Government of **Western Australia**
Conservation Commission

Conservation Commission
WESTERN AUSTRALIA

Review of Management Planning:

Management Plan Review Package (June 2009)

The Conservation Commission of Western Australia (the Commission), which has statutory responsibility for the preparation of management plans for lands vested in it, is currently undertaking a major review of management planning in Western Australia. This review is underpinned by a wide investigation into management planning being undertaken.

The Commission has already adopted three principles that guide the new management planning framework: a regional approach to management planning, more concise documents and meaningful objectives. These principles are described in two documents developed by the Commission: *Management planning – A changed approach* and *New planning regions*.

As part of the wider investigation into management planning that it is undertaking, the Commission has commissioned a study by Murdoch University. The research being conducted by Murdoch University includes a review of best practice in management planning (Stage One) and consultation with a range of stakeholders (Stage Two). The report entitled *Learning from others: A selective review of management planning approaches in Australia* that is presented in this package is a report on Stage One of the study. Information arising from the investigation will guide changes to the management planning framework in Western Australia. It is expected that the Murdoch University study will be considered in its entirety by the Commission by the end of 2009.

This Management Plan Review package is intended for stakeholders and includes the following documents:

- *Management planning – A changed approach*
- *New planning regions*
- Stage One Report prepared by Murdoch University, entitled *Learning from others: A selective review of management planning approaches in Australia.*

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SUBJECT: MANAGEMENT PLANNING – CHANGED APPROACH

The Conservation Commission of Western Australia is seeking changes in respect to the structure and approach adopted in the development and presentation of management plans for lands vested in the Conservation Commission.[1] This document sets out the rationale behind the change in broad terms, decisions that have been taken on key principles, studies that are underway and some items under consideration.

BACKGROUND

A large percentage of the vested terrestrial conservation estate is not covered by a management plan. This is a problem at a statutory level along with the need to show that the lands held on behalf of the public are being managed appropriately. It is to everyone's benefit that the manner in which the estate is being managed is clearly understood across the State.

It is recognised that the amount of information contained within management plans has increased over time and this produces very wordy documents containing a large amount of material that, whilst interesting, might not be directly applicable to the specifics of management strategies. This demand contributes, for example, to the time taken for plan preparation and the time taken to process the public verification of contents.

The level of 'uptake' of management plans is variable. It is acknowledged that competing resource demands and management issues contribute to this variability. Plans must be effective and useful guides for managers, key stakeholders and the public.

Concerns have been expressed over the length of time being taken to prepare individual reserve plans. This has impact on resources, the credibility of the process as context changes and the ability to show a response to changing circumstances. The Conservation Commission is very mindful of the issue of staff and fund availability, and increasing constraints on these.

Planning processes should deliver in such a way as to be cost effective in their preparation, be produced in a timely manner, maximise coverage, clearly define the main values and opportunities, threats and management responses, and be readily accountable.

ACTIONS

The Conservation Commission has undertaken two major actions.

[1] Statutory functions of the Conservation Commission are given in the *Conservation and Land Management Act 1984.* For example in relation to management planning *S19(1)(f)(g), S54* apply.

Firstly the Commission has adopted three overall principles to be applied to management plans. This was considered at the Conservation Commission's meeting of 8 December 2008 and the principles that guide a new planning framework are:

A regional approach
Planning areas relate to a suite of reserves in geographical area rather than individual reserves. Broad mapping has been developed for the State which can be used as a guide in determining final planning region boundaries. The regions developed include biogeographical parameters along with existing administrative boundaries established by the Department of Environment and Conservation (DEC).

More concise documents
Plans are focused on relevant site specific values, threats and management responses. For example, background information, including detailed site descriptions and generic information, including policy, which relates to all reserves, is kept in a separate reference or resource document, or is kept on a web accessible data storage site. The latter would be more effective due to not having to cover drafting and publication costs.

Meaningful objectives:
Plan objectives and strategies are precise, specific, achievable, realistic, time-related and measurable. This has been referred to as the need to have less 'aspirational' documents but this was misconstrued to infer that plans should have no higher level aspirations or would constrain the taking up of opportunities that might arise during the planning period. Plans should relate to higher level commitments at the State, national and international levels. An effort to be achievable and realistic does not mean aspirations are forgone per se, indeed it is important to write objectives in a way that retains openness to new opportunities as they arise.

In discussions held with senior staff of DEC the adoption of these principles has been supported.

Secondly the Conservation Commission established a research project, undertaken by Murdoch University, to investigate current thinking on best management practices for the preparation and presentation of management plans, with a focus on how the plans might best serve people who wish to use them or are required to comply with them.

The research project is broadly comprised of three components:

Stage 1. Undertake a review of best practice through a literature review and interaction with planning practitioners at a national level.

Stage 2. Consult with a range of stakeholders, primarily those people responsible for the implementation of management plans, to assess expectations of plans and means of improving plans.

Stage 3. Prepare a report for the Conservation Commission.

Consultation with a range of staff within DEC will occur as a requirement of the research project and it is intended to conduct a series of workshops with DEC on the outcomes of both the research project and the Conservation Commission framework to clearly identify expected outcomes.

The original intention of the Commission was that the definition and adoption of key principles would occur following the research project. At the request of the consultant, and in recognition of the expertise of the consultant, the Commission agreed to a one year delay in starting the project. Over the course of the delay, the Commission was presented with a number of plans, which highlighted the need for action sooner, rather than later. A major implication for the consultancy project is that the Conservation Commission is especially interested in examples of best practice in management plans and processes that relate to the three broad principles

It is to be noted that the research project is one of a number of areas of work that will provide guidance to the Commission.

CONSULTATION

The Conservation Commission is concerned with ensuring that the new management planning framework is appropriate in the West Australian context, and in identifying an efficient and effective process for implementing the new framework. There are a range of interwoven actions needed to bring about the establishment of the required change. All aspects of plan preparation should eventually be investigated. For example, it will be necessary to ensure that the legislative requirements of the *Conservation and Land Management Act 1984* continue to be met.

A further example is the establishment of appropriate objectives and the linked identification of performance indicators. In a number of cases it has been identified that the factors designed to indicate whether the objectives (desired outcomes) are being met do not facilitate an effective assessment. The problem could relate to an inappropriate objective or the relationship between the objective and the means for measuring progress.

The Conservation Commission is certain that the required change to the approach to management planning is achievable and will be of great assistance across a wide range of levels (plan preparation, coverage, costs and resources, implementation, success assessment, etc.). To that end it is important to ensure that a variety of communication measures are in place for the constructive exchange of ideas and information. If anyone wishes to seek clarification on the contents of this document, provide their views on the varied aspects of management planning or be kept up to date with progress, please contact the Commission either via email, phone or in person. The contact person for the project is Carol Lacroix (9387 1766; caroll@conservation.wa.gov.au)

MAY 2009

Review Date: September 2009

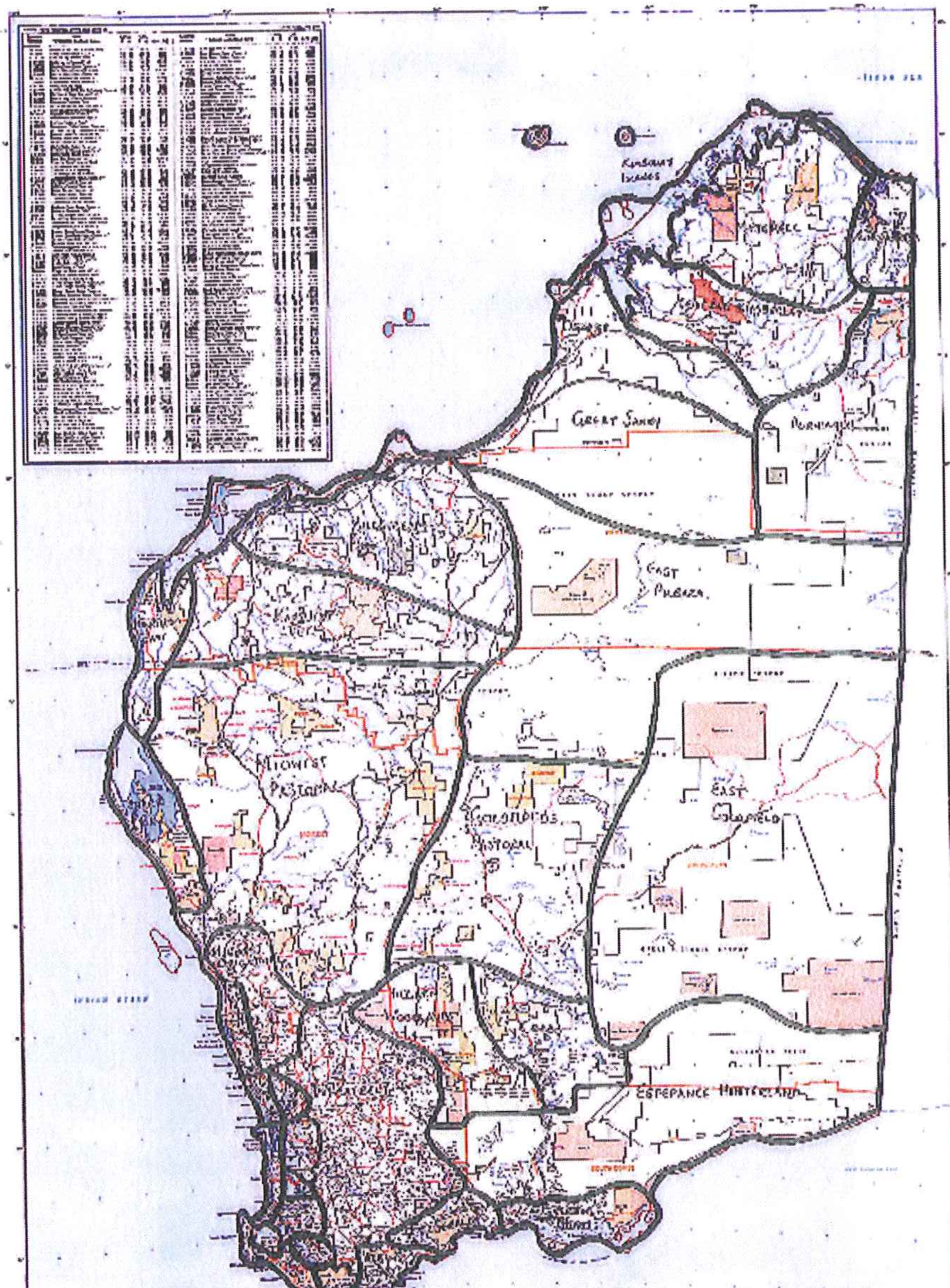
New Planning Regions

The new 'planning region' approach to management planning involves the formation of 35 new Planning Regions in Western Australia. These Planning Regions were accepted by the Conservation Commission on 11 May 2009 and are outlined in Table 1 and Figure 1 (attached). Please note that the current list of Planning Regions and their boundaries may be subject to minor amendments prior to finalisation.

