildlife, fire operations and conflict may impact on staff and initiate the need for such counselling	
Occupational health and safety systems	Occupational health and safety systems help ensure a safe work environment for staff. Organisations with such systems in place and good records of safety often pay lower insurance premiums	
Insurance systems	Protected areas include a range of assets, from visitor centres, offices, workshops, accommodation and training facilities to plant and equipment. Insurance systems that provide cover for loss or damage of these assets, as well as insurance for people, are essential	
Asset management systems	Protected areas include a range of physical assets that provide services for the enjoyment or management of protected areas. Typically these assets include access tracks and roads, lookouts, toilets, buildings, plant and equipment, vehicles and other assets. Asset management systems are usually computer based and record details of the asset, its life history and maintenance requirements	Chapter 25

Management tool or framework	Background notes and reference	Chapter cross-reference (where applicable)
Information support tools		
Computer software systems	Computer software systems and their application are rapidly evolving. The best management systems will be those that are adaptive and permit individuals and organisations to be at the cutting edge of their work and supported (where possible) by an information technology team	
Geographic information systems	Spatial information is critical for protected area management. Geographic information system data of individual protected areas and their associated national system can facilitate heritage inventories, the spatial analysis of information and the immediate presentation of incoming data from a range of sources including live incident and satellite data	Chapter 11
Internet and intranet tools for accessing and disseminating information	Modern search engines permit the immediate retrieval of information necessary for managing protected areas. For individual protected areas this may include their history and all aspects of their management. Implementing such systems will achieve cost efficiencies in the future. Web content management systems are also available	Chapter 11
Integrated management information systems	The Tasmanian Parks and Wildlife Service has developed a system for its visitor management that integrates its recreation opportunity spectrum setting planning, its levels of service determination, its assets information, its risk management assessment and its budgeting information to assist with its prioritisation decisions (Poll 2006)	Chapter 25
Decision-support tools		
Marxan software	The Marxan computer spatial prioritisation software includes a suite of tools that assists conservation planning. It includes economic considerations and assists managers to prioritise tasks and includes using financial (costing) inputs	Chapter 8
The Investment Framework for Environmental Resources (INFFER)	INFFER™ is one method that assists managers to prioritise a range of competing conservation management projects	
Structured decision-making	This is a process of decision-making that involves experts and practitioners, that deals with complex issues, establishes clear objectives and provides a transparent rationale for a preferred management decision	
Leading (implementation) Protected area operations tools		
Project management tools	The Conservation Action Planning System (TNC 2007) and the Open Standards Miradi software (CMP 2013) are two tools that provide effective project management for protected area actions	Chapter 13
Risk-management systems	Risk-management systems identify risks to management. They are analysed against an organisational risk-assessment criteria and treated where a risk is unacceptably high. Such systems constantly monitor risks (Worboys and Winkler 2006b)	
Incident management systems	The National Interagency Incident Management System developed in the United States has been modified and adopted by many nations and organisations. This 'incident control system' identifies the functions of incident controller, planning, operations and logistics and concepts such as span of control and 12-hourly shift changes. It has been a highly successful method for multiple organisations working together	Chapter 26

Management tool or framework	Background notes and reference	Chapter cross-reference (where applicable)
Sustainable organisation systems	Sustainable organisation management systems such as the commercial Earthcheck tool (Earthcheck 2013) allow organisations to assess their quantified environmental performance for energy consumption, water use, and liquid and solid waste generation against baseline standards. Environmental design considerations can also be assessed	
Operations Guide of the Fiji Locally Managed Marine Areas Network	Guidelines or goals including the establishment of community and network research priorities and protocols that govern any collaborating researchers, minimum monitoring approaches, communications and intellectual property issues, and membership criteria (Govan and Meo 2011)	Chapter 20
Media management systems	Some protected area organisations employ commercial media monitoring systems to track commentary and internal systems where local protected area issues (and responses) are communicated routinely to central office with or without associated media coverage	Chapter 15
Evaluation **Management effectiveness evaluation and monitoring**		
Ecological integrity monitoring system	The Parks Canada Ecological Integrity (EI) monitoring is a system for measuring and reporting maintenance or restoration of EI in protected areas. The system enables a quantified assessment of condition and change in condition for biodiversity and enables outcomes to be measured relative to objectives established (PC 2007)	Chapter 21
'State of the parks' reporting	Protected area organisations within a number of nations (such as Canada, South Korea and Finland) and States within a nation (such as Australia's New South Wales and Victoria) have instituted state of the parks reporting for their protected area systems. These may report on the ecological integrity (biodiversity condition), threats and management effectiveness for their protected areas	Chapter 28
IUCN management effectiveness evaluation framework	The Protected Area Management Effectiveness Evaluation (PAME) framework is based on a cycle of management for protected area organisations with six key elements: context, planning, inputs, process, outputs and outcome (Hockings et al. 2000, 2006). The IUCN PAME framework has been adopted by the World Bank and many protected area organisations as their principal evaluation framework tool	Chapter 28
World Wide Fund for Nature (WWF)/World Bank Tracking Tool	This scorecard tool is very brief; it is based on the IUCN PAME framework's six elements and it is very effective (Worboys 2007). It focuses on evaluating individual protected areas and monitors effectiveness relative to targets	Chapter 28
IUCN Green List of Well Managed Protected Areas	The Green List is an IUCN initiative to encourage, measure and celebrate the success of protected areas in reaching good standards of management (Hockings 2012). It is based on the widespread adoption of the PAME assessment (Hockings et al. 2000, 2006) and identifies good management practice	
World Heritage: Enhancing Our Heritage	UNESCO and the IUCN have developed this evaluation framework based on the PAME method, and it is used for assessing World Heritage sites and their current activities to identify any problems, issues and responses (Hockings et al. 2008)	Chapter 28
Visitor use: limits of acceptable change	This method assesses the limits of acceptable change for visitor use of natural areas and is closely aligned with the recreation opportunity spectrum planning tool. It was prepared by George Stankey and other researchers from the US Forest Service (Stankey et al. 1985)	Chapter 23
Other management effectiveness evaluation systems	There are other evaluation tools that have been developed in the past that are applicable to protected areas, including the Parks in Peril Site Consolidation Scorecard and the Enhanced 5S Project Management Process developed by The Nature Conservancy (Worboys 2007)	

Adaptive management

Adaptive management is a protected area management process that may be used by practitioners and policymakers (Chapter 13). It is seemingly an intuitive approach though it is research based and this is not always fully understood. It has been defined as 'a systematic approach for improving resource management by learning from management outcomes' (Williams et al. 2009:1). Adaptive management has been described as involving six key steps.

1. Identification of clear management goals.
2. Specification of multiple management options.
3. Hypothesising how the system will respond to management interventions.
4. Implementing management action(s).
5. Monitoring the system response to see if it supports the hypothesis or otherwise.
6. Based on the analysis results, refining and adjusting management practice (Williams et al. 2009).

US Forest Service researcher George Stankey and his colleagues reviewed the theory and concepts of adaptive management and arrived at the following key conclusions.

- Though widely acclaimed as a model for resource management under conditions of risk and uncertainty, adaptive management remains primarily an ideal.
- There are many definitions, though typically they do not include core characteristics of an adaptive approach by not including explicit hypothesis testing, monitoring and evaluation.
- Experimentation is at the core of adaptive management involving hypotheses, controls and replication.
- It includes explicit research designs (including problem framing and solving processes, documentation and monitoring protocols and assessment and evaluation processes).
- It is irreducibly socio-political in nature.
- It is grounded in a recognition and acceptance of risk and uncertainty.
- Learning is a key output (Stankey et al. 2005).

Open Standards for the Practice of Conservation

The Open Standards for the Practice of Conservation (CMP 2013) is a method that includes adaptive management and has been established by a group known as the Conservation Measures Partnership (CMP), a consortium of conservation organisations 'whose mission is to advance the practice of conservation by developing, testing and promoting principles and tools to credibly assess and improve the effectiveness of conservation actions' (CMP 2013:i). The CMP has combined principles and best practice in adaptive management and results-based management to create the open standards. Open standards is a process aimed at establishing good project design, management and monitoring, and is organised into a five-step project management cycle.

1. Conceptualise the project vision and context.
2. Plan actions and monitoring.
3. Implement actions and monitoring.
4. Analyse the data, use the results and adapt.
5. Capture and share the learning (CMP 2013).

These steps describe the general process necessary for the successful implementation of conservation projects. Importantly, the entire process and its analysis include human wellbeing inputs and climate change considerations. The process develops result chains; prioritises strategies; develops a monitoring plan with monitoring methods and indicators; develops an operational plan with associated shorter-term work plans; prepares a budget; undertakes implementation; and analyses the performance.

Managing protected area systems

A well-designed national system of protected areas provides a strategic approach to the conservation of a nation's biodiversity (Davey 1998). Ideally, such systems have been developed using systematic conservation planning techniques or have been influenced by these techniques. The establishment of protected areas and systems of protected areas is considered further in Chapter 13).

Protected area systems: Strategic targets

Global guidance for an ideal minimum area that should be reserved in national reserve systems has been established following lengthy negotiations and discussions between nations signatory to the CBD and the development of a strategic plan. In 2010 in Nagoya, Japan, the *Strategic Plan for Biodiversity 2011–2020 and the Aichi Targets* was adopted by parties to the CBD with the purpose of inspiring all countries and stakeholders to implement broad-based action in support of biodiversity conservation over the next decade (CBD 2011). The strategy provides a rationale, vision, mission and targets for the conservation of biodiversity and guidance, and through these 'Aichi Targets', the establishment of enhanced protected area systems. This is an important management action for governments and protected area organisations or groups whether they are government, private, indigenous peoples' or community groups. Target 11 of the strategic plan specifically identifies spatial area targets for establishing marine and terrestrial national reserve systems.

The 2011–20 strategy establishes a planning context that identifies the importance of the Earth's biodiversity:

> Biological diversity underpins ecosystem functioning and the provision of ecosystem services essential for human well-being. It provides for food security, human health, the provision of clean air and water; it contributes to local livelihoods, and economic development, and is essential for the achievement of the Millennium Development Goals, including poverty reduction. In addition it is a central component of many belief systems, world-views and identities. Yet despite its fundamental importance, biodiversity continues to be lost. (CBD 2011:4)

The strategy's vision clearly identifies that long-term leadership is needed and that a great deal more needs to be done to ensure the conservation of biodiversity: 'By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people' (CBD 2011:2).

The strategy's mission statement identifies a compelling need and immediacy of action for achieving biodiversity conservation with words like 'urgent', 'effective action' and 'halt the loss':

> Take effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life, and contributing to human well-being, and poverty eradication. To ensure this, pressures on biodiversity are reduced, ecosystems are restored, biological resources are sustainably used and benefits arising out of utilization of genetic resources are shared in a fair and equitable manner; adequate financial resources are provided, capacities are enhanced, biodiversity issues and values mainstreamed, appropriate policies are effectively implemented, and decision-making is based on sound science and the precautionary approach. (CBD 2011:3)

The strategy recognises 20 targets, with many relating to protected areas. Target 11 recognises the effectiveness of protected areas in the conservation of biodiversity (Chapter 2) and the strategy identifies enhanced area targets and quality protected area attributes for protected area systems for nations:

> By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes. (CBD 2011:2)

These targets relate to governments and other organisations and communities, as a nation's protected area system may comprise a mix of government, private, indigenous and community-based protected areas. The 2020 CBD strategic target to conserve biodiversity is a challenge for nations and for national systems of protected areas given that in 2014 many nations had not met the following global targets. Progress in achieving Target 11 (from a spatial area perspective) is indicated in Figure 8.3.

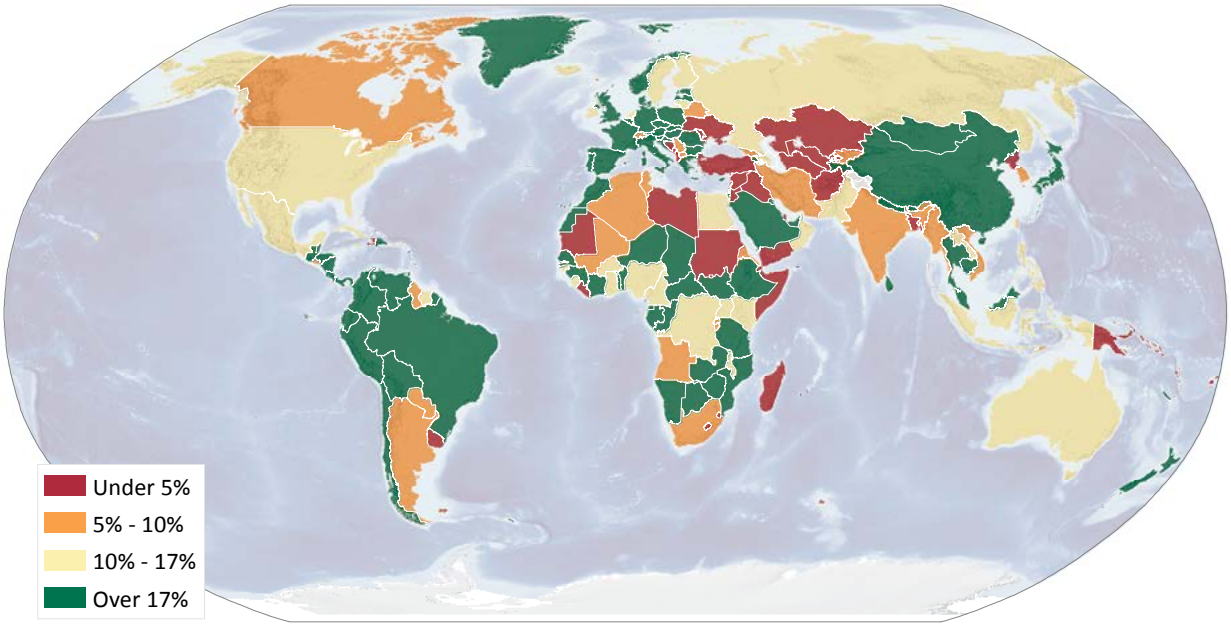

Figure 8.3 Percentage of terrestrial area of nations reserved as protected area in 2014

Note: Nations that have met the CBD's Target 11 spatial target (only) in 2014 for protected areas are shown in green. Areas conserved by other effective means are not presented.

Disclaimer: Disputed territories have been given 'no value' and no colour on the map. The boundaries of nations as identified do not represent the views of the UNEP-WCMC.

Source: IUCN and UNEP-WCMC (2014)

Governments and protected area systems

There are many critical management actions governments undertake in support of protected area systems. These include facilitating the expansion of the protected area system; facilitating biodiversity conservation at a whole-of-government level; managing for international conventions and treaties; facilitating trans-boundary cooperation; providing national protected area data; and facilitating connectivity conservation corridors. Accountability for collecting and supplying high-quality protected area spatial data and IUCN protected area category data for a nation's protected area system rests with each national government (Chapter 11).

New protected areas

Governments, in enhancing the protected area system, may establish protected areas in their own right; they may encourage their establishment by facilitating mechanisms for NGOs and the private sector to reserve and manage land; and they may help indigenous peoples and local communities establish protected areas, or recognise existing ICCAs as protected areas with the consent of the relevant people or community.

Biodiversity conservation and protected areas

Governments may facilitate biodiversity conservation in protected areas and beyond by:

- implementing the full provisions of the CBD strategy (CBD 2011) across all relevant sectors of government and society
- preparing a national biodiversity conservation strategy that recognises and responds to any gaps in protected areas that may exist
- preparing a national plan for large-scale and important connectivity conservation areas that interconnect protected areas and the natural landscape
- providing incentives for the private sector and indigenous peoples and local communities to participate in the establishment of protected areas.

International considerations

International considerations that form part of an organisation's responsibility for managing a protected area system include:

- observing and responding to international conventions (Table 8.2)
- participating in cooperative trans-boundary protected area management (Chapter 7)
- observing and facilitating international migratory species agreements (Chapter 21)
- working on large-scale connectivity conservation corridors (Chapter 27)
- providing shared national protected area data for the international UNEP-WCMC World Database on Protected Areas (WDPA) (Chapter 11)
- meeting World Heritage management standards and reporting requirements (Chapter 2)
- meeting biosphere reserve and Ramsar requirements (Chapter 2)
- having regard for international treaties and declarations such as the UN Declaration on the Rights of Indigenous Peoples.

Table 8.2 Examples of international conventions relevant to protected area management

Year	International Convention	Reference
1946	Convention for the Regulation of Whaling The International Convention for the Regulation of Whaling was established to provide for the proper conservation of whale stocks and to help facilitate the orderly development of the whaling industry. It established the International Whaling Commission and included the provision for fixing sanctuary areas	UN (2014a)
1971	Ramsar Convention In 1971, the Ramsar Convention on Wetlands of International Importance, especially as Waterfowl Habitat was adopted in Ramsar, Iran. The convention is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources	Ramsar (2013)
1972	World Heritage Convention In 1972, the Convention Concerning the Protection of the World Cultural and Natural Heritage developed from the merging of two separate initiatives: the first focusing on the preservation of cultural sites, and the second dealing with the conservation of nature. The World Heritage Convention protects the world's natural and cultural heritage considered to be of outstanding universal value	UNESCO (2013)
1973	CITES Convention The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was adopted in 1973 by many countries. The convention helps to protect species that are highly sought after illegally such as for traditional medicines and pelts. These animal products could, for example, be sourced from snow leopards (*Panthera uncia*) (pelts); tigers (*Panthera tigris*) (medicine); musk deer (*Moschus* spp.) (medicine); African elephants (*Loxodonta* spp.) (ivory); and rhinoceros (*Ceratothirium simum* and *Diceros bicornis*) (medicine)	CITES (2013)
1979	Migratory Species Convention The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention) aims to conserve terrestrial, aquatic and avian migratory species throughout their range. It is an intergovernmental treaty, concluded under the aegis of the UN Environment Programme, concerned with the conservation of wildlife and habitats on a global scale	CMS (2013)
1982	Convention on the Law of the Sea In 1982, the United Nations adopted the Convention on the Law of the Sea (UNCLOS) and this (among many matters) provided coastal states with sovereign rights for a 200-nautical mile exclusive economic zone with respect to natural resources, certain economic activities, jurisdiction over marine science research and the opportunity for environmental protection within this zone. It did not come into force until 1994	UN (2013)
1992	Convention on Biological Diversity The CBD has been fundamental for recognising the need to conserve biodiversity and the role and importance of protected areas as part of this. Protected areas are recognised by parties to the convention as a key response in stemming the loss of biodiversity, and Article 8 of the convention requires each contracting party, as far as possible and appropriate, to establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity	CBD (1992)

Year	International Convention	Reference
1992	United Nations Framework Convention on Climate Change The 1992 UN Framework Convention on Climate Change (UNFCCC) provides a framework for negotiating specific international treaties (called 'protocols') that may set binding limits on the emission of greenhouse gases. It was a start to an international response to greenhouse gas pollution of the atmosphere	UNFCCC (2014)
1994	The United Nations Convention on the Law of the Sea The UN Convention on the Law of the Sea (UNCLOS) came into force and was critical in global efforts to establish marine protected areas. It defines the rights and responsibilities of nations in their use of the world's oceans, establishing guidelines for businesses, the environment and the management of marine natural resources	UN (2014b)

Box 8.3 Convention on Biological Diversity Programme of Work on Protected Areas

The Programme of Work on Protected Areas (PoWPA) is one of the strongest reflections of the policies of the IUCN and its members. It was agreed to by the CBD in February 2004, and the PoWPA draws heavily on the Durban Action Plan that emerged six months earlier at the end of the IUCN's Fifth World Parks Congress. The essence of the PoWPA is a commitment that countries develop participatory, ecologically representative and effectively managed national and regional systems of protected areas, stretching where necessary across national boundaries, integrated into other land uses and contributing to human wellbeing. The PoWPA includes four program elements, 16 goals (each with a more specific target) and 92 activities for parties, many with timetables for suggested implementation. The four main themes and associated elements are as follows.

1. Direct actions for planning, selecting, establishing, strengthening and managing protected area systems and sites
   - building protected area networks and the ecosystem approach
   - site-based protected area planning and management
   - addressing threats to protected areas.
2. Governance, participation, equity and benefit sharing
   - improving the social benefits of protected areas.
3. Enabling activities
   - creating an enabling policy environment
   - capacity building
   - ensuring financial sustainability.
4. Standards, assessment and monitoring
   - management standards and effective management
   - using science.