Table 1: Planning regions and reserves

	Planning Region	**Reserves in the planning region include:**
1	Blackwood	Whicher, Blackwood River, Milyeannup, Hilliger, Wiltshire-Butler NPs, other reserves
2	Credo	Goongarrie and Credo NPs, Clear & Muddy Lakes NR, Rowles Lagoon CP
3	Monadnocks	John Forest NP, Kalamunda NP, Midgegooroo NP, Helena NP, Wandoo NP, Monadnocks CP, Mooradung NR, other reserves.
4	Purnululu	Purnululu NP, Purnululu Conservation Reserve,
5	East Pilbara	Karlamilyi (Rudall River) National Park
6	Fitzgerald	Fitzgerald River NP, Koornong, NR, Kundip NR, Jerdacuttup Lakes NR, other reserves
7	Midwest Pastoral	Karara (Former Lochada, Karara, Kadji Kadji, Burnerbinmah, Warriadah, Thundelarra & Barnong stations), Gascoyne (Kennedy Range NP, Mt Augustus NP, former Boologooro, Mt Philip, Waldburg, Dalgety Downs, Doolgunna, Pimbee, Mooloogool stations), Murchison (Toolonga NR, former Muggon, Twin Peaks, Narloo, Yuin, Noongal & Dalgaranga stations)
8	Mitchell	Mitchell River NP, Lawley River NP, Laterite CP, Camp Creek CP, Prince Regent NR, Drysdale River NP. King Leopold Range CP, Charnley River CP
9	East Goldfield	Gibson Desert NR, Mangkili Claypan NR, Great Victoria Desert NR, Queen Victoria Spring NR, Plumridge Lake NR, Neale Junction NR, Yeo Lake NR & De La Poer NR
10	Esperance Hinterland	Peak Charles NP, Frank Hann NP, Dundas NR, other reserves north of Recherche sub-bioregion; Nuytsland NR;Eucla NP. Yellowdine NR, Jilbadji NR, Lake Julston and other reserves
11	Swan Coastal Plain south	Forrestdale Lake NR, Thompson Lake NR, Leda NR,Yalgorup NP, Lake McLarty NR, Goegrup Lake NR, Buller NR, Sabina NR other NRs. Vasse-Wonnerup Reserves, Harvey Flats NR, Riverdale NR, Crampton Wellard NR, Byrd Swamp NR, Korijekup CP, Leschenault Peninsula CP, Benger Swamp NR , Tuart Forest NP
12	Southern Forest	Gloucester, Warren, Greater Hawke, Greater Beedelup, Easter, Jane, Greater Dordagup, Boorara-Gardner NPs, Shannon other NRs, Shannon NP, D'Entrecasteaux NP
13	Wheatbelt	Includes over 700 nature reserves. Dryandra Woodland.
14	Lesueur coast	Nilgen NR, Namming NR, Wanagarren NR, Nambung NP, Souther Beekeepers NR, Badgingarra NP, Drover Cave NP, Lesueur NP, Coomallo NR, Beekeepers NR & other NRs; WA Coast Islands Reserves (incl. Turquoise Coast islands). Includes 13 island nature reserves for 40 islands

15	Ashburton	Karijini NP, 2015 additions.
16	Avon valley	Walyunga NP, Avon Valley NP, Bullsbrook NR, Moondyne NR, Leschenaultia CP, Beechina NR, Clackline NR, Boonanarring NR & other NRs
17	Yilgarn woodlands	Mount Manning Range NR, Helena and Aurora Range CP, Mt Manning Range CP, Wallaroo Rock CP, Jaurdi CP, Mt Elvire CP, Die Hardy/Jackson/Windarling Range NR, Granite Sandplain Woodland CP, Boorabin NP, Goldfields Woodlands NP, Goldfields Woodlands CP, Victoria Rock NR, Burra Rock NR & Cave Hill NR, Karroun hill NR
18	Central Kimberley	Geike Gorge NP, Geike Gorge CP, Brooking Gorge CP, Devonian Reef CP, Tunnel Creek NP, Windjana Gorge NP, King Leopold Range CP, Charnley River CP
19	Midwest Agricultural	Includes a number of NRs
20	Swan Coastal Plain North	Yanchep NP, Neerabup NP, Neerabup NR, Yeal NR, Moore River NR, Moore River NP, & other NRs
21	Southern Jarrah	Extends from Blackwood River NP to Wellington NP
22	Ningaloo Coast	Cape Range NP, Jurabi CR, Bundegi CR & Muiron Islands NRs, Ningaloo Coast former pastoral leases
23	Goldfields pastoral	Lorna Glen CP, Earaheedy CP, Wanjarri NR, Lake Mason CP, Black Range CP, Kaluwiri CP, Ida Valley CP & Cashmere Downs CP
24	Millstream	Millstream Chichester NP, Mungaroona Range NR & Meentheena. Murujuga NP
25	Pilbara Islands	Barrow Islands complex, Montebello Islands complex, Dampier Archipelago complex (Dolphin Is NR, Reserve 36913, Enderby & Rosemary NR, Cohen Is NR)
26	Lane Poole	Lane Poole Reserve, , Falls Brook NR, other NRs.
27	Great Sandy	Dragon Tree Soak NR; Coulumb Point NR.
28	Kununurra	Ord River NR, Parry Lagoons NR, Miriuwung Gajerrong reserves, Mirima NP, Point Spring NR; Ord Regent Reserve
29	Walpole	Walpole-Nornalup NP, Mt Frankland NP, Mt Frankland North NP, Mt Frankland South NP, Mt Roe NP, Mt Lindesay NP, William Bay NP, Biyndaminup NP, Quarram NR, Oqingup NR, Mehniup NR, Mt Shadforth NR, Kordabup NR & other NRs
30	Shark Bay	Francois Peron NP, Bernier & Dorre Islands NR, Shark Bay Islands NR, South Peron CP, Nanga CP, Edel Land NP, Dirk Hartog Island NP, Zuytdorp NR, Monkey Mia CP, Kalbarri NP
31	Leeuwin Naturaliste	Leeuwin Naturaliste NP, Yelverton NP, Bramley NP, Forest Grove NP, Scott NP, Gingilup Swamps NR, Blue Rock Cave NR, Haag NR, Stockdill Road NR, Walburra NR & other reserves
32	Muir	Lake Muir NP, Lake Muir NR, Tone-Perup NR, Greater Kingston NP, Unicup NR & other NRs
33	Esperance Coast	Stokes NP, Cape Le Grand NP, Cape Arid NP, Recherche Archipelago islands, Muntz NR, Nuytsland NR (crosses two subregions),other NRs
34	Albany Coast	West Cape Howe NP, Torndirrip NP, Albany islands, Gull Rock NP, Mt Martin, Two Peoples Bay NR, Waychinicup NP, Pallinup CP, Stirling NP, Porungurup NP & other NRs
35	Kimberley Islands	


Great Sandy
East Pilbara
Midwest Pastoral
Goldfields Pastoral
East Goldfield
Esperance Hinterland

Learning from Others: A Selective Review of Management Planning Approaches in Australia

Report prepared for the Conservation Commission of Western Australia

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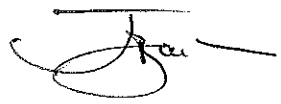
Foreword

This report was commissioned by the Conservation Commission of Western Australia (the Commission), which has statutory responsibility for the preparation of management plans for lands vested in it.

The Commission is currently conducting an investigation into management planning. The research being undertaken by Murdoch University, the first stage of which is described in the report, represents one part of the wider investigation being undertaken by the Commission. Information arising from the investigation will guide further changes to the management planning framework in Western Australia.

It should be noted that the Commission has already undertaken a commitment to three principles that guide the new management planning framework: a regional approach to management planning, more concise documents and meaningful objectives. The report should be read in conjunction with documents developed by the Commission: *Management planning – A changed approach* and *New planning regions*.



John Bailey
CHAIR
Conservation Commission of Western Australia

CONTENTS

Summary

Background

This report was commissioned by the Conservation Commission of Western Australia. In this State management plans are prepared by the WA Department of Environment and Conservation for submission, by the Conservation Commission, to the Minister for the Environment. This report is part of a broader review of management planning in WA also commissioned by the Conservation Commission of Western Australia. The objective of this broader review is to:

1. Finalise the development of a framework for producing good quality management plans that relate to a regional planning area, are concise and can be implemented, and where the framework emphasises both the planning process and product.

As such, this report reviews management planning and plans in Australia, predominantly using web-accessible material, as well as providing detailed insights into planning practices and products in Queensland, NSW and Victoria obtained through interviews with their staff. The intention is to learn from practice elsewhere and provide a platform for the broader review.

With the new millennium, protected area management and by association management planning, is being affected by a number of factors including the new paradigm for protected areas (of greater community engagement among other things), increasing interest in and emphasis on how protected areas are 'governed', the political imperative of being able to value protected areas and manage for these values, and renewed calls for adaptive management.

Recent reviews

Reviews of management planning have recently been completed by NSW DECC and Parks Victoria. Changes recommended to the planning system in NSW include: shifting to values-based planning; improving monitoring and management reporting for parks; linking management planning to other processes/procedures for management; and making management plans the drivers of management. The Victorian review recommended a tiered approach with strategic efforts at the State level, 15 year management plans for parks in landscapes (i.e. clustered parks in single plans), 5 year implementation (regional) plans and 1 year action (operational) plans.

Status of management plans

The last 2-3 years has seen a resurgence of the centrality of management plans in protected area management, in large part in response to the 'new millennium' issues raised above. Differing expectations, however, still accompany these plans, as one agency member commented:

> People have all different expectations about…management plans. Some of them want them [plans] to be the precise recipe book that says this is how I go about doing x, y and z. Others like it to be really vague because then they can do whatever they like.