Source: Stolton et al. (2008)

Wedge-tailed shearwater (*Puffinus pacificus*), South Coast of New South Wales, Australia: this species migrates large distances between hemispheres and breeds during the southern summer on many islands in southern Australia. This species and many others benefit from conventions that help protect migratory species.

Source: Graeme L. Worboys

The CBD Programme of Work on Protected Areas (PoWPA) signifies the greatest commitment by the international community to protected areas to date. It provides a framework for cooperation between governments, donors, NGOs and local communities in order to develop a participatory, ecologically representative and effectively managed national and regional system of protected areas (Box 8.3) (CBD 2004).

Box 8.4 General reserve management principles for IUCN protected area categories

The following principles of management for Australian protected areas have been developed for all six IUCN protected area categories by the Australian Government. They have international relevance.

Community participation

Management arrangements should, to the extent practicable, provide for broad and meaningful participation by the community, public organisations and private interests in designing and carrying out the functions of the reserve or zone.

Effective and adaptive management

Management arrangements should be effective and appropriate to the biodiversity objectives and the socioeconomic context of the reserve or zone. They should be adaptive in character to ensure a capacity to respond to uncertainty and change.

Precautionary principle

A lack of full scientific certainty should not be used as a reason for postponing measures to prevent degradation of the natural and cultural heritage of a reserve or zone where there is a threat of serious or irreversible damage.

Minimum impact

The integrity of a reserve or zone is best conserved by protecting it from disturbance and threatening processes. Potential adverse impacts on the natural, cultural and social environments and surrounding communities should be minimised as far as practicable.

Ecologically sustainable use

If resource use is consistent with the management principles that apply to a reserve or zone, it should (if it is carried out) be based on the principle of ecologically sustainable use, which is that:

- natural resources should only be used within their capacity to sustain natural processes while maintaining the life-support systems of nature
- the benefit of the use to the present generation should not diminish the potential of the reserve or zone to meet the needs and aspirations of future generations.

Transparency of decision-making

The framework and processes for decision-making for management of the reserve or zone should be transparent. The reasons for making decisions should be publicly available, except to the extent that information, including information that is culturally sensitive or commercial-in-confidence, needs to be treated as confidential.

Joint management

If the reserve or zone is wholly or partly owned by aboriginal people, continuing traditional use of the reserve or zone by resident indigenous people, including the protection and maintenance of cultural heritage, should be recognised.

Note: In the text provided, 'reserve' or 'zone' refers to an Australian Government management context where the principles may be applied to an entire protected area or a geographic part of that protected area (commonly identified by a plan of management as a zone).

Source: CoA (1999)

Management guidance for IUCN protected area categories

In this section, we present management principles and guidance information for each of the IUCN management categories and discuss the conservation emphasis of each category. This guidance is particularly relevant for planning purposes, where it can assist in the development of management objectives. We also describe managing for 'official people' who live within different IUCN protected area category reserve types.

Biodiversity conservation and other natural and cultural heritage conservation are undertaken for all six IUCN protected area management categories (I–VI) though there are important differences in approach. Australian guidance material of international relevance for each IUCN category is given in Boxes 8.4–8.11. The principles have been sourced from the Australian Government's *Environment Protection and Biodiversity Conservation Act (1999)* and supporting papers (Box 8.4).

Managing IUCN Categories I–IV

All IUCN management categories are important for biodiversity conservation, but Categories I–IV provide a particular focus on the protection of biodiversity and other natural and cultural heritage (Dudley 2008). This protection and management are what contribute directly to the conservation of species and biodiversity at a time when there is rapid species decline and continuing loss of habitats. These reserves are what provide a key contribution to the conservation of many of the world's rarest and most endangered species in the wild. They also contribute critically to keeping common species common.

Box 8.5 Reserve management principles for IUCN Category Ia protected areas (strict nature reserve) – Australia

The reserve or zone should be managed primarily for scientific research or environmental monitoring based on the following principles.

- Habitats, ecosystems and native species should be preserved in as undisturbed a state as possible.
- Genetic resources should be maintained in a dynamic and evolutionary state.
- Established ecological processes should be maintained.
- Structural landscape features or rock exposures should be safeguarded.
- Examples of the natural environment should be secured for scientific studies, environmental monitoring and education, including baseline areas from which all avoidable access is excluded.
- Disturbance should be minimised by careful planning and execution of research and other approved activities.
- Public access should be limited to the extent that is consistent with these principles.

Source: CoA (1999)

Managing 'strict nature reserves' (IUCN Category Ia)

Strict nature reserves are among very few areas on Earth where human activities are strictly limited, and they are extraordinarily important for helping to conserve Earth's heritage (Dudley 2008). Many of Earth's species would not exist without the existence of this category. Managing these areas will often be challenging and should take into account guidance principles for Category Ia protected areas (Box 8.5). Management should have regard to:

- strict regulation of official and other visitor use and access through permits and supported by on-ground patrols and regulatory responses to illegal access and poaching; this may have special regard to wildlife management requirements such as breeding and birthing seasons, winter dormancy requirements (bats in caves), species migration patterns and the presence of dangerous animals
- application of invasive species prevention best practice linked to access management including quarantine measures; IUCN guidelines prepared by Wittenberg and Cock (2001) are useful for this work
- implementation of introduced species eradication programs such as those being implemented for Macquarie Island, Tasmania, Australia (TPWS 2014)
- encouragement and facilitation of scientific research including the establishment of reference sites for baseline and long-term measurement of the environment
- respecting and recognising the values and rules of communities governing sites considered sacred or otherwise culturally important in ways that no resource use is allowed
- regular communication with scientists about the special responsibilities they have when entering protected areas and especially a strict nature reserve—providing entry and use guidance (as well as access permission) such as identified in the 2013 IUCN draft Code of Practice for Research—is important (Box 8.6).

Managing 'wilderness areas' (IUCN Category Ib)

Wilderness areas are formally recognised by the IUCN as a protected area category. They are typically large natural areas, and many species need such large areas that are essentially unmodified by humans and that have little permanent or significant human habitation for their survival. They are often the only areas remaining where this opportunity is available. Designated wilderness areas are managed in order to protect their long-term ecological integrity and the natural forces and processes that predominate. They are also managed to be largely undisturbed by human activity and free of modern infrastructure (Dudley 2008). It is also understood that some people do not accept the term 'wilderness', and many cultures around the world have no equivalent term for what in some Western countries is considered a neat dichotomy between 'wild' and 'domesticated'. Such cultural differences and views helped to shape the concept of wilderness prepared by the IUCN in Barcelona in 2008 (Dudley 2008), and further discussions may be anticipated in the future.

Managing IUCN Category Ib wilderness areas should have regard to:

- guidance material prepared for these reserves (Box 8.7)
- providing for public access at low use levels and in a manner that retains the wilderness (natural) condition of the area; this may include policies that emphasise self-reliant recreation and restrict the use of pack animals (such as horses), motorised vehicles (motorcycles, four-wheel drives) and aircraft (fixed-wing and rotary wing)

Box 8.6 Draft code of practice for responsible research and monitoring in protected areas

1. All research must have the necessary national, State or Territory and local approvals and permits, pay any fees required, and strictly follow laws, regulations and social norms and protocols relating to research within protected areas, including with respect to access and benefit sharing under the CBD.
2. All research should obtain necessary ethics approval from research organisations, funding agencies and protected areas with respect to both animal research and social research.
3. Field researchers must adopt the highest precautionary standards to avoid the accidental introduction and distribution of invasive and pathogenic organisms.
4. Field research should minimise disturbance both to the organisms being studied and to other species and ecosystems.
5. Data collection involving the killing of an organism should only take place when this is absolutely essential to the research and has been agreed by managers and follows national rules.
6. Research involving significant alteration to ecosystems including through the killing of organisms should normally not be undertaken in IUCN Category I–IV protected areas unless there is no feasible alternative research location, or unless research is likely to be of significant importance to the conservation goals of the protected area. In all such cases, a detailed impact assessment and cost–benefit analysis should be undertaken before permission is granted, and research should focus on less strictly protected zones of the protected area. Particular attention should be given to whether the areas or species are considered sacred or culturally important to indigenous peoples or local communities and to the degree of threat faced by the species (drawing on the IUCN Red List categories).
7. Where research involves fieldwork in areas occupied by people, or affects species or ecosystems to which people have *de facto* or *de jure* tenure rights or cultural connections, it must have free prior and informed consent from rights-holders in relation to the rights that may be affected, and must be carried out in a way that respects local beliefs, economic and cultural interests, and rights.
8. Managers of protected areas should seek to partner with research organisations to develop collaborative research that will both inform management and meet the needs of the research community for cutting-edge science. In turn, researchers should seek collaborative relationships with managers where the results of their research are likely to inform park or conservation management and build capacity.
9. Researchers should consider the aesthetic values of protected areas and impacts on visitor experience when selecting methods of data collection, radio collaring, constructing research plots, field bases and other actions, and remove all equipment and other materials at the end of the research.
10. Researchers employed by protected area organisations or associated government departments should abide by the same rules and code of conduct, where applicable, as external researchers.
11. Protected area managers should welcome research as an important value of protected areas. They should create clear conditions for permitting research and seek to encourage suitable research in protected areas ideally through a process (such as a research working group) that identifies research priorities.

Source: Hockings et al. (2013)

- guidance provided by *A Handbook on International Wilderness Law and Policy* prepared by the Wild Foundation, which states that '[w]ilderness legislation seeks to protect large natural areas in as wild a state as possible and to maintain the biological integrity of these areas into the future' (Kormos 2008:355), and that wilderness is not about excluding people, 'rather, the key point is that wilderness legislation regulates human use of certain areas to preserve certain wilderness values, while allowing those uses that are consistent with those values' (p. 356)
- enabling indigenous communities to maintain their traditional lifestyle in wild areas in ways compatible with the protected area's conservation objectives
- protecting the cultural and spiritual values of wilderness areas that are special to indigenous and non-indigenous populations
- facilitating low-impact research and educational activities
- restoration of any disturbed areas
- active management of threats such as introduced plants and animals, poaching, and other human-caused threats (Chapter 16).

Box 8.7 Reserve management principles for IUCN Category Ib protected areas (wilderness) – Australia

The reserve or zone should be protected and managed to conserve its unmodified condition based on the following principles.

- Future generations should have the opportunity to experience, understand and enjoy reserves or zones that have been largely undisturbed by human action over a long period.
- The essential attributes and qualities of the environment should be maintained over the long term.
- Public access should be provided at levels and of a type that will best serve the physical and spiritual wellbeing of visitors and maintain the wilderness qualities of the reserve or zone for present and future generations.
- Indigenous human communities living at low density and in balance with the available resources should be able to maintain their lifestyle.

Source: CoA (1999)

Managing 'national parks' (IUCN Category II)

National parks are the best understood and probably the most visited of all the IUCN protected area categories by visitors and communities from around the world. They are primarily managed to protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, but importantly, they promote opportunities for education and recreation in some of the most beautiful natural areas of Earth (Dudley 2008).

National parks are critical for the conservation and protection of species, and may contribute to the conservation of wide-ranging species, regional ecological processes and migration routes, and often form core areas of very large connectivity conservation areas (Chapter 27; Dudley 2008). They are managed for appropriate visitor use for inspirational, educational, cultural and recreational purposes, and national park management of nature-based tourism contributes importantly to local economies (see Chapter 23). Contemporary global policy for national parks takes into account the needs of indigenous peoples and local communities responsibly and equitably, consistent with reserve management objectives, though in practice, in some countries, more needs to be done. National parks provide important opportunities for research, with many research sites monitoring changes in natural environments such as those due to climate change.

Managing IUCN Category II national parks should have regard to:

- guidance material for the management of national parks (Box 8.8)
- management planning and zoning to ensure that large-scale ecological processes are protected; that opportunities for conserving wilderness are secured; that connectivity areas are maintained for wildlife; and that a range of opportunities for visitors for recreation and enjoyment of the park is provided
- working with neighbours and local communities
- restoration of disturbed areas
- active management of threats and incidents
- facilitation of research and opportunities for research
- active management of visitor facilities and visitor services and any emergencies involving people within a park.

Managing 'natural monuments or features' (IUCN Category III)

The focus of management for IUCN Category III protected areas is the protection of specific outstanding natural features and their associated biodiversity and habitats (Dudley 2008). Many of these features are geological phenomena such as karst sites or volcanic landscape features, and are described further in Chapter 18. Many of these protected areas may be culturally significant and may be managed for their natural and cultural heritage values. Managing IUCN Category III 'natural monuments or features' should have regard to:

- guidance material for IUCN Category III protected areas (Box 8.9)
- use of IUCN specialist guidance material for caves and karst protection prepared by Watson et al. (1997)
- use of active threat management, conservation work and restoration action that target the conservation of specific species found only at the monument or feature; this could include, for example, bat colonies within caves and flora species found only within the spray zone of waterfalls
- facilitation of research of the protected area and its natural phenomena
- active management of appropriate visitor use of the protected area.

Box 8.8 Reserve management principles for IUCN Category II protected areas (national park) – Australia

The reserve or zone should be protected and managed to conserve its natural condition according to the following principles.

- Natural and scenic areas of national and international significance should be protected for spiritual, scientific, educational, recreational or tourism purposes.
- Representative examples of physiographic regions, biotic communities, genetic resources and native species should be perpetuated in as natural a state as possible to provide ecological stability and diversity.
- Visitor use should be managed for inspirational, educational, cultural and recreational purposes at a level that will maintain the reserve or zone in a natural or near-natural state.
- Management should seek to ensure that exploitation or occupation inconsistent with these principles does not occur.
- Respect should be maintained for the ecological, geomorphologic, sacred and aesthetic attributes for which the reserve or zone was assigned to this category.
- The needs of indigenous people should be taken into account, including subsistence resource use, to the extent that they do not conflict with these principles.
- The aspirations of traditional owners of land within the reserve or zone, their continuing land management practices, the protection and maintenance of cultural heritage and the benefit the traditional owners derive from enterprises, established in the reserve or zone consistent with these principles, should be recognised and taken into account.

Source: CoA (1999)

Box 8.9 Reserve management principles for IUCN Category III (natural monument) – Australia

The reserve or zone should be protected and managed to conserve its natural or cultural features based on the following principles.

- Specific outstanding natural features should be protected or conserved in perpetuity because of their natural significance, unique or representational quality or spiritual connotations.
- Opportunities for research, education, interpretation and public appreciation should be provided to an extent consistent with these principles.
- Management should seek to ensure that exploitation or occupation inconsistent with these principles does not occur.
- People with rights or interests in the reserve or zone should be entitled to benefits derived from activities in the reserve or zone that are consistent with these principles.

Source: CoA (1999)

Hang Sung Sot Cave, Ha Long Bay World Heritage Property, Vietnam: this World Heritage limestone karst feature, with its large numbers of visitors, has active management to help conserve its geological and geomorphic values

Source: Graeme L. Worboys

Box 8.10 Management principles for IUCN Category IV (habitat/species management area) – Australia

The reserve or zone should be managed primarily—including, if necessary, through active intervention—to ensure the maintenance of habitats or to meet the requirements of collections of or specific species based on the following principles.

- Habitat conditions necessary to protect significant species, groups or collections of species, biotic communities or physical features of the environment should be secured and maintained, if necessary, through specific human manipulation.
- Scientific research and environmental monitoring that contribute to reserve management should be facilitated as primary activities associated with sustainable resource management.
- The reserve or zone may be developed for public education and appreciation of the characteristics of habitats, species or collections and of the work of wildlife management.
- Management should seek to ensure that exploitation or occupation inconsistent with these principles does not occur.
- People with rights or interests in the reserve or zone should be entitled to benefits derived from activities in the reserve or zone that are consistent with these principles.
- If the reserve or zone is declared for the purpose of a botanic garden, it should also be managed for the increase of knowledge, appreciation and enjoyment of a country's plant heritage by establishing, as an integrated resource, a collection of living and herbarium specimens of native and related plants for study, interpretation, conservation and display.

Source: CoA (1999)

Managing 'habitat/species management areas' (IUCN Category IV)

Many protected areas have been reserved specifically to conserve flora and fauna species and their habitats. Often they are very small but they are critical for wildlife, such as remote islands and their use by birds for resting during migration or for nesting. In contrast with IUCN Category I–III protected areas, these areas may require regular management intervention to deal with threats, to achieve restoration and to achieve the conservation of species and their habitats (Dudley 2008).

Managing IUCN Category IV habitat/species management areas should have regard to:

- guidance material for IUCN Category IV protected areas (Box 8.10)
- seasonal (wildlife-focused) management requirements for these protected areas and the role they may provide as an integral part of protecting an entire migration route for a trans-hemisphere migratory species
- the role they may play as part of a core protected area within a larger connectivity conservation area (corridor)
- the possible need for active restoration and threat management on an ongoing basis
- opportunities that are available for providing public education and the appreciation of wildlife species.

Managing IUCN Category V and VI protected areas

IUCN Category V protected areas involve ongoing human change to a landscape and seascape as the value basis for a particular landscape and, for Category VI, resource use. One key purpose is to conserve biodiversity—as with all IUCN protected area categories—but management also involves balancing nature and human use and the management of human cultural landscape features.

Managing 'protected landscapes/seascapes' (IUCN Category V)

Managing Category V protected areas focuses on protecting and sustaining important landscapes and seascapes (and their associated nature conservation and other values) that have been created by humans through traditional management practices (Dudley 2008). Managing IUCN Category V protected landscapes/seascapes should have regard to:

- guidance material for IUCN Category V protected areas (Box 8.11)
- guidance material prepared by Phillips (2002) and subsequent material generated by the IUCN WCPA (Brown et al. 2005; Amend et al. 2008; Mallarach 2008; Dudley and Stolton 2012)
- balancing the interaction between nature and culture through actively protecting nature and working with local communities and indigenous peoples to help retain traditional practices
- recognising and working with local communities and indigenous peoples to help retain traditional practices, including the sustainable governance of their biocultural landscapes and seascapes (Chapter 7)

Box 8.11 Reserve management principles for IUCN Category V protected areas (protected landscape/seascape) – Australia

The reserve or zone should be managed to safeguard the integrity of the traditional interactions between people and nature based on the following principles.

- The harmonious interaction of nature and culture should be maintained through the protection of the landscape or seascape and the continuation of traditional uses, building practices and social and cultural manifestations.
- Lifestyles and economic activities that are in harmony with nature and the conservation of the social and cultural fabric of the communities in the reserve or zone concerned should be supported.
- The diversity of landscape, seascape and habitat, and of associated species and ecosystems, should be maintained.
- Land and sea uses and activities that are inappropriate in scale or character should not occur.
- Opportunities for public enjoyment should be provided through recreation and tourism appropriate in type and scale to the essential qualities of the reserve or zone.
- Scientific and educational activities that will contribute to the long-term wellbeing of resident populations and to the development of public support for the environmental protection of similar areas should be encouraged.
- Benefits to the local community and contributions to its wellbeing, through the provision of natural products and services, should be sought and promoted if they are consistent with these principles.

Source: CoA (1999)

Box 8.12 Reserve management principles for IUCN Category VI (protected area with sustainable use of natural resources) – Australia

The reserve or zone should be managed mainly for the ecologically sustainable use of natural ecosystems based on the following principles.

- Biological diversity and other natural values of the reserve or zone should be protected and maintained in the long term.
- Management practices should be applied to ensure ecologically sustainable use of the reserve or zone.
- Management of the reserve or zone should contribute to regional and national development to the extent that this is consistent with these principles.

Source: CoA (1999)

- dealing with native species that have evolved in association with cultural management systems
- working with the landscape as a buffer area to core protected areas
- working with the landscape/seascape as part of a larger connectivity conservation area/corridor.

Managing 'protected areas with sustainable use of natural resources' (IUCN Category VI)

Some large and essentially natural areas may be managed for objectives of conservation and sustainable use that are mutually beneficial and have been recognised as Category VI areas (Dudley 2008). Managing these areas should have regard to:

- guidance material for IUCN Category VI protected areas (Box 8.12)
- achieving sustainable use of natural resources from the perspective of ecological, economic and social dimensions as a means to secure nature conservation (Chapter 25)
- working with local communities to assist in securing social and economic benefits as well as conserving ecosystems and habitats
- recognising and facilitating ICCAs—for instance, sustainable community forestry, locally managed marine areas and other such approaches (Chapter 7)
- working to ensure threats are actively managed, including the potential for large-scale industrial harvesting of natural resources
- ensuring that a large proportion of the Category VI protected area is retained as a no-take zone (two-thirds has been used as a guide by some countries) (Dudley 2008).