Plan content and presentation

Agencies Australiawide have reduced the resource information included in management plans, preferring to locate it elsewhere or not collect it. The same applies to policy information, with an increasing emphasis on the benefit of cross-linking from plans to policies held elsewhere and publicly available. The continuing lack of general availability, to the public, of policy materials was identified by a number of those interviewed as a shortcoming. Interviewees were divided on whether plans should include detailed action statements. Although no agencies had objectives that were all readily measurable, a number had management strategies and actions that were measurable.

Parks Victoria summarised the importance, to them, of being able to measure and report on their

management effectiveness:

> This agency is interested in plans that: (1) can help show that they have maintained or…improved the condition, that [their] activities have produced an outcome; (2) tie up the strategies…in plans to what can…and needs to be measured; (2) reflect what is in the business and the 1-year action plans in more detail; and (3) direct accountabilities for people taking carriage of some of the major strategies.

Plans are presented in a variety of styles. Most are now limited to 30-40 pages.

Planning processes

All agencies interviewed were considering or had progressed clustering of reserves geographically proximate, and/or with similar values and issues. All lacked enthusiasm for using IBRA regions. They noted clustering as providing benefits across landscapes especially in terms of providing a range of recreation opportunities. 'Nesting' of a larger reserve within a clustered plan was accepted, rather than separating it out.

The links between management plans and operational planning were difficult to un-package and were generally poor with agencies noting they needed to pay more attention to these links.

Evaluation of the effectiveness of protected area management was undertaken through state of the parks reporting in two of the States (NSW, Victoria). Some evaluation of management plan implementation was also underway in both States but not yet linked to the state of the parks processes (but intentions to do so). Queensland has a comprehensive Excel-based approach to tracking and reporting on management plan implementation and effectiveness, however, links with other management and reporting components are not yet streamlined.

The internet is being widely used to provide access to draft and final plans. Parks Victoria has an ambitious project underway using the internet to run the Alpine National Parks management planning process (using blogs, facebook, wikis, social networking).

Improvements in plans and planning processes require agency change. Those interviewed commented that change is best achieved by careful consultation with staff, especially those in regions and districts, and with other key stakeholders. Championship of the required changes by senior agency staff is critical.

Challenges

The challenges for the future identified in this report are:

- Producing concise plans quickly.
- Integrating management plans with other policies and agency activities.
- Planning in the face of uncertainty.
- Developing a protected area management (planning) framework.
- Developing objectives that allow for the measurement of management effectiveness *and* adaptive management.

1 Scope of this report

This report was commissioned by the Conservation Commission of Western Australia. In this State it is the function of the Conservation Commission to submit proposed management plans to the Minister for Environment.[1] The Conservation Commission is responsible for preparing proposed management plans and reviewing existing management plans,[2] through the agency of the WA Department of Environment and Conservation (WA DEC). Management planning has been a core activity of the WA DEC since the Department's inception in 1985. Such planning is a legislative requirement (CALM Act 1984 WA).

This report is part of a broader review of management planning in WA. The objective of this broader review is to:

1. Finalise the development of a framework for producing good quality management plans that relate to a regional planning area, are concise and can be implemented, and where the framework emphasises both the planning process and product.

As such, this report reviews management planning and plans in Australia, predominantly using web-accessible material, as well as providing detailed insights to planning practices and products in Queensland, NSW and Victoria obtained through interviews with their staff. The intention is to learn from practice elsewhere and provide a platform for the broader review. The questions provided by the Conservation Commission to guide this project and directing this review are given in Appendix 1.

Management planning processes in Western Australia, as in many other jurisdictions, are being reviewed and adjusted on the basis of the lessons learned from over two decades of activities and rapidly changing expectations regarding protected areas and their management. There is widespread concern regarding the slow rate of plan production, especially giving the renewed recognition of the centrality of management plans in protected area management. In Western Australia, for example, the Department and its predecessor have produced over the last two decades 51 management plans with a further 27 plans in various stages of completion. A total of 18.4% of the Department's estate is covered by these plans (Department of Environment and Conservation Annual Report 2006-2007). Given this rate of production it seems unlikely that all of the State's protected areas will be covered by management plans. The same situation holds in most if not all States in Australia.

The Conservation Commission has recently developed a new framework (agenda) for management planning in large part to address this concern. The three central tenets are:

1. Prepare management plans for a planning region (based on logical groupings of reserves) rather than individual reserves and take into account IBRA regions in these groupings;
2. Make plans briefer by removing resource inventory material (and potentially other material as well); and
3. Focus plans more tightly on actions that achievable.

The project, of which this review is part, uses this framework as a starting point.

2 Changing context for management planning in the 21st century

The main purpose of management planning is the interpretation and integration of policies,

[1] Conservation and Land Management Act 1984 (WA) S19(1)(f)
[2] Conservation and Land Management Act 1984 (WA) S54(1)(3)

treaties, strategies, business plans and legislative requirements into a framework to guide management of a particular protected area (ANZECC, 2000). Management plans are the principal statutory instrument guiding management and are also the primary mechanism for involving and informing the public and government on how a protected area will be managed. Most other planning instruments are less open for public review.

With the new millennium, protected area management and by association management planning, has or will be affected by a number of factors, including the new paradigm for protected areas, increasing interest in and emphasis on how protected areas are 'governed', the political imperative of being able to value protected areas and manage for these values, and renewed calls for adaptive management.

2.1 A new paradigm for protected areas

The new millennium has seen a ground swell of opinion that the paradigm shaping how protected areas are managed is changing. The suggested new directions are summarised in Table 1. This paradigm, developed from the Fifth World Parks Congress held in Durban, South Africa in 2003, recognises that in addition to conserving biological and cultural diversity, the social and economic aspects of protected areas must be considered (Phillips, 2003). Of particular importance for management planning is the increased importance of public engagement, the change in management techniques highlighting the need for adaptive long-term planning, and the need to involve multi-skilled individuals who can draw on local knowledge (Table 1).

2.2 Good governance for protected areas

The new millennium has also seen increased interest in governance of protected areas, with it identified as central to the conservation of such areas (WCPA 2003, cited in Dearden et al., 2005). According to Graham et al. (2003), governance is the interactions among structures and processes that determine how power and responsibilities are exercised, how decisions are made, and how stakeholders are involved. These authors and others subsequently (e.g. Eagles, 2009; Lockwood, 2008; Moore et al., 2008) have suggested five principles of good governance for protected areas:

1. Legitimacy and voice;
2. Direction;
3. Performance (includes effectiveness and efficiency);
4. Accountability (includes transparency); and
5. Fairness (includes equity) (Graham et al., 2003).

Management plans, properly prepared and implemented, can help agencies to practice good governance. Such plans assist protected area management to be seen as legitimate (principle 1), for example, through enabling public consultation about management. Plans are also pivotal in translating international, national and state policy directions into on-ground actions (principle 2). New ways of thinking about management planning, as providing a guide and means for assessing management effectiveness, help meet the performance principle (3). Publicly reporting on management effectiveness, as part of the implementation and review of management plans, helps with agency transparency and ensuring accountability to stakeholders (principle 4). Principle 5 (fairness) is achieved if all affected stakeholders have the opportunity to be involved in management planning. Management plans clearly have a major role to play in good governance for protected areas.

Table 1. A new paradigm for protected areas

	As it was: protected areas were…	As it is becoming: protected areas are…
Objectives	▪ Set aside for conservation ▪ Established mainly for spectacular wildlife and scenic protection ▪ Managed mainly for visitors and tourists ▪ Valued as wilderness ▪ About protection	▪ Run also with social and economic objectives ▪ Often set up for scientific, economic and cultural reasons ▪ Managed with local people more in mind ▪ Valued for the cultural importance of so called "wilderness" ▪ Also about restoration and rehabilitation
Governance	Run by central government	Run by many partners and involve an array of stakeholders
Local People	▪ Planned and managed against people ▪ Managed without regard to local opinions	▪ Run with, and in some cases by, local people ▪ Managed to meet the needs of local people
Wider context	▪ Developed separately ▪ Managed as 'islands'	▪ Planned as part of national, regional and international systems ▪ Developed as 'networks' (strictly protected areas, buffered and linked by corridors)
Perceptions	▪ Viewed primarily as a national asset ▪ Viewed only as a national concern	▪ Viewed also as a community asset ▪ Viewed also as an international concern
Management techniques	▪ Managed reactively within a short timescale ▪ Managed in a technocratic way	▪ Managed adaptively in a long term perspective ▪ Managed with political considerations
Finance	Paid for by taxpayer	Paid for from many sources
Management skills	▪ Managed by scientists and natural resource experts ▪ Expert led	▪ Managed by multi-skilled individuals ▪ Drawing on local knowledge

Source: Phillips (2003)

2.3 Values-based planning and management

Management plans are strategic documents that usually take either a values-based or issue-based approach (where the focus is the major issues facing an area). In the past most plans had an issue-based approach, however, recently there has been a shift by some protected area agencies in Australia to a values-based approach where the focus is on achieving goals expressed in terms of values and attributes of an area (Table 2) (Hockings et al., 2008). The values-based approach to management planning is preferred rather than an issue or threat approach because it focuses on what is important, provides for a more holistic view, is less time-bound and is adaptive (Leverington, 2005). It also importantly provides an ongoing means for communicating to society, including politicians and other decision makers and fundors, about the values of protected areas.

Table 2. Planning approaches taken by protected area agencies in Australia

Agency	Predominantly value- or issue-based approach to planning
Environment Australia (see Kakadu National Park Management Plan, 2007-2014)	Issue
NSW DECC (see Jervis Bay National Park and Woollamia Nature Reserve Draft Plan of Management, 2007)	Values approach proposed
Parks Victoria (see Greater Bendigo National Park Management Plan, 2007)	Issue
WA DEC (see Millstream-Chichester National Park and Mungaroona Range Nature Reserve Draft Management Plan, 2007)	Values and issue
NT Parks and Wildlife Commission (see Rainbow Valley Conservation Reserve Joint Management Plan, 2008)	Values
SA DEH (see Witjira National Park Draft Management Plan, 2008)	Issue
Queensland EPA (see Girraween National Park Draft Management Plan, 2009)	Values
Parks and Wildlife Service TAS (see Trevallyn Nature Recreation Area Management Plan, 2008)	Predominantly issues
GBRMPA (see Cairns Area Plan of Management, 2008)	Values

The Nature Conservancy (2003) recommends the use of no more than eight conservation 'targets' or values as a basis for management planning. Values can be natural, social, cultural or economic and can relate to a variety of things e.g. a species, the landscape, a place, a story or an event. Values need to be identified by managers but awareness is needed as they are socio-culturally determined and therefore subject to change. By taking this approach any decisions relating to the protected areas need to be based on the protection of the value(s) that represent the area (Hockings et al., 2008).