Managing for people officially present in protected areas

A nation's protected areas are typically part of rich and diverse cultural landscapes and multi-sectoral societies (Chapter 5). In addition to visitors (Chapter 23), there are people who may live within protected areas because they are community members of an ICCA, they own or co-own the protected area or they are present for other official reasons. Such people are involved in living and working in and using protected areas as part of their daily lives, and some activities relevant to protected area management are described here. These people and communities are officially present, they are an integral part of protected areas and protected area practitioners need to manage for this.

People living in protected areas for official reasons

There may be many people living in protected areas for official reasons. These could include:

- rangers and protected area law enforcement staff
- protected area field officers responsible for works and services
- protected area entrance station, visitor centre and security staff
- research staff and scientists participating in long-term park-based research projects
- quarantine management and border security staff
- police, ambulance, doctor and fire station staff
- general maintenance and road management staff (such as for snow clearing and road-ice management)
- military personnel within the protected area who assist with the protection of the reserve and, potentially, deal with conflict
- external contract staff responsible for operating services such as water supply, waste removal and sewage treatment works operations
- visitor service support staff for retail outlets, accommodation, restaurants, tours and expeditions, transport/taxi support and other services
- people who lived in the protected area prior to its establishment
- communities living in protected areas of various governance types with various rights such as ownership, resource use and residency status.

Managers would be expected to assist people for protected area management-related matters, including for:

- operational matters such as permit systems for official residents, dealing with emergencies such as human–wildlife issues, emergency medical evacuations and responding to emergency events such as vehicle incidents or pollution spills
- logistical issues such as the provision of power, water, solid waste removal and sewerage services; telecommunication equipment and accommodation; and support services for a range of official organisations
- sensitive social issues such as dealing with trauma and death—some agencies such as the US National Park Service (NPS) have protocols for handling such matters.

From time to time, it may be necessary to deal with a minority of 'official people' to ensure that the reserve is protected. This intervention by 'official people' could include responding to illegal activities such as poaching, theft of protected resources and illegal access.

People working in protected areas

Many people commute to and from or through protected areas for their daily work. Often they bring with them their equipment and materials needed for their work. This access relates to all aspects of management including visitor access services, tourism services and services that underpin operations and work within the protected area. Management considerations may include:

- practical permit systems for access that assist locals
- practical permit systems that assist access for temporary work such as for filming or special events
- the danger of vehicle–wildlife interactions and other safety concerns
- quarantine issues—the introduction of materials and organisms that are adverse to the protected area
- illegal activities such as poaching.

People using and contributing to protected areas

Many people use and positively contribute to protected areas and enjoy these areas in many different ways. Ensuring that their visit is a safe and positive experience is very important. Subject to the specific IUCN categories, management access and service support considerations may include:

- for recreational visitors, a range of recreation opportunities and facilities that matches, where possible, tourism market segments seeking use of the protected area (Chapter 23)

Superintendent's cottage, Mammoth, Yellowstone National Park: this historical structure was built about 1910 as part of the US Army's presence within the park, and forms part of the official staff presence in the park

Source: Graeme L. Worboys

- for visitors accessing for cultural and spiritual reasons, the provision of access services and respectful backup support especially for key events and ceremonies
- for volunteers, the provision of training support, access transport, equipment and materials, where appropriate
- for remote area and other users, the capacity to provide first-aid facilities and, where necessary, emergency evacuation
- for locals, providing assistance to commemorate special historical events and customary occasions.

Management for protected area governance types

There are different forms of governance for protected areas (Chapter 7), with four principal types being recognised (Figure 8.4). Management of protected areas within these different governance types varies, and some aspects of the management for government, shared, private and ICCA protected area governance types are described here. Many management considerations presented will apply to all governance types.

Government managed protected areas

A great many IUCN Category I–VI protected areas around the world are managed by governments as part of a national or sub-national reserve or local government reserve system, and some of the many management requirements of working in a government system are described here. We have already described the all-important governance of protected areas and its focus on the allocation and use of power in different organisations and organisational structures (Chapter 7). Here, for management, we focus on the characteristics of management processes, systems and actions that may need to be completed within a government protected area organisation. It can be expected there will also be some parallel processes and systems for NGOs and for private sector institutions.

Whole-of-government processes

A government protected area organisation is often part of an entire government environment and must manage within this context. Depending on the nation's constitution, its governance structures and the laws of the land, this context may include receiving management response requests from the government, the parliament, executive government and the judiciary. A protected area agency chief executive will need to respond to such requirements.

Governance types / Protected area categories	A. Governance by government			B. Shared governance			C. Private governance			D. Governance by indigenous peoples and local communities	
	Federal or national ministry of agency in charge	Sub-national ministry or agency in charge	Government delegated management (e.g. to an NGO)	Transboundary management	Collaborative management (various forms of pluralist influence)	Joint management (pluralist management board)	Declared and run by individual landowners	... by non-profit organisations (e.g. NGO's, universities)	... by for profit organisations (e.g. corporate owners, cooperatives)	Indigenous peoples' protected areas and territories - established and run by indigenous peoples	Community conserved areas - declared and run by local communities
Ia. Strict Nature Reserve											
Ib. Wilderness Area											
II. National Park											
III. Natural Monument											
IV. Habitat/ Species Management											
V. Protected Landscape/ Seascape											
VI. Protected Area with Sustainable Use of Natural Resources											

Figure 8.4 The IUCN Protected Area Matrix: A classification system for protected areas comprising both IUCN management category and governance type

Source: Dudley (2008)

Legislative requirements

In many countries, as a manager of land, freshwater and marine environments, a protected area organisation will be accountable to protected area legislation as well as (potentially) a range of other legislative (or executive) requirements. Specific accountabilities may also be prescribed, including environmental land-use planning, local government administration, building codes and standards, emergency management, criminal incidents, agriculture quarantine measures, pest animal control, introduced plant species control, fire management and emergency response, anti-pollution responses (water, air, solid waste), mining rights, fishery controls, marine mammal protection, use of firearms, road construction, use of explosives, design standards, workplace management laws, and occupational health and safety requirements. Managers will need to ensure they are knowledgeable of the entire suite of government legislative responsibilities they are accountable for when they manage their protected areas.

Requirements of parliament

Parliament (or equivalent organisations) may instruct that certain actions are undertaken by a protected area organisation. Interestingly, this could include legislation passed by a parliament that is not the legislation of the elected government in power. This circumstance has happened in a democratic parliament where the elected government did not have a majority and was reliant on independents for power. Non-elected government legislation was enacted, it became law and the protected area chief executive was required to implement the legislation, even though it was neither the elected government's policy nor (from their perspective) a priority. Parliament may also request that protected area

experts and top-level managers provide formal evidence to inquiries they are conducting, and parliamentary inquiries and delegations may require assistance for on-site inspections of protected areas.

Requirements of government

In a democracy, the election policies, commitments and promises of an incoming government will set the scene for the protected area organisation's priorities. Responding to these commitments will be the highest priority for protected area organisations and may require substantial realignment of priorities including the cessation of some work and the commencement of new tasks. Once this organisational realignment has been achieved, it will be important for a protected area organisation to implement the policies efficiently and effectively. This requires change management and is a normal and essential part of an organisation's operation. Protected area organisations are independent of party politics and are required to provide information to government in response to issues. Such processes need to be managed efficiently. Organisations will also be expected to routinely provide information on the conservation status and management of protected areas including through state of the parks reporting, annual reports and, potentially in the future, through the IUCN's Green List processes.

Ministerial requirements

A minister in charge of a protected area portfolio will have multiple logistical requirements that need to be managed. Everything from organising briefing meetings, policy preparation, the flow of paperwork for approval and signature and the organisation of very important person meetings to organising special launch events and preparing speeches and field inspections all need to be managed with great precision. Organisations typically have internal systems and checking processes to ensure that briefing notes to the minister, for example, are timely, accurate and concise. For a new minister, organisations usually prepare a briefing portfolio and provide opportunities to meet staff and visit key protected area localities as early as possible in the minister's term. (Most ministers in charge of national parks believe they have the best portfolio in government.) Specific requests for action by the minister need to be accounted for and processes put in place to implement the request. This may also require internal organisational changes for a protected area agency.

Requirements of the courts

Given a nation's courts are independent from the legislature and the police, protected area organisations may receive directives from courts in relation to the management of their areas that may conflict with other directives. Inquiries run by coroners and the courts will usually finish with a range of recommendations for implementation, many (or all) of which are confirmed by government as directives for managers. In an interesting possibility, protected area managers in charge of an area may be required to respond to the requirements of government, the recommendations of the courts and the directives of parliament—all in relation to the same issue.

Requirements of other authorities

There may be a range of legislation that applies to the geography of a protected area and, subject to the circumstances, there may be different, overriding governance accountabilities and responsibilities for management. In an emergency such as a search and rescue, the police may take charge of operations in a protected area. For a wildfire, it may be the fire service that is responsible for the emergency, and for a quarantine issue, responsibility for management may be with an agriculture department. Managers need to ensure that each top-level manager in charge (and their support staff) of these different areas of responsibility is thoroughly briefed on the purpose and management of the protected area and its special protection and conservation needs.

Protected area chief executives managing for biodiversity conservation

In addition to running a protected area organisation efficiently and effectively, a chief executive may be called on to provide advice to a minister and government on key biodiversity conservation issues. Protected areas may be the last location for some species on Earth, and a chief executive will be busy assisting a government to achieve its policies as well as protecting a nation's native species. Regrettably sometimes, proposed government policy requirements will conflict with species' needs and some decisions may mean the demise of a species at a location or even its extinction. In working with a minister and government to resolve such difficult issues, chief executives would, of course, be respectful and courteous; they would use their negotiation skills, their detailed knowledge of the species' needs, their understanding of the specific issue and pre-prepared practical alternatives to help secure an outcome in favour

of species conservation. Such proactive leadership and courage may be needed from time to time if we are to stem the loss of species on our planet. It is also useful to reflect that such attributes of a chief executive described here are considered essential in the 21st century and are described further in Chapter 12.