Protecting values does not mean that there will be no impacts or disturbance to an area. Instead the size and type of disturbance needs to be consistent with giving support to the protection of the value over competing claims. In the long term the values-based approach is more effective because it provides a more systematic structure compared to issues-based planning, better links to the goals of conservation policy and legislation as well as being consistent with the outcomes focus of modern public sector management. The values-based planning approach also responds to the present while providing a decision-making framework for the future (Hockings et al., 2008).

2.4 Adaptive management

In the past management plans have been regarded as inflexible with limited ability to adapt to developing knowledge. The length of plans and their inability to adapt has resulted in many being ignored, especially when they have been perceived as out-of-date (Worboys et al., 2005). To avoid this adaptive management is required for management plans. Such management allows

for information from the past to feed back into and then change and improve management in the future (Hockings et al., 2004). Recognition of uncertainty is also integral to adaptive management. Catering for uncertainty can be built into management plans so when knowledge becomes available it is used to inform and if necessary modify management practices (Worboys et al., 2005). The Park Management Framework (Figure 2) proposed by Hockings et al. (2008) illustrates the adaptive management process. Values provide the foundation of the Framework.

Figure 1. Park Management Framework (Source: Hockings et al., 2008)

To ensure adaptive management is achievable management plans need to set broad directions due to the operational length of the plans. By having broader statements they are able to adapt as the context changes or as the knowledge becomes available.

3 Methods

This report is based on a web-based review and interviews with staff from Queensland EPA, NSW DECC and Parks Victoria. The web review focused on planning practices and products by protected area agencies in Australia and elsewhere. Key sources included the websites and associated web-based literature of protected area agencies and organisations, such as the National Park Service (United States), Parks Canada, Countryside Council for Wales (United Kingdom), and World Commission on Protected Areas. Agency sites from across Australia were also accessed. Other sources included journal articles, guidelines, frameworks and similar studies completed in other countries. Identification and sourcing of this material was conducted via searching journal databases and internet search engines using terms such as 'plans of management', 'protected areas', 'planning', 'management', 'frameworks', and 'park management'. The management plans selected for detailed review (the associated analysis appears in a number of this report's tables) are those most recently completed by Australian protected area agencies and accessible from the web. Excerpts from these plans are included in Appendix 2.

Interviews were conducted with 10 staff from the Queensland EPA, NSW DECC and Parks Victoria. Included were planners and their managers, plus staff involved in management effectiveness evaluation and auditing of management plans. These interviews asked questions about how plans are prepared, what they contain and how the agency incorporates or relates planning to their other management activities (Appendix 3). They collectively also address, either partially or completely, the questions provided by the Conservation Commission to guide this project (Appendix 1).

4 Other reviews

In recent years a number of inadequacies of management plans have been highlighted. These include plans: being either too long and scientific, or too short and general; having unrealistic expectations; containing objectives that do not have effective implementation mechanisms; and the absence of an adaptive framework (Lockwood et al., 2006). This has resulted in several protected area agencies undertaking reviews to try and improve the planning process.

4.1 Best Practice in Protected Area Management Planning report

The *Best Practice in Protected Area Management Planning* report (ANZECC, 2000) aimed to identify current 'good practices' in protected area management planning. Relevant objectives included:

1. Identifying the purpose and audience of management plans;
2. Identifying processes used to undertake management plans;
3. Identifying processes used in absence of management plans;
4. Identifying the content, detail and form of current management plans; and
5. Determining best practise in the preparation, implementation, monitoring and evaluation of management plans.

Methods included a desktop review of benchmarking literature, detailed discussions with members from a benchmarking group, a questionnaire distributed to benchmarking partners, and meetings. The report found that due to the trend for leaner 'issue-focused' management plans by 2001 most agencies will have achieved complete planning coverage of the higher status, high use protected areas.

The report identified that planning needed to improve with respect to:

- Effectively involving indigenous people in planning.
- Integrating management plans with policy and strategic planning, budgeting and development planning.
- Monitoring, evaluating and reporting on plan implementation, and their effectiveness in meeting management objectives.
- Using the internet for greater public participation.

4.2 Review of the New South Wales Parks and Wildlife Division's Plan of Management Process

The NSW Parks and Wildlife Service commissioned the *Review of the New South Wales Parks and Wildlife Division's Plan of Management Process* (Hockings et al., 2008) after it was reported that management plans were not the primary driver in managing reserves. The objective was to identify opportunities for improving the way Parks and Wildlife Division (PWD) develops and presents its management plans as well as provide practical tools to implement any recommendations. Interviews were held with 18 senior managers and planning staff who had been selected by PWD.

The review highlighted the importance of vertical integration. Vertical integration refers to how planning at one operational level at PWD relates to and influences planning at other levels. Management plans need to be coordinated and integrated across the levels of the organisation. Consistency is needed in the preparation and approval for planning documents as well as the actual documents themselves. The procedures for preparation and approval are as important as the policies and documents. Management plans provide direction for regional and operational plans.

The review recommends changes to improve the planning system to benefit park management. Of particular relevance to this report are:

- Values-based planning. Adopt a framework that is committed to planning based on the conservation values of each park. All management plans to include specific statements of conservation values.
- Improve systemic discipline in the planning process – adopt systems to ensure accountability for following proper planning procedures.
- Improve monitoring and management reporting for parks by establishing a park planning and management data system that contains information on each park which allows tracking of implementation of actions and achievement of objectives in management plans.
- Link management plans to other plans/processes for management to formalise as well as strengthen the links between management plans and other plans/processes. Management plans are not linked to budgets or resource allocation, nor monitoring and evaluation. Management plans are poorly linked to regional strategies and need to feedback to policy.
- Make management plans the drivers of management to increase their effectiveness. Ensure operational plans and budget decisions for a particular park are related to goals and strategies set out in management plans.

Several tools were suggested for improved planning. These included:

- Link management plans to operations and budgets. Prepare operational plans and allocate budget priorities based around the actions and strategies outlined in management plans. Ensure management plans provide clear strategies and actions to guide operational plans and budgets.
- Cluster parks for planning. Develop management plans for cluster of parks when conditions are appropriate including small park areas with similar or related values and similar threats and under one management jurisdiction.
- Capacity build. Implement a program of staff training that includes planning; hold an annual forum for planning staff to discuss issues; create an electronic planning blackboard that allows for web-based discussion of planning topics.
- Plan presentation. Make management plans more engaging by reducing reliance on narrative to convey information. Presentation and style of management plans needs to be linked to level of plan being prepared and level of service. Invest in better templates that will cater for different levels of plan and which link to the level of service ascribed to a park.

4.3 Parks Victoria: Park Management Plan Reform

A recent review of management plans was undertaken for Parks Victoria. The scope of the *Parks Victoria: Park Management Plan Reform* (Kismet Forward, 2009) was to:

- Review management plan structure, content and style to identify best practice and innovative approaches.
- Consider future planning needs and the need to accommodate a diversity of parks.
- Develop a new updated contemporary plan structure, contents, and style.
- Engage internal and external parties in the development of an updated contemporary standard that is accepted by the Department of Sustainability and Environment and supported as an improvement by staff and community.
- Explore options to improve accessibility and be readily web enabled for use on Wikipedia, face book.

This reform has resulted in a new framework with a tiered approach to planning. Figure 2 illustrates a working example of the tiered framework with park trails. The first tier (blue) is the overall strategic approach to park management by Parks Victoria – including legislation, policy and organisational principles. The second tier (yellow) is a long-term strategic management plan (15 years) articulating the strategic direction and measurable outcomes and objectives for a group of parks in the landscape. This tier relies on 5 year checks and 5 year State of Parks reporting. The community has the opportunity for input during the initial plan development as well as during the 5 year checks.

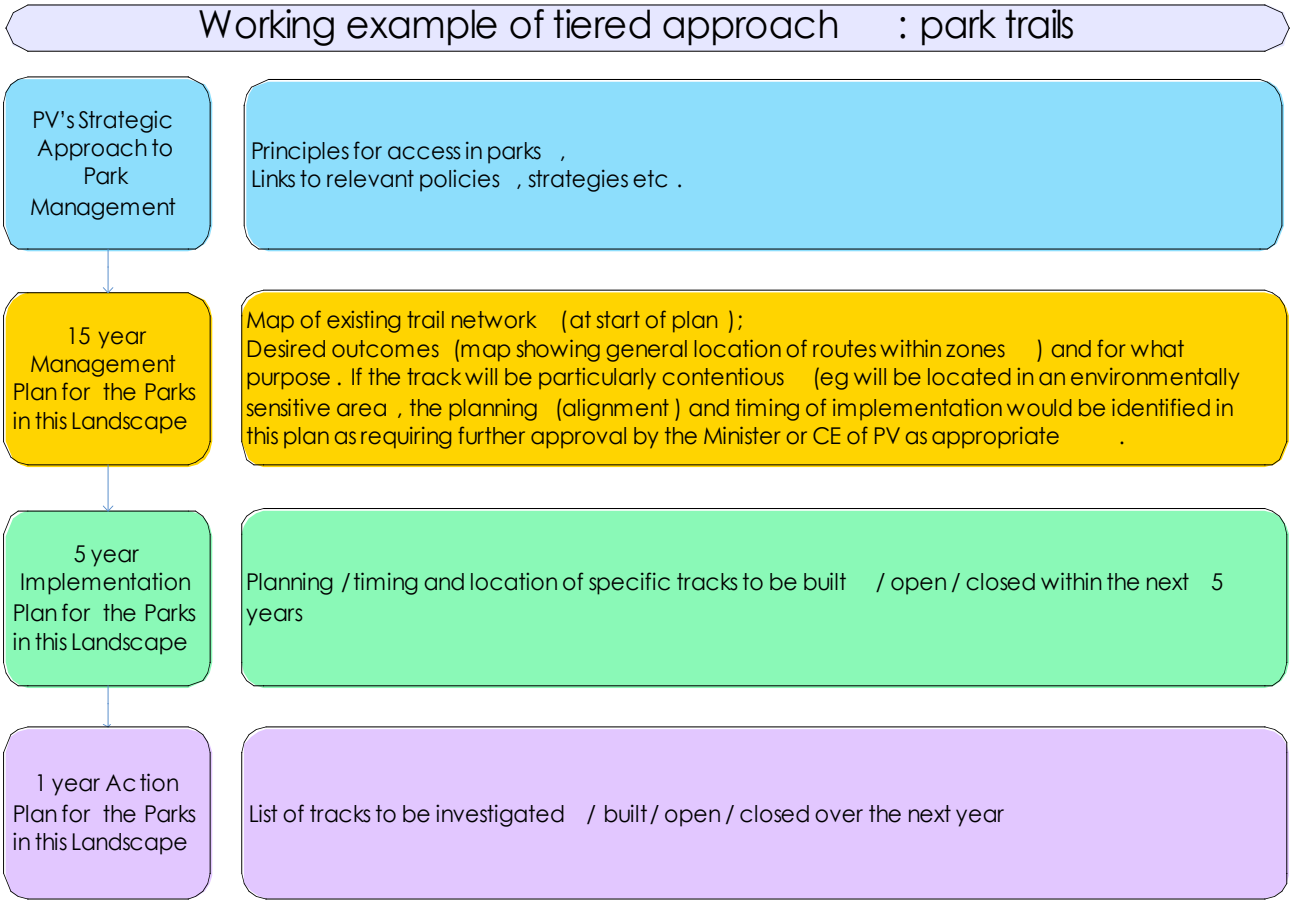


Figure 2. Working example of Parks Victoria's tiered approach (Source: http://weplan.parks.vic.gov.au/)

The third tier (green) is an implementation plan articulating what will be done to achieve the outcomes and objectives over a 5 year period. The community also has the opportunity for feedback and input to this plan. The final tier (purple) is the action plan that directs work over

the next year. It also has a proviso for community input. The aim of the new management plans is to be simple, inclusive accessible documents.

4.4 Queensland EPA: Planning, Evaluating and Managing Parks – Bridging the Gaps. Discussion Paper

A discussion paper titled *Queensland Environmental Protection Agency (EPA): Planning, Evaluating and Managing Parks – Bridging the Gaps* was prepared by the EPA in 2005 (Leverington, 2005). It highlighted issues regarding the current format of management plans, the time taken and resources needed to produce plans, along with the usefulness of plans in Queensland. The discussion paper made a number of recommendations, including a new format based on values-based planning.

Since 2005 Queensland has developed a new approach for their management plans, which is strongly values-driven. These plans are concise and include three main sections. The first includes management intent (the intent for managing the key values); basis for management (legislation and agreements and Traditional Owners); and location, context and surrounding land use (includes maps) (2-3 pages). The second section highlights the key components of protecting and presenting the park (includes landscape, water, plants and animals, culture, visitor opportunities, education and science, community partnerships) including for each status, desired outcomes, and where possible measurable actions and guidelines. The third section is also in table format and summarises other key issues.

4.5 Parks Canada: Guide to Management Planning

Also of relevance to this review is the *Parks Canada Guide to Management Planning* (Parks Canada, 2008) for protected heritage areas. This guide described the context in which management planning occurs as well as the requirements and expectations for the steps in the planning cycle. There are three main concepts to their plans – the vision, key strategies and area approach (Figure 3). The plans begin with a short clear vision statement. This statement draws on the broader landscape including its ecological, social and cultural aspects. The vision statements are supported by key strategies. The key strategies provide the framework for setting objectives, targets and actions for the protected area as a whole as well as specific locations. The area management approach ensures an integrated approach to planning. This approach could be useful for dealing with specific values or issues when developing a management plan for a group or cluster of parks.

5 Findings

5.1 Status of management plans in agencies

In Australia, all park management agencies are required by legislation to produce management plans for protected areas. The NSW State of the Parks review found that parks with a plan are better managed than parks with no plan (Hockings et al., 2008). And, parks with a draft plan are better managed than parks with an old plan. This is because the actual process of developing a plan results in better management. This is due to increased park data, managers required to think about the park strategically, greater contact between stakeholders and managers, and the need for managers to reflect on current management (Hockings et al., 2008).

The process of developing management plans varies from state to state in Australia due to differing legislative requirements. The format and content of management plans has changed over recent years with standard formats more or less being used within each agency. Generally there has been a move to shorter and more concise plans that focus on significant values and issues with little background resource information included (ANZECC, 2000).

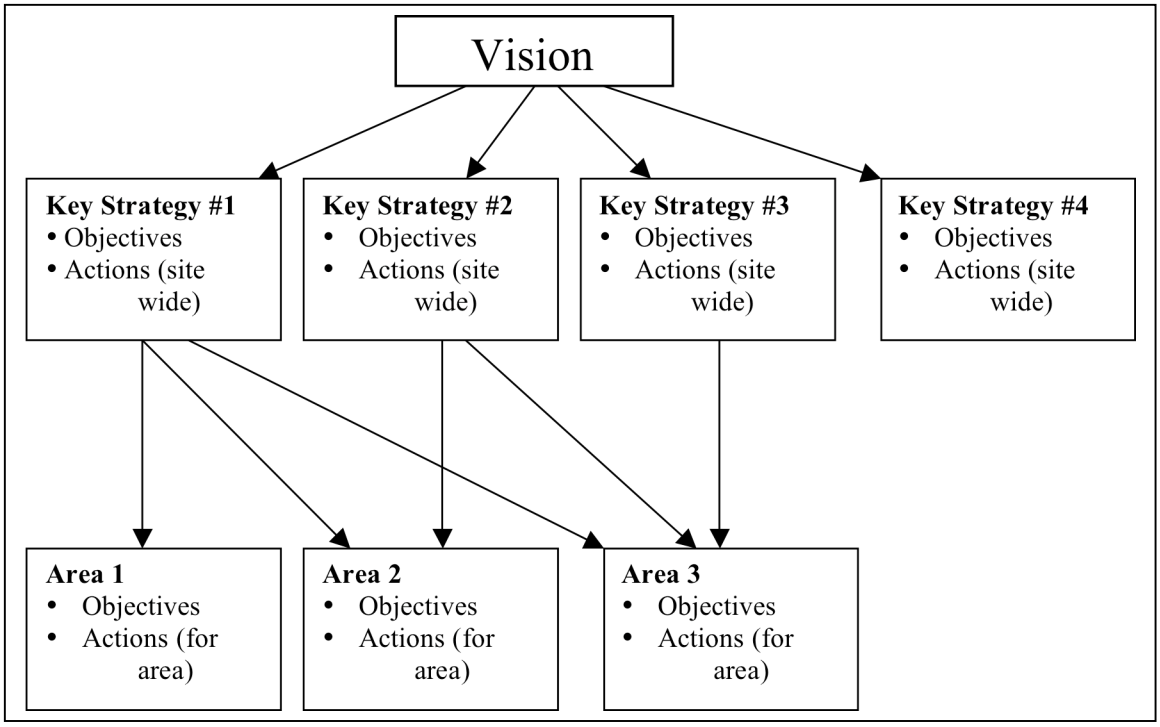


Figure 3. Main components of Park Canada heritage plans (Source: Parks Canada, 2008)

The Australian reviews of management planning (by NSW DECC and Parks Victoria) have both drawn attention to the centrality of management planing in agency activities. And, in the last two years, management plans have again been made a high priority by the Queensland EPA and a review is proposed (although already partly underway) over the next 12-18 months. The renewed interest in management planning in Queensland has been driven by field staff who wanted the direction provided by these plans, plus an increase in resources and staff dedicated to management planning. In all cases, a major driver of the reviews has been concerns about the slow rate of plan production. Queensland has completed 96 plans. A number of these plans are now due for review. Victoria has about 110 parks requiring management plans. No information was obtained for NSW.

In the interviews the critical dual mandate of plans for agency staff and as a social contract with the community was emphasised:

> I think we have got to be careful to ensure that we recognise that plans are not just a technocratic planning tool, they are also a social contract, that they are a bridging document between the agency and staff and the community in general. A lot of the community don't necessarily engage with the kind of technocratic kind of stuff that we as planners can drive. We have got to make sure our plans speak to the people as much as they speak to our staff, because they are, whether we like it or not, while they are prepared for the staff in terms of managing the area…they are subject to social contract with the community and in particular the local community and the key stakeholders. It is strong message to your colleagues in WA, it is all very well driving a strongly articulated, tactical document, if it doesn't deal with the issues that the community expect, then they don't have anywhere…the more technocratic and technical they become, the less traction there is for them at a political level and the moment you lose that kind of 'yes' for other plans: 'keep them coming to me as a Minister or as a government', then the game is over.

From the interviews a range in planning staffing levels was apparent: about 20-30 in NSW DECC (mostly in regions or directorates), about 12 in Parks Victoria (either regions or head office) and about 20 in the Queensland Parks and Wildlife Service located through out the State's 7 hubs. Planning in all three states was strongly regionalised, however, in interviews the strength of WA's centralised system, in terms of consistency and policy linkages, was emphasised although potential implementation and ownership issues were noted.

Each state has a different approval process with variations in complexity between states. In Queensland plans require Governor-in-Council approval and have two rounds of consultation under the Nature Conservation Act 1992. In NSW required to prepare management plans by the NSW National Parks and Wildlife Act 1974 and to consult with regional advisory committees and a statewide advisory council in preparing plans, before plans go to the Minister. In Victoria plans are approved by the Secretary of the Department and released by the Minister. In Western Australia, plans are prepared by the protected area agency for the Conservation Commission for transmission to the Minister for approval.

Differing expectations of management plans

From the interviews and reviews, it became apparent that people (including agency staff) have vastly different expectations of management plans. This breadth of expectations seem unrealistic given that it is only one document seeking to meet the needs of a large complex bureaucracy with an extremely heterogeneous and engaged public. A brief overview of some of these (often contrasting) expectations follows.

> At the moment, I guess there is the default without having anything else the management plan is supposed to be everything to everybody.
>
> Management plans are a 'hybrid beast' between aspirational and tactical. Keen to have some aspirational statements so as not to get dragged into tactical/operational details on everything.
>
> Some want plans that are so general that the agency can't be held accountable for anything, while others believe plans need to provide sufficient guidance so people know what they need to do/or will happen in a place. For example, for new tracks, need to show where they will start and finish. Should indicate where camping areas will be and how big.
>
> Some of the regional managers want management plan to be more strategic, more visionary, not so much detail – want the detail left to them. While some regional managers want something more detailed and drilling down in to specific actions to give them a bit of support in some of their decision making.
>
> People have all different expectations about…management plans. Some of them want them to be the precise recipe book that says this is how I go about doing x, y and z. Others like it to be really vague because then they can do whatever they like. And clearly what we have tried to do here [through the Parks Victoria reform] is set up some clear objectives so people know that they have got to hit these targets but not constrain them in the way in which they hit those targets, apart from our own existing policies.