Organisational change

Organisational change is normal for protected area organisations. It needs to be conducted for legitimate reasons and especially as an investment in achieving goals more effectively, including biodiversity conservation outcomes. Ideally, organisational change takes place in collaboration with staff and may include downsizing due to budget cuts or the enlargement of an organisation due to the addition of new protected areas. Major organisational changes would usually involve a business strategy, a human resource management strategy and an organisational change strategy. A human resource management strategy considers all aspects of working with people in an organisation affected by the change, including, as appropriate, information flow and briefings, capacity development, meeting industry award requirements, employment opportunities, redundancy opportunities, new organisation structures, position descriptions and interview requirements. Factors that are important in developing the human resource strategy would be the degree of change proposed and the type of change leadership to be exercised (Dunphy and Stace 1991). Getting these approaches right is important, and change management specialists would normally play a key role in this process.

Budgets and financial inputs

Managing finances is a basic, routine and essential part of a protected area manager's responsibilities within government (and other organisations). Protected area organisations prepare a financial budget, as do the managers of individual protected areas and individual projects. The same principles apply at each of these levels, though clearly the complexity changes. At the heart of financial management lies a budget plan. At the protected area systems level, this will have been developed from corporate (strategic) planning priorities, routine financial estimates of annual operating costs and inputs from a bidding process where corporately aligned and realistic budget proposals are submitted. Characteristics of a protected area organisation's 12-month budget plan include:

- details of the overall organisational budget amount available
- sources of income that would include capital funds, recurrent funds, funds sourced from revenue and other sources such as donations
- operating expenses such as employee salaries, payroll tax, superannuation, insurance and other costs
- assets and liabilities
- priority budget expenditure programs (which are linked to government priorities and consequently to corporate planning and strategic planning priorities).

Frontline managers in charge of projects are responsible for tracking and managing their expenditure and financial commitments, with both over-expenditure and under-expenditure being issues for an organisation at the end of a financial year. Basic spreadsheet financial controls (or online software equivalents) would itemise income, expenditure and forecast expenditure, allow for regular budget reconciliations and identify project budget milestones. Depending on the type of organisation and the location, these may be achieved using a simple traditional accountant's ledger, a computer spreadsheet program or a much larger whole-of-organisation computerised financial management system.

Middle-level managers often have the responsibility of managing the efficient and effective management of multiple project budgets. Top-level managers are accountable for the entire organisation's budget. Typically there is an end of financial year annual report, which accounts for all aspects of an organisation's budget performance, and there is a routine (annual) financial audit. From time to time, external government organisations such as an auditor-general's department may complete an independent audit of an organisation's financial management.

In managing finances, corruption is always a risk and all managers need to be alert to this potential. Hopefully, this never happens; however, vigilance, regular audits and an 'anti-corruption plan' to avert corrupt conduct are recommended best practice. Areas of financial management particularly vulnerable to corruption include tendering procedures, licensing, the receipt of revenue and the handling of expenditure. Organisations may need to consider implementing special ethics training for employees, and may need to put in place special protection arrangements for whistleblowers.

Human resource inputs

Effective human resource management ensures that the right people are appointed to the right positions at the right time. It also ensures that the right systems to support staff are in place. A government human resource management process may include:

Case Study 8.1 Fire as indigenous forest management: The Soliga of Biligiri Rangaswamy Temple Sanctuary

The Biligiri Rangaswamy Temple Tiger Reserve in India is home to the indigenous Soligas community and is an area of high biological diversity. The forest area was declared a wildlife sanctuary in 1974, resulting in the displacement of Soligas from their traditional settlements; they were settled into colonies either along roads or on the periphery of the reserve. Customary practices—including shifting cultivation, hunting and the use of early dry season fires—were banned. The notification of the wildlife sanctuary altered the social, agricultural and ecological practices of the Soliga. The outcomes of this cessation of customary practice are now becoming evident. Today the forest is covered by the invasive species lantana (*Lantana camara*). Long-term monitoring of the Temple forest across its 540 square kilometre area has demonstrated the rate and extent of lantana spread. Between 1997 and 2008, there was a doubling in extent of lantana presence in sampling plots and a sixfold increase in the density of lantana (Sundaram and Hiremath 2011). There has been a corresponding decline in the occurrence of native plant species, with fewer adult trees of important non-timber forest produce such as Indian gooseberry (*Phyllanthus emblica*) and terminalia (*Terminalia chebula*) as well as other tree species such as axlewood (*Anogeissus latifolia*) and *Kydia calycina*.

The Soligas have a nuanced understanding of the role of fires and their interaction with lantana. They claim that the cessation of fire has produced the above consequences through increased mortality due to deficiency of sunlight for regeneration, and the availability of grazing areas for wildlife has shrunk significantly. They maintain that low-intensity ground fires early in the dry season (*taragu benki* or litter fire) help to control weeds, encourage regeneration of native species and produce fresh grass for wildlife. Their understanding has, however, so far gone unheeded by managers, resulting in an accumulation of biomass that causes canopy fires in the dry season, affecting many wildlife species. Evidence is now accumulating from ecological studies to support the Soliga theory of fire, including that it kills lantana seeds in the soil.

The Soligas have also highlighted the interactions between fire, mistletoes and host tree mortality. Mistletoes are tree hemi-parasites that eventually reduce fruit yield and kill the trees they infest. Observations show that mistletoe infestation on gooseberry is increasing, resulting in more than 50 per cent mortality. Soligas have long held that fires kill mistletoes. It is clear from Soliga situated knowledge and from long-term studies that the suspension of customary management practices in the 1970s has resulted in unintended and adverse consequences. This shows that situated local knowledge and scientific studies can facilitate our understanding of the dynamics of human impacts on natural landscapes. Protected area policy has to urgently incorporate adaptive and situated management practices if we are to prevent the erosion of ecological values and knowledge systems.

— Nitin D. Rai, Ankila J. Hiremath and Siddappa Setty

- planning for human resources (including approved staffing levels and management requirements)
- conducting formal recruitment processes
- selection (that may include organisational affirmative-action targets for particular sectors of the workforce)
- induction
- training and development
- performance management
- compensation payment (for services provided, including industrial award considerations)
- promotions, demotions, terminations or lateral movement
- employee welfare, services, accommodation, transfer support and occupational health and safety support (Worboys and Winkler 2006c).

Each of these matters needs to be carefully managed. Safety and health in the workplace are also particularly important for protected area management. Staff may be operational within protected areas in extreme weather or extreme environments; they may face dangerous circumstances such as wildfire, wild animals and armed poachers; they may use powerful chemicals such as herbicides and pesticides; and they may be operational in aircraft, boats, four-wheel-drive vehicles and using equipment such as chainsaws. Their safety and wellbeing are paramount, and considerations for their training, necessary safety equipment, insurance cover and backup medical support (if needed) are critical (see Chapter 24). Safety may also be more than preventing accidents. In the United States, for example, protected area law enforcement officers may be hurt or killed in the line of duty by law-breakers. In Africa and elsewhere, protected area rangers have been killed in the line duty, with an estimated 1000 rangers killed between 2004 and 2014, mostly by poachers and militia groups (TGL 2014). Organisations may need to actively manage and prepare for such potential dangers to staff.

Local knowledge

Benefiting from local knowledge and experience is an important part of managing protected areas. When combined with professional management expertise and additional scientific inputs (see Chapter 21), it can be of great assistance to biodiversity conservation. One aspect of local knowledge and its application to protected area management are given in Case Study 8.1.

Box 8.13 Shared governance

Complex institutional mechanisms and processes are employed to share management authority and responsibility among a plurality of—formally and informally—entitled governmental and non-governmental actors. Shared governance—sometimes also referred to as co-management—comes in many forms. In 'collaborative' management, decision-making authority and responsibility rest with one agency but the agency is required—by law or policy—to inform or consult other stakeholders. Participation in collaborative management can be strengthened by assigning to multi-stakeholder bodies the responsibility of developing technical proposals for protected area regulation and management, to be submitted ultimately to a decision-making authority for approval. In 'joint' management, various actors sit on a management body with decision-making authority and responsibility. Decisions may or may not require consensus. In any of these cases, once decisions about management are taken, their implementation needs to be delegated to agreed bodies or individuals.

Source: Dudley (2008)

Shared governance of protected areas

Shared governance is an important approach to protected area management that brings with it special management requirements. The concept of shared governance is explained in Box 8.13.

Shared governance may include a range of management responses including:

- cultural awareness capacity building for protected area practitioners
- operational capacity building for all protected area practitioners, especially vocational training for the use of specialised plant and equipment
- enhanced consultation and meeting processes
- agreed dispute-resolution processes
- different time frames for decision-making.

From recent Australian Indigenous Protected Area (IPA) management experiences, for example, special management requirements have included:

- enhanced collaboration and indigenous engagement to enhance cooperative or joint management arrangements over a range of different government protected areas
- recognition of cultural aspirations for indigenous peoples as well as protected area management purposes
- revised protected area management plans and potential lease-back arrangements for management (Rose 2012).

Trans-boundary initiatives

One form of shared governance relates to trans-boundary protected areas, which involve at least two or more governments and possibly other local actors (Dudley 2008). Cooperative trans-boundary agreements between nations can help conserve habitats such as those needed by migratory species. In relation to the Altai-Sayan area of Russia, for example, a 2009 trans-boundary agreement between Kazakhstan and Russia (for two adjoining protected areas) was an important contribution to protecting endangered species (Badenkov et al. 2012). Trans-boundary agreements are discussed further in Chapters 7 and 27.