5.2 Plan content

Resource inventory material (background, values)

The amount of resource inventory material in management plans varies between protected area agencies. Some include a large amount of information (e.g. Environment Australia) while others

include the minimum amount required to support actions within the plan (e.g. to manage threatened species) (Queensland EPA) (Table 3). It was noted as important to include only relevant resource information while at the same time using management plans to assist in public education by highlighting values that need recognising by visitors and protected area neighbours. Worboys et al. (2005) note that in certain cases it might be appropriate to publish resource material in a separate document. This can ensure the management plan is not overloaded with a large volume of background information. Excess information in the plan can distract the reader from the plan itself as well as resulting in a long and unwieldy document.

Recent management plans produced by the Queensland EPA and GBRMPA have shown a shift away from large amounts of resource information in plans. Instead this material is available on the protected area agency's website or hard copy documents are available on request. Much of the web-based material is only available to agency staff but this is expected to change in the near future.

In Queensland EPA, planners try to keep the resource information in management plans to a minimum. They may (but not very often) put resource information into a background paper. They use resource information to set the context and explain the desired outcomes. As one planner explained, the strong 'values' focus of management planning in Queensland EPA helps determine what information goes in plans:

> Management planning is strongly driven by…evaluating the effectiveness of desired outcomes by knowing what we are trying to conserve, then identifying the actions we need to maintain condition. The idea being if the actions are being implemented then the value will be conserved.

A similar approach in minimising the resource information in plans is taken by NSW DECC:

> Relevant resource information…should go in, again some plans will have a lot more than others but people will want to put species lists in and we will say no, don't put species lists in, apart from the fact that they change all the time at any rate. Yes, threatened species depending on how many you end up with and particularly if you have got management actions relating to them. Veg communities we would put in, but not going down to the species, maybe just a few key species. General principles for cultural heritage, Aboriginal sites and sensitivities, information is often limited to generalised statements about Aboriginal sites, historic sites most of them would be mentioned.

Parks Victoria staff similarly commented that plans are not an inventory anymore… 'it is not a big list of anything, we just want the key information and then really drill down so that you can understand why we have got the strategies and what the management considerations are. We try to cut it back and provide that information somewhere else…' The other information can be in reports (already published) or spatially based (i.e. statewide databases such as the wildlife atlas). Community groups also hold information.

In NSW and Victoria, discussion papers are prepared by specialist staff for the key values/issues (e.g. weeds, pests, fires) to assist with plan preparation.

Table 3. Summary of resource information included in management plans prepared by Australian protected area agencies

Agency	Resource information in management plans
Environment Australia (see Kakadu National Park Management Plan, 2007-2014)	Very detailed resource information. Description of Kakadu NP is over 30 pages. For each management issue there is a couple of paragraphs of information before aims and actions are listed.
NSW DECC (see Jervis Bay National Park and Woollamia Nature Reserve Draft Plan of Management, 2008)	Detailed resource information. The first 8 pages discuss the legislative framework, the planning area, key values and management directions.
Parks Victoria (Greater Bendigo National Park Management Plan, 2007)	Detailed resource information. Background information on park, regional context, history of park and park values (up to 8 pages). Strategies for managing values each have up to 2 pages of background information.
WA DEC (see Millstream-Chichester National Park and Mungaroona Range Nature Reserve Draft Management Plan, 2007)	Very detailed resource information. The first 18 pages provide information on the park as well as the management directions and purpose of the management plan. Each individual management issue has up to 5 pages of information before objectives and aims are given.
NT Parks and Wildlife Commission (see Rainbow Valley Conservation Reserve Joint Management Plan, 2007)	Resource information is given in the first 5 pages, followed by section on joint management. Further background information is given for each management issue throughout the plan (up to 3 pages for each issue).
SA DEH (see Witjira National Park Draft Management Plan, 2008)	Brief resource information (approximately 3 pages), plus 2 pages on legislative requirements, 3 pages on park management framework and 2 pages on joint management.
Queensland EPA (see Girraween National Park Draft Management Plan, 2009)	Minimal resource information. Maps in appendix. Each value has approximately 1-2 paragraphs before objectives are listed in tables. Park Folios are used to store resource information.
Parks and Wildlife Service TAS (see Trevallyn Nature Recreation Area Management Plan, 2008)	Resource information on location, history, values (first 7 pages). Each management issue has up to 5 pages of background information.
GBRMPA (see Cairns Area Plan of Management, 2008)	No resource information. For each management issue up to 7 values listed.

Having resource information accessible elsewhere means that it does not need to go in management plans. In Queensland there is no need to put detailed flora and fauna information in management plans as the public has access to selected flora and fauna information. They can also access the Agency's fire management strategies. Also in Queensland resource information is held in park folios (Excel-based), including both biophysical and visitor data. These data are sourced from 'scouring all our databases' and ground truthed by staff at workshops. Held on web

pages on the Agency's intranet. The park folios are used to help form and review management plans and to provide interim management direction in the absence of plans.

NSW does not write or have separate resource documents. They usually rely on 3-4 references and summarise resource information from that. An interesting comment from NSW DECC was that plans do not get implemented if there is not enough rationale in plans justifying what needs to be done.

Policies

Similarly to the resource information, agencies across Australia differ in how much policy detail is included in management plans (Table 4). All, however, list the relevant Acts. Some agencies name the actual policy (e.g. Parks Vic, WA DEC, Qld EPA, Parks and Wildlife Service TAS and GBRMPA) while others take a more generic approach by stating that the park will be managed according to relevant policies (see NSW DECC).

In their new management plan format Queensland EPA provides hyper links to the relevant Acts and policies, as policies are available on the agency website.

For NSW DECC some policies are publicly available (e.g. fire strategy for the Department) while others are not. In a management plan would write about the objectives of fire management in national parks, a paragraph only and then cross-reference. Widely known policies, like no dogs in parks, would not even be mentioned, but if it was a park-specific issue the policy would be repeated in the management plan. As most NSW DECC policies are not publicly available, plans allow policies that are important to the public associated with a particular park to become publicly accessible. For example, a policy for mountain bikes or horse riding with respect to a particular national park.

Similarly in Victoria policies are not publicly available – 'The reason the original Alpine Park Management Plan was so fat was that we didn't have them [the policies] written down internally and a lot of the policy stuff was spelt out in great detail…' A key part of the new Parks Victoria Park Management Framework (detailed in the recent reform) is to make policies publicly available and take all policies out of management plans. Will still need, however, policy interpretation from head office.

Locating prescriptive/detailed action statements

Where prescriptive actions should be placed – in management plans or operations plans – was discussed with those interviewed. Some Queensland staff preferred having detail in operational plans, while others need detail in statutory management plans. These requirements differ from park to park. Zoning is used in Queensland management plans to guide visitor infrastructure development and visitor expectations about the level of development at a site/area, while it is not used in NSW. NSW does not use zones in their plans because such an approach often does no more than reflect the current situation. Better to make prescriptions apply to certain trails rather than apply more generally to the zone through which the trails pass.

In Queensland, the level of detail in management plans also depends on the requirements of the regional staff and the type of park. Often, plans need lots of detail on visitor management because there are no other strategies guiding visitor use, apart from operational policies. Also, if a park has visitor management issues, for example walk trail re-alignment, details might need to be included in the management plan so public consultation around this proposal can contribute to a holistic approach to park management. Detailed changes to management are sometimes then given in plans – e.g. closure of campgrounds, opening of campgrounds, walking track management.

Table 4. Summary of policy information included in management plans prepared by Australian protected area agencies

Agency	Acts and/or policies included in management plans
Environment Australia (see Kakadu National Park Management Plan, 2007-2014)	Relevant Acts listed.
NSW DECC (see Jervis Bay National Park and Woollamia Nature Reserve Draft Plan of Management, 2008)	Relevant Acts listed. Management of protected areas in accordance with the policies of NPWS but no specific policies mentioned.
Parks Victoria (Greater Bendigo National Park Management Plan, 2007)	Relevant Acts and policies listed.
WA DEC (see Millstream-Chichester National Park and Mungaroona Range Nature Reserve Draft Management Plan, 2007)	Relevant Acts listed. Relevant policies incorporated by name throughout the plan.
NT Parks and Wildlife Commission (see Rainbow Valley Conservation Reserve Joint Management Plan, 2007)	Relevant Acts listed. Selected parts of Act given in appendix. No policies mentioned.
SA DEH (see Witjira National Park Draft Management Plan, 2008)	Relevant Acts given throughout the plan. No policies mentioned.
Queensland EPA (see Girraween National Park Draft Management Plan, 2009)	Relevant Act mentioned. Hyperlinks to relevant Acts. Park to be managed according to relevant EPA policies. Hyperlink to specific policies possible.
Parks and Wildlife Service TAS (see Trevallyn Nature Recreation Area Management Plan, 2008)	Relevant Acts referred to throughout plan. Two policies mentioned.
GBRMPA (see Cairns Area Plan of Management, 2008)	Relevant Acts and policies listed throughout management plan with links to GBRMPA web pages.

The Parks Victoria reform suggests putting the detail in operations plans because over the 10-15 years of the management plan the priorities are likely to change. Plans will have 'all encompassing' strategies. 'It is all about doing weed and pest control to protect the highest values through an environmental framework.' Also, what will be done where and how much it will cost is already done by each region in their action plans:

> Each region already does…action plans. The output [of the action plan] may be a spreadsheet or a table from an Oracle database, [with] half that's viewable by the public and you could even have a 2 month period so that the public provide input or rank or even talk why that is a priority over that or whatever.

One interviewee noted that in WA if prescriptive actions were devolved to non-statutory documents, the Conservation Commission could still have control through performance measures detailed in the management plans. Strategic direction and performance measures would be in management plan; delivery details in a 1 year plan (and 5 year regional plan?).

In NSW two alternative views were presented: that management plans could be more general with all the operations details given in 1-year operations plans versus the public needing to know the detail of proposed actions (especially regarding visitor use and developments) and hence this detail being included in publicly available management plans. The 'public needing to know' concern might be alleviated if operations plans were open to public scrutiny. This is the intention in Victoria, as proposed in the recently completed reform.

Including measurable objectives and strategies in management plans

Making comment on whether objectives and actions (strategies) were measurable was enormously problematic because of definitional problems, and determining what 'measurable' means. A wide variety of terms are used in management plans, including aims, goals, objectives, strategies, actions and desired outcomes (Table 5). Often these have overlapping and undefined intents making a review across plans and planning processes difficult as well. Terminologies aside, there is widespread agreement that clear objectives are critical for determining whether the management activities detailed in management plans are achieving the desired result i.e. has the management plan been effective. Objectives must be measurable if managers are to determine whether their management activities are achieving the desired outcomes (Thomas & Middleton, 2003).

This report uses Lockwood et al.'s (2006) definitions as follows:

- *Goal*: general statement of ends. It is not necessarily achievable in the planning period.
- *Objective*: specific statements of realistic and measurable intentions. Objectives are needed for effective evaluation of management plans. Should be specific, achievable, clearly stated, and measurable.
- *Strategies*: general statements of means. They provide a broad indication of how a goal or objective will be achieved.
- *Actions*: specific statements of means that should include enough detail to enable field staff to implement.
- *Performance indicators*: scales used to assess the degree to which a desired outcome has been achieved.

Very few protected area agencies in Australia use the term 'objective' other than WA DEC and SA DEH (Table 5). Other agencies use the terms 'aims' or 'desired outcomes' for that part of management plans that might most closely align with objective setting. The GBRMPA makes no mention of objectives in their management plans; their plans highlight values and then issues followed by strategies. Using Lockwood et al.'s (2006) planning definitions all of the objectives listed in column 2 of Table 5 are much more likely to be goals than objectives. This is because of their general nature, along with a lack of measurability. Worboys et al. (2005) note that objectives can be improved with greater specificity and measurability. However, this is difficult to achieve when there is insufficient information available. It is also difficult to develop measurable objectives that will not become out-of-date during the life span of management plans (usually 10 years).

All the plans reviewed included strategies for how the protected area agency will achieve their objectives. Environment Australia is the only agency to include both strategies and actions. There was a wide diversity of terms used for the part of plans that translates objectives through to action, including strategies, guidelines, actions, direction, and prescriptions (Table 5, column 3). According to Lockwood et al. (2006) strategies are broad statements indicating how the objectives will be achieved. This means that they are not necessarily measurable. WA DEC, Queensland EPA and NT Parks and Wildlife tend to present strategies and actions together

(Table 5). This approach results in a number of broad general statements on how objectives will be achieved intermingled with more detailed statements that staff are able to implement. Some of the actions are measurable (see Table 5 for details).

Table 5. Summary of inclusion or otherwise of objectives and actions, and whether these are measurable, in management plans prepared by Australian protected area agencies

Agency	Objective	Strategies/Actions	Targets/ indicators
Environment Australia (see Kakadu National Park Management Plan, 2007-2014)	Yes Not measurable (Aims)	Strategies (Policies): not measurable Actions: measurable	No
NSW DECC (see Jervis Bay National Park and Woollamia Nature Reserve Draft Plan of Management, 2007)	Yes Not measurable (Desired Outcomes)	Strategies: not measurable Actions: measurable	Priority – low, medium, high
Parks Victoria (see Greater Bendigo National Park Management Plan, 2007)	Yes Not measurable (Aims)	Strategies and actions (Management Strategies) presented together: some actions measurable	No
WA DEC (Millstream-Chichester National Park and Mungaroona Range Nature Reserve Draft Management Plan, 2007)	Yes Not measurable (Objectives)	Strategies and actions presented together: some actions measurable	Key performance indicators
NT Parks and Wildlife Commission (see Rainbow Valley Conservation Reserve Joint Management Plan, 2008)	Yes Not measurable (Aims)	Strategies and actions (Directions) presented together: some actions measurable	Selected performance indicators
SA DEH (see Witjira National Park Draft Management Plan, 2008)	Yes Not measurable (Objectives)	Strategies and actions (Strategies) presented together: some actions measurable	No
Queensland EPA (see Girraween National Park Draft Management Plan, 2009)	Yes Not measurable (Desired outcomes)	Strategies and actions (Actions and Guidelines) presented together: some actions measurable	No
Parks and Wildlife Service TAS (see Trevallyn Nature Recreation Area Management Plan, 2008)	Yes Not measurable (Desired outcomes)	Strategies and actions (Prescriptions) presented together: some actions measurable	Priority – very high, high, medium, lower.
GBRMPA (see Cairns Area Plan of Management, 2008)	No objectives given	Strategies: not measurable No actions	No

WA DEC and NT Parks and Wildlife Commission are the only agencies including performance indicators for measuring management effectiveness. The NT Parks and Wildlife Commission also explains how the objectives will be achieved. For example: the aim for managing visitors is

for them to enjoy the reserve safely and with respect to the area's values. The indicators are visitor satisfaction (at least 80%), number of safety related incidents (low) and number of inappropriate incidents recorded (low). Guidance is given on how to measure the indicators – by visitor surveys and routine reporting. NSW DECC and Parks and Wildlife Tasmania do not use indicators, instead they provide a priority ranking for their objectives classifying them as very high, high, medium or low.

Comments from the interviews add to the previous analysis based on the agency management plans. For Queensland EPA, the staff commented that their 'desired outcomes' don't need to measurable because the 3-4 actions sitting beneath each outcome are measurable. The Agency's reviews of plan implementation (through the Rapid Assessment Program[3] and Park Folios[4]) focus on what has been achieved rather than the desired outcomes:

> The way it [RAP] is set up is to provide a current inventory of the tools, plans and information available to manage a park and to determine if the tools and plans are being implemented and are adequate/effective. Park Folios take a snap shot of the park's values and assesses the trend and condition of these values at a point in time. They allow for comparison over time to determine if management actions are being effective. This information is fed back into management plans. Our aim is to get RAP and Park Folios informing each other and therefore closing the management feedback loop.

Parks Victoria commented that having 'measurable, achievable objectives is something the organization is fundamentally pursuing' and that they are yet to achieve plans with measurable, achievable objectives. This agency is interested in plans that: (1) can help show that they have 'maintained or…improved the condition, that [their] activities have produced an outcome; (2) 'tie up the strategies…in plans to what can…and needs to be measured'; (2) 'reflect what is in the business and the 1-yr action plans in more detail'; and (3) 'direct accountabilities for people taking carriage of some of the major strategies'. The agency also identified and acknowledged, in interviews, the difficulties in measuring and reporting on outcomes:

> That is really hard [working out how to identify and measure outcomes], the environmental framework looks at did we do what we said we would do, did we spray the weed, got some money, sprayed the weed, but did spraying the weed achieve the outcome that we wanted? Did we get the improvement in the condition, did the vegetation community that we are trying to protect grow back there? Those steps are the things we don't measure…We have struggled all over the place, how do you articulate what that improvement in condition might be, do you say it's we saw 3 seedlings per ha or something? Should that be based on research or not, should this be informed by the experts in the park? The one area that we did all this research in the Mallee, we used the example of area and we had 3 seedlings per ha that we were aiming, rabbit control, ended up being this target that was hugely unachievable.

This agency also commented that they will not put targets in plans but more likely strategies that can be measured.

Measurable objectives, actions and targets were not discussed in detail with NSW DECC staff.

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[3] RAP identifies what management strategies a park has (e.g. plans strategies) and if they have been implemented and then effective. Regarded by Queensland Parks and Wildlife Service as 'similar' to State of the Park reporting.

[4] Park folios hold information on the parks' values, and associated trends and condition, and allow comparison over time. They also include the actions from park management plans and an assessment of the extent of implementation of each action.

5.4 Plan presentation

The format and styles of plan vary between agencies (Table 6, Appendix 2). In recent years several protected area agencies have changed or altered their approaches. Newer approaches to management plans have a simpler style with less reliance on words and greater use of photos, maps and tables. They are shorter: Queensland EPA aims for a 30 page maximum A4 plan for most national parks and 15 pages for smaller parks. NSW DECC has no absolute limit but most plans are 15-30 pages. For important areas like Kosciusko and other big parks they may be 200-300 pages. They have two formats – a table-based approach for plans under 32 pages and straight text-based plans (portrait format) for larger plans. Parks Victoria expects plans to be no longer than 30 pages.

Table 6. Summary of the format and style of management plans prepared by Australian protected area agencies

Agency	Format and style
Environment Australia (see Kakadu National Park Management Plan, 2007-2014)	Simple structure with logical flow. Lots of resource information. Easy to read. No jargon.
NSW DECC (see Jervis Bay National Park and Woollamia Nature Reserve Draft Plan of Management, 2007)	Long and thorough. Use table format for plans under 32 pages in length. Very few photos, maps. Use jargon.
Parks Victoria (see Greater Bendigo National Park Management Plan, 2007)	Two columns, few photos, tables. Prescriptive. Bureaucratic language. Use jargon.
WA DEC (see Millstream-Chichester National Park and Mungaroona Range Nature Reserve Draft Management Plan, 2007)	Wordy, few photos, limited use of tables. Lots of resource information.
NT Parks and Wildlife Commission (see Rainbow Valley Conservation Reserve Joint Management Plan, 2008)	Simple structure. Uses colour and pictures. Shows great respect for people and country. Easy to read. Little jargon.
DEH SA (see Witjira National Park Draft Management Plan, 2008)	Bureaucratic. Wordy. Use jargon.
Queensland EPA (see Girraween National Park Draft Management Plan, 2009)	Landscape page layout. Use of tables and pictures.
Parks and Wildlife Service TAS (see Trevallyn Nature Recreation Area Management Plan, 2008)	Little use of pictures or tables. Resource information included. Tables in appendix with implementation priorities.
GBRMPA (see Cairns Area Plan of Management, 2008)	Few photos, little use of tables/maps. Easy to follow.

5.5 Planning processes

Grouping protected areas for planning purposes

Clustering or grouping of areas in plans of management has successfully been used by a number of protected area agencies across Australia (Table 7). This approach aims to improve the

efficiency of management plan development. To-date clustering or grouping has been applied to or proposed for a small group of parks, parks with similar values, and one larger park with surrounding smaller parks.