Private protected areas

Exclusive hunting reserves established by the monarchs and aristocracies of Europe and elsewhere reflect the antiquity of the concept of private protected areas. Private governance comprises protected areas under individual, cooperative, NGO or corporate control and/or ownership, which are managed under not-for-profit or for-profit schemes (Dudley 2008). Private reserve systems are growing rapidly in number around the world (Mitchell 2005) and, if they are integrated into a national reserve system framework, they can potentially provide a powerful contribution to biodiversity conservation (Figgis et al. 2005). There are many private protected areas around the world, and a contemporary description of them was crafted by Brent Mitchell of the IUCN WCPA, who stated:

> Origins of the private approach to protected areas can be traced to private initiatives to create conventional, public protected areas, and in most cases are inextricably linked to government conservation regimes. (Examples of private individuals creating protected areas and gifting them to the public for governments to manage are many and familiar. Some are centrepieces of national systems of protected areas.) What sets private protected areas apart is that land ownership is not relinquished to the state, or at least not fully. The origin of the word private is the Latin *privatus*, 'withdrawn from public life,' in turn derived from *privus*, 'single, individual.' But oddly neither of these necessarily apply to private protected areas. Though private ownership is retained, when

Kingsmill Creek and the ancient (Precambrian) Arkaroola limestone reef, Arkaroola Protection Area, a private protected area in the northern Flinders Ranges, South Australia

Source: Graeme L. Worboys

> truly managed as protected areas private reserves have public benefits—either direct (e.g. immediate public access) or indirect (biodiversity conservation or ecological services). And *privus* need not apply: in fact a majority of PPAs are not owned by a single individual. (Mitchell 2005:1)

The definition of a private protected area was developed in 2003 at the Durban World Parks Congress: 'a land parcel of any size that is 1) predominantly managed for biodiversity conservation; 2) protected with or without formal government recognition; and 3) is owned or otherwise secured by individuals, communities, corporations or non-governmental organisations' (Mitchell 2013:1).

The definition means that 'ownership' may be held by a variety of individuals, groups or organisations.

Purpose of private protected areas

Landowners may pursue conservation objectives because of their personal commitment to nature; it may be for personal benefit through financial returns from ecotourism, land valuation cost and taxation relief; it may be for public relations purposes; or it may be for a mix of reasons. Within the bounds of the law, landowners are free to exercise their management over these lands.

An assumption underlying the recent growth in private protected areas is that management will be most effective when the managers have an interest in the land—a legal or economic interest, or interest as an individual, a group or a corporation. But we must not be naive. Though non-confrontational and, in most cases, apolitical, working willingly on a voluntary basis, landowners are not always motivated by altruistic intentions (Mitchell 2005:2).

Mitchell (2005) further advises that more work needs to be done on the issue of standards of management for private protected areas.

Board of management

Some private protected areas are managed by a board of management. A creative and visionary board targeting biodiversity conservation outcomes (and free of the constraints that may otherwise limit governments) may enable investment in innovative protected area management practice. Where there is a greater commercial and business focus, the priority may be to manage for a profit or for breaking even financially to continue their work. This may mean that investments for dealing with threats to biodiversity do not always have priority.

Protected areas governed by indigenous peoples and local communities

This governance type includes two main subsets: first, indigenous peoples' areas and territories established and run by indigenous peoples, and second, community conserved areas established and run by local communities. The subsets, which may not be neatly separated, apply to both sedentary and mobile peoples and communities (Dudley 2008). The concept and role of ICCAs as important contributors to heritage conservation and especially biodiversity conservation have been championed by a number of organisations and individuals, and in particular, the IUCN's Theme on Indigenous Peoples, Local Communities, Equity and Protected Areas (TILCEPA) and the ICCA Consortium. Kothari (2006:1) states that ICCAs have burst upon the global conservation scene and 'are the most exciting development since the concept of "protected areas" came into vogue, over a century back'. Though the generic term ICCAs is increasingly in use, other terms such as indigenous protected areas, biocultural heritage sites, and community reserves, are also used (Kothari et al. 2012). 'The conservation of sites and species by indigenous peoples and local communities is age-old. But the fact that these are equivalent in many ways to conventional, government-managed "protected areas", has only recently been recognised' (Kothari 2006:1).

ICCAs in the landscape

ICCAs can be very small or very large and provide multiple conservation values, harbouring important biodiversity or forming integral links to other protected areas, or being part of landscape conservation initiatives such as connectivity conservation areas. Many ICCAs are part of national reserve systems, but most are not yet formally recognised as sites of conservation importance.

ICCA vision

For many indigenous peoples and local communities, the vision for a protected area is often unwritten; it is orally transmitted over generations, and is encompassed within a larger understanding such that it may not even be clearly distinguished from other aspects of life.

ICCA management

ICCAs have been introduced and defined in Chapter 2, their governance described in Chapter 7, with further aspects of their management presented in Chapter 25. Management actions may include:

Villagers of Munsiari, Western Himalaya, India, undergoing bird identification training

Source: Ashish Kothari

- clearly mapping the boundaries of their ICCA
- establishing formal recognition by government(s) of the ICCA
- developing a community protocol for conservation of the area
- developing consultation with outside groups which may threaten unwanted developments
- preparing and implementing a monitoring plan for natural resources to track the condition of scarce species
- preparing and implementing a management plan for the area
- undertaking climate change awareness planning and responses
- managing finances to maintain local traditions and livelihoods while protecting the ICCA (UNEP-WCMC 2013).

Managing protected areas in special contexts

Many protected areas have been established or exist in very different social, political and environmental contexts. In this book, for example, we have specifically recognised the management of protected areas for geoheritage sites (Chapter 18), freshwater areas (Chapter 19), marine environments (Chapter 20) and biodiverse

sites (Chapter 21). In this chapter, we focus on protected areas situated in or at the edge of large population centres, which are referred to as 'urban protected areas'.

Managing urban protected areas

Urban protected areas technically may be any one of IUCN Categories Ia to VI, but most commonly they are Category II and Category V protected areas. They may technically be from any of the four governance types, though most of them are administered by governments at national, state or provincial, or local levels, with some managed by NGOs, businesses or communities and some as collaborative efforts. These are IUCN category protected areas in every sense and do not include conventional urban parks with lawns, flowerbeds and sports fields. They often require special management. Urban protected areas are distinctive in several ways. They:

- receive large numbers of visitors, including many who visit frequently, even daily; many of these visitors lack experience of wilder forms of nature, and they tend to be much more diverse ethnically and economically than visitors to non-urban protected areas
- relate to numerous actors in the urban arena, including government decision-makers, communications, media and opinion leaders, and key educational and cultural institutions
- are threatened by urban sprawl and intensification of urban development
- are disproportionately affected by crime, vandalism, littering, rubbish dumping and light and noise pollution
- are subject to such urban edge effects as more frequent and more severe fires, air and water pollution, and the introduction of invasive alien species (Trzyna 2014).

Why they matter

Urban protected areas are important for all the reasons any protected area is important, such as providing ecosystem services, protecting species and supporting the local economy with income from tourism. They have a critical role, however, that sets them apart from other protected areas. They provide opportunities for large numbers of urban people to experience nature, including many people who may not be able to visit more remote protected areas (Box 8.14). This is important for two reasons.

1. Regular contact with nature is good for people. Aside from the benefits of outdoor exercise, there is growing scientific evidence to support the idea that spending time in nature improves physical and mental health, and the concept of 'healthy parks, healthy people' has emerged (Chapter 6).
2. Urban people are critical for nature conservation nationally and globally. More than half of humanity lives in urban areas and this proportion is growing dramatically. Wealth is concentrated in cities, as are communications media. Worldwide, there is a general trend towards more democratic political systems in which voters hold ultimate power. Conservation depends on support from urban voters, urban donors and urban communicators. Yet urban people tend to have less and less contact with nature. People will value nature only if they care about nature where they live.

Twelve challenges and opportunities especially relevant to urban protected areas

The following management challenges and opportunities are pertinent to some IUCN category protected areas, but they are especially relevant to zoned IUCN Category II protected areas, for example, in or adjoining large population centres.

1. **Providing access for all, reaching out to diverse ethnic groups and the underprivileged:** This includes accommodating disabled people, choosing words and symbols for compliance signs carefully, and using a range of languages in signs and publications where appropriate. It also includes encouraging direct public transportation, supplying transportation if necessary, providing well-mapped and clearly marked trails and making bicycle routes and rental bicycles available where possible.
2. **Engendering a local sense of ownership:** To promote appreciation of their protected area among local residents, managers should draw on writers, artists and other creative people and their works and ideas that relate to it. They should promote appreciation of their area's cultural, as well as natural, assets. Making facilities available for the events of governmental agencies, NGOs and businesses helps build good relations with these organisations.
3. **Demonstrating, facilitating and promoting good environmental behaviour:** Urban protected areas offer opportunities to reach large numbers of people with information about the causes and consequences of climate change and demonstrations of energy efficiency, energy and water conservation, and reduction, reuse and recycling of materials.

Box 8.14 Urban protected areas around the world

The following examples of urban protected areas represent different world regions, socioeconomic situations, natural environments, sizes and styles of management.

- The harmonious interaction of nature and culture: Table Mountain National Park: Cape Town, South Africa (metropolitan population: 3.9 million; Category II; 25 000 hectares of land; 100 000 hectares of the Atlantic Ocean). The park includes iconic Table Mountain, the Cape of Good Hope and unparalleled floral diversity. It is managed by South African National Parks and is part of a natural World Heritage property.
- Hong Kong Country Parks: Hong Kong (metropolitan population: 7 million; Category V; 44 000 hectares of land; 1430 hectares of marine park). These mountainous parks cover 40 per cent of Hong Kong's otherwise intensively developed territory. They are administered by the Government of the Hong Kong Special Administrative Region of China.
- Blue and John Crow Mountains National Park: Kingston, Jamaica (metropolitan population: 580 000; Category II; 580 000 hectares). This national park protects wet tropical forests that are habitat for diverse wildlife and a key source of water for cities and agriculture. It is managed by an NGO, the Jamaica Conservation and Development Trust, under contract from the National Government.
- London Wetland Centre: London, United Kingdom (metropolitan population: 8.3 million; Category IV; 42 hectares). The centre is a 're-creation' of wetlands along the River Thames. It has been created and managed by an NGO, the Wildfowl and Wetlands Trust.
- Santa Monica Mountains National Recreation Area: Los Angeles, California, USA (metropolitan population: 18 million; Category V; 62 300 hectares). This recreation area extends from the city's heart to the Pacific Ocean, and top-predator mountain lions (*Felix concolour*) are resident. The recreation area is managed as a cooperative effort between the US National Park Service and two California State protected area agencies.
- Calanques National Park: Marseille, France (metropolitan population: 1.5 million; Category II; 8500 hectares of land and 43 500 hectares of the Mediterranean Sea, plus buffer zones). This park includes rocky inlets, headlands and islands that have been heavily influenced by human activity over millennia. The park is managed by an administrative council comprising representatives of national and regional agencies and local governments, various interest groups, residents of the park and park staff.
- Nairobi National Park: Nairobi, Kenya (metropolitan population: 3 million; Category II; 11 700 hectares). This park is a protected corner of a large savannah ecosystem, and is home to an impressive array of wildlife species, including the black rhinoceros (*Diceros bicornis*) (IUCN critically endangered), lion (*Panthera leo*), leopard (*Panthera pardus*), buffalo (*Syncerus cafer*) and hippopotamus (*Hippopotamus amphibus*). The park is managed by the Kenya Wildlife Service.
- Tijuca National Park: Rio de Janeiro, Brazil (metropolitan population: 12.8 million; Category II; 4000 hectares). This is a mountainous national park that is almost entirely covered by restored tropical rainforest. It is part of a cultural World Heritage property and is jointly managed by the municipality and the national protected area agency, the Instituto Chico Mendes de Conservação da Biodiversidade (Chico Mendes Institute for Biodiversity Conservation).
- Bukhansan National Park: Seoul, Republic of Korea (metropolitan population: 25 million; Category V; 8000 hectares). The park is dominated by granite mountain slopes and wooded valleys and receives more than 10 million visitors a year. It is managed by the Korea National Park Service.
- Royal National Park: Sydney, Australia (metropolitan population: 4.7 million; Category II; 16 000 hectares). This national park is the second-oldest in the world, established in 1879. Formerly on the outskirts of Sydney, it now lies to the east of extensive urban suburbs. The park includes natural heathland, woodland, forest, rainforest, streams and wetlands, and is bordered by the Pacific Ocean, an estuarine inlet, suburbs and a transportation corridor. It is managed by the NSW National Parks and Wildlife Service.