Table 8. Grouping protected areas for management plans prepared by Australian protected area agencies

Agency	Clustering	Nature of Cluster
Environment Australia	No	--
NSW DECC	Yes	Whenever conditions suggest it appropriate –protected areas with similar or related values (e.g. all rainforest areas) under one management jurisdiction. Complementary reserves where recreational activities are supported in one or more reserves but not others.
Parks Victoria	Yes	Intending to use landscape approach to group parks (as per recently completed reform). The grouping will be geographical and ecosystem based (e.g. mallee parks together, Murray corridor). Currently working on Alps National Parks management plan covering 5 large national parks.
WA DEC	Proposed	Bio-regional/regional approach.
NT Parks and Wildlife Commission	No	--
SA DEH	Yes	Beginning to cluster smaller conservation parks in same area.
Queensland EPA	Yes	Grouped under one management unit or where issues are very similar. Grouped plans written in two different ways: as chapter plans with a chapter per protected area or looking at the whole landscape as one unit (e.g. Byfield Management Plan). Use clustering to provide a range of recreation opportunities across the landscape.
Parks and Wildlife Service TAS	Yes	Grouping of national parks with state reserves and conservation areas.
GBRMPA	Yes	Areas e.g. Cairns Area Plan of Management.

Sources: Agency websites and interviews with Queensland EPA, NSW DECC and Parks Victoria.

In interviews, NSW staff noted that decisions about reserve groupings are made on a case-by-case basis by local staff. Most important to manage a 'consistent' landscape and this might mean crossing administrative boundaries in grouping reserves. Commented that the IBRA regions would be too big to provide a meaningful way of grouping management plans. Also commented that:

> What basis are you managing the reserves? If the key basis is consistency of vegetation, then [using IBRA] makes sense, but that is not always the key basis for why you are managing the reserve. Things like visitation could be a reason for management and therefore needs some outcomes from a much higher point of view than the vegetation in terms of how you write your management plan.

The landscape approach proposed by Parks Victoria will reduce the number of plans required from 100 odd to about a dozen (for 10-12 areas across the State). This will be far more manageable over the proposed 5 yr review cycle. Still not decided how the landscape/planning

boundaries will be determined – mentioned Ecological Vegetation Communities as one possibility (about 10 of these in Victoria) or more a geographic-based approach to grouping. This landscape approach includes taking a view outside parks and dealing openly with catchment management authorities (equivalent to NRM groups in WA) and other agencies.

A landscape plan might potentially cross regional administrative boundaries but would link down to regions (as the operational unit) through the proposed 5-year regional implementation plans. Staff are ok with the plan crossing regional boundaries as these boundaries seem to change quite often (NSW DECC made a similar comment). This approach is for national parks alone; the State has another 3,000+ conservation reserves not covered by this approach.

In Queensland, protected areas are also grouped for planning purposes. The agency considered using the IBRA regions as a basis for grouping. IBRA region groupings could work in western Queensland but is problematic in the south east due to the concentration of visitor use in one bioregion. This region would therefore be likely to need more than one plan.

'Nesting' protected areas for planning purposes

For agencies such as Queensland EPA, Parks Victoria and NSW DECC, who have proposed or are already producing management plans for clusters of protected areas, different approaches to 'nesting' are apparent. 'Nesting' refers to how agencies deal with an area (or an issue) that is positioned within a wider management plan for a cluster of reserves. For example in Queensland, a chapter approach (Table 7) will be used for Bribie Island Recreation Area, Bribie Island National Park and Buckley Hole Conservation Park. The recreation area and national park are clustered together as they are managed as a single unit, and Buckleys Hole Conservation Park is dealt with in a separate chapter as it is managed under a trusteeship by the local council. Clustering these parks allows a holistic approach to management of the Island while providing efficient consultation on a range of issues with stakeholders, Traditional Owners and visitors.

Parks Victoria intends to keep more 'dominant' parks in cluster plans (an alternative is to produce a separate plan), because these parks dominate the geographic area anyway. Those interviewed noted that it is more important to be specific about which park(s) each strategy applies to. In contrast, NSW DECC is considering 'removing' Mt Warning from a cluster plan covering a number of reserves and preparing a new management plan for this national park as the current cluster plan has proved unwieldy. The end result will be one management plan for the grouping and one for Mt Warning (and possibly one other park). This 'removal' may require an amendment to the existing management plan (a statutory document). Amendments are not a usual part of planning business for NSW DECC. This agency undertakes 2-5 amendments a year, very few compared to the number of plans being prepared.

Integrating management plans with other strategies and policies

The following results are derived predominantly from interviews with Queensland EPA. This integration information proved difficult to source from all of the agencies where interviews were conducted without undertaking detailed evaluations. Such evaluations would allow the vertical and horizontal links between management planning and other policy, planning and management activities to be explored in detail. Such an approach, applied to 1-2 management plans, their preparation and implementation, would shed light on these complex relationships and links.

In Queensland, fire and pest management strategies are prepared by regional staff to guide management of parks. Management plans cross-reference to all relevant strategies. If regional strategies for pest management are updated, for example, the management plan follows suit. Management plans cross-reference to pest strategies as well as including principles from these

strategies in the management plan. The reliance on these other strategies for direction is evidenced by the following quote:

> Fire is one of a number of priorities for park managers in Queensland…fire management and protection of life and property. A management plan would not be used instead of a Fire Management Plan for the planning or implementation of fire management on the ground.

With respect to visitor management in Queensland, management plans may draw out the main objectives of site plans or where there is a lack of site planning, the plan may call for one to be developed. Management plans can also recommend re-developing a particular site enabling field staff to give it a higher priority for funding and development of a site plan. Queensland staff noted that visitor management is where staff want more guidance: management plans are one place where visitor opportunities are identified and the tourism industry can be involved in the development of sites.

For NSW DECC the management plan is the key document and others are subsidiary (such as conservation plans for historic sites). Their management plans refer to the key points in the other documents. Parks Victoria uses the recent reform to implicitly advocate integration across four tiers of their park management framework (Figure 4).

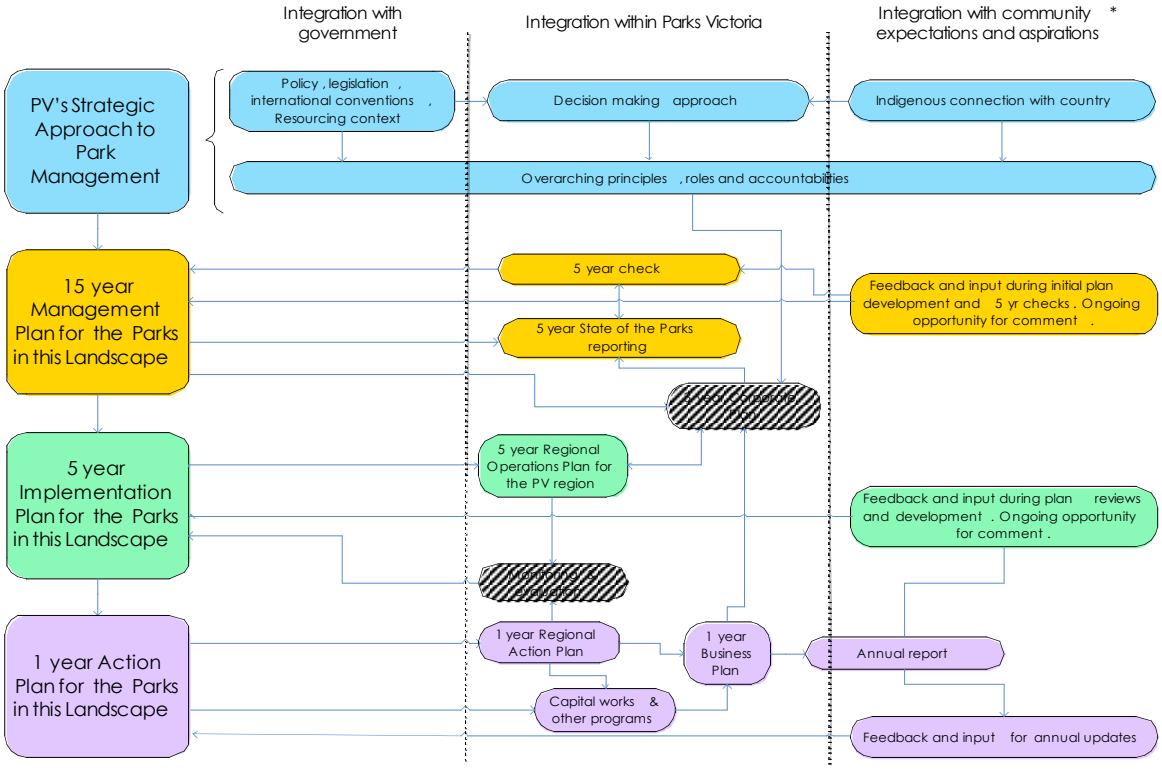

Figure 4. Park Victoria's (draft) management planning framework (Source: http://weplan.parks.vic.gov.au/)

Integrating management plans with operational planning

Those interviewed commented on the need to improve the integration of management plans with operational planning. Both the NSW review and Victorian reform provide recommendations for how to better link the two.

5.6 Evaluating management effectiveness

Trying to unravel and report on the Queensland, NSW and Victorian approaches to management effectiveness evaluation for protected areas proved a difficult task.

NSW and Victoria undertake State of the Parks reporting. These reports focus on the condition of the parks in each state. Data are collected for individual parks and aggregated to give state-level data. Neither system currently includes reporting on the achievement of the actions or objectives given in management plans (i.e. an evaluation of management effectiveness).

Over the last 3 years NSW DECC has developed a sophisticated State of the Parks reporting system that uses the IUCN performance effectiveness evaluation framework and reports on context, planning, inputs, processes, outputs and outcomes as given in Figure 1 (Hockings et al., 2008). This system allows the effectiveness of management actions in achieving agency objectives to be determined. Reviewing the extent to which actions prescribed in management plans have been implemented is not currently part of this system, although it may become so.

Currently one management plan per region per year is self-audited through a process separate to State of the Parks reporting. Auditing is according to a proforma with staff noting for all the actions in the plan (on a scale of 1 to 5) whether an action has been done, partly or not all.

> The audit is often done by the Ranger or the area manager and it has to go through the regional manager and then the regional advisory committee and then it goes to an independent committee called the Conservation Audit and Compliance Committee, which is a statutory set-up. The only problem is that to-date they don't give feedback.

Staff report finding the audit very useful. It enables staff to refamiliarise themselves with the plan, what still needs doing and at the end of the plan, working out what needs re-writing. The audit sheets are stored electronically but are not provided or stored online.

In Victoria, the recently completed reform (Kismet Forward, 2009) has a strong focus on using regular checks (e.g. every 5 years) and integration with State of the Parks reporting to determine management effectiveness (Figure 4). The problems associated with evaluating whether outcomes have been achieved or not was highlighted by Parks Victoria staff and was noted earlier in this report. In terms of management planning in Victoria, management plans are formally assessed to see how much they have been implemented. If plans are not fully implemented, they are rolled over to continue