4. **Demonstrating, facilitating and promoting the health benefits of being in contact with nature as well as good eating habits:** Urban protected areas have an important role to play in encouraging a healthy lifestyle. Spending time in the healthy environment of nature improves both physical and mental health. For parks that have food outlets, an alternative to selling conventional fast-food items can be the provision of nutritious, local and sustainable fresh food for visitors.
5. **Preventing littering:** Littering is a perennial problem in many urban protected areas, with their large numbers of visitors, many of whom regard these places as extensions of the built environment. Managers should draw on the results of local research on littering behaviour; however, certain measures apply everywhere: cleaning up litter frequently and consistently, providing plenty of containers for rubbish and cigarette butts, and informing visitors of the importance of and reasons for not littering.

6. **Reducing human–wildlife interaction and conflict:** Although conflict between people and wildlife can occur almost anywhere, dense human populations near urban protected areas increase the likelihood of such encounters. Predator animals are of particular concern. Managers should help people protect themselves from predators and seek to maintain a balance between them and their wild prey. Public education has a key role. Keeping habitat as natural as possible helps control emerging zoonotic diseases (diseases transmitted between other animals and humans).

7. **Controlling invasive species:** The main pathways by which invasive alien species invade new territory are urban. These include seaports, river ports, airports, rail and truck yards, plant nurseries and gardens. Urban protected areas can be both facilitators and victims of such traffic. Managers should survey their lands and waters regularly to detect new invasions and participate in local and national partnerships for quarantine, prevention, early detection, eradication and control (Chapter 16).

8. **Promoting connections to other natural areas:** Managers should cooperate with other public agencies and NGOs to prevent their areas becoming green islands, including by containing or guiding urban sprawl, maintaining and creating corridors to other natural areas and rural lands, and creating and maintaining buffer zones. Trails linking urban natural areas are physical and psychological connectors to the natural environment.

9. **Helping infuse nature into the built environment:** Managers of urban protected areas and their supporters should participate in region-wide nature conservation coalitions, projects to develop comprehensive local biodiversity strategies, and efforts to protect, restore and infuse natural elements in the built environment.

10. **Controlling encroachment:** Illegal building in protected areas may be associated with the poor as well as the wealthy and politically well connected. Managers should prevent and control all encroachment by remaining vigilant, enforcing the law, seeking help from local authorities and enlisting the cooperation of local people.

11. **Reducing impacts of noise and artificial night-time light:** Noise—defined as unwanted sound—and artificial night-time light can be problems in any protected areas, but those in urban settings are especially vulnerable. Humans and wildlife are stressed by noise from visitors, road and rail traffic, aircraft and other sources. Artificial night-time light interferes with organism and ecosystem function, impedes visitors' enjoyment of the night sky, as well as astronomy, and can intrude on appreciation of cultural heritage sites in their authentic state. Some urban protected areas are making progress towards protecting natural soundscapes and the night sky by developing indicators and standards, educating visitors, enforcing regulations and working with local authorities and businesses in adjoining communities.

12. **Cooperating with institutions that have complementary missions:** Educating young people about nature through visits by school and youth groups is a core mission of almost all urban protected areas. Another set of connections is less obvious. Typically there are several kinds of museums and similar institutions in metropolitan areas aimed at educating and sensitising people to the natural world, but these institutions rarely work together. Managers of urban protected areas could encourage natural history museums, science centres, zoos, aquariums and botanic gardens to provide information and exhibits about nature and conservation challenges in their regions and cooperate towards that purpose. This can start with cross-promotion such as a museum providing visitors with information about natural places to visit nearby and exhibits in protected areas directing visitors to museums.

Other problems especially relevant to urban protected areas include fire, crime, vandalism, flooding, and air and water pollution. Other opportunities include training urban teachers, taking advantage of highly motivated and well-educated urban volunteers, and cooperating with urban universities. These matters are discussed further in Trzyna (2014).

Understanding the differences between urban and non-urban protected areas

In a protected area system, urban national parks and nature reserves are almost always a minority. The organisational cultures of such systems tend to be based on protected areas that are more remote. Their staff members often come to urban assignments from posts in non-urban protected areas. It is imperative therefore that those staff with experience in managing urban protected areas should share their experience with their non-urban colleagues (Case Study 8.2). This can be done at protected area organisation training sessions, on field trips and through staff exchanges.

Case Study 8.2 Managing the Sydney Harbour National Park: A unique challenge

Nestled within and surrounded by Sydney Harbour is a unique collection of natural reserves that constitute Sydney Harbour National Park. At just less than 400 hectares, the park is made up of islands, massive sandstone headlands and bush remnants isolated by the Sydney City urban area. The natural bushland and cliffs of the park set the scene for one of the most beautiful and famous harbours in the world. These natural gems have been saved by virtue of being important for past military and quarantine purposes, or they have been conserved by local communities which use and enjoy them. The Federal and NSW State governments established the park in April 1975, completing a vision that had begun in the late 1800s.

The park has protected many important Aboriginal sites, and we are fortunate that after more than 200 years, the Koori community has survived and thrived and is reclaiming their heritage, lore and connection to land around the harbour. The park is managed by a small professional team supported by specialist sections of the NSW National Parks and Wildlife Service (NPWS). An annual budget of about A$3 million in 2014 is supplemented by departmental programs such as capital works, targeted government and external grants and revenue from the many tourism ventures, events, filming and business operators who use the park.

The staff manage the park by balancing a range of sometimes conflicting values, uses and assets. This necessitates a robust and adaptive management approach, strongly focused on communications and consultation. Key to this is the plan of management (2012), which outlines the guiding principles, key values, threats and desired outcomes.

The park's diverse nature means that different precincts need to be managed in different ways using a suite of strategies to address the conservation values, recreational uses and local community needs. North Head, for example, is managed primarily for the endangered communities of little penguin (*Eudyptula minor*), long-nosed bandicoot (*Perameles nasuta*) and eastern Sydney banksia scrub (less than 3 per cent remains in New South Wales). On the other hand, Nielsen Park is a highly managed 'modified natural environment' that includes open parklands and the historical Greycliffe House (1852), juxtaposed alongside the only known population of endangered Nielsen Park she-oak (*Allocasuarina portuensis*).

While the primary aim of the plan of management is the protection of natural and heritage values, it also emphasises improving visitation, accessibility and transport linkages to the park's islands and headlands. There is also the increasing challenge of event and venue management, including weddings, filming and the spectacular New Year's Eve events on the harbour, which attract millions of visitors hosted across multiple tenures and responsible authorities.

The park's team also has responsibility for wildlife across the majority of inner Sydney. This can range from basic native fauna issues to the resource-intensive management and monitoring of whales, dolphins and other marine life in the harbour and coastal waters. Experts, volunteers and the media all assist with implementing adaptive and integrated management, education and communications strategies essential for a good outcome.

The park is forging closer ties with the private sector in an attempt to improve its management efficiency and financial returns in support of key objectives. The aim is to maintain the heritage values of hundreds of historic sites and buildings, including the adaptive reuse of many significant heritage assets. Community and corporate volunteers contribute tens of thousands of hours of their time to improve the park every year, as well as providing significant funding via donations and grants. They are primarily involved in successful bush regeneration of heavily impacted semi-natural or 'anthropogenic' ecosystems, which has resulted in many native animals, including more than 150 recorded bird species, resettling in this 'new nature'.

The Sydney Harbour National Park, in its iconic harbour and international setting, serves as a focus of the importance of both New South Wales' national parks and protected areas nationally and worldwide. The park provides a unique opportunity for the public to be actively engaged and inspired to take on stewardship of its parks, reserves and the broader environment. It also plays a vital role in introducing the next generation to the bush, a mini-version of the 'big' parks as well as protecting our oldest European heritage in Australia and some of the oldest Indigenous heritage in Sydney.

— Michael Treanor, Area Manager, Sydney Harbour National Park, NPWS, Office of Environment and Heritage, New South Wales, Australia

Conclusion

Management is an intuitive concept and it is part of what we do in our everyday lives. For official management actions, we usually need to be more organised, and this chapter has reinforced the importance of a process of management and four underpinning functions of management: planning, organising, implementing and evaluating. These functions are common to most management—written or unwritten—and underpin management frameworks and many management support tools. Managing systems of protected areas and individual protected areas strategically and consistent with established principles provides a basis for the effective conservation of biodiversity and other natural and cultural heritage. This includes considerations at a global level as well as site-based requirements. Four different governance types help achieve management implementation but in turn they each need different management support. There are also variations in how protected areas are managed in particular physical, social and political contexts: in this chapter, protected areas in urban areas have been examined in detail.

Sydney Harbour National Park, The Spit to Manly walk: natural bushland in the heart of the City of Sydney, New South Wales, Australia

Source: Hamilton Lund, DNSW

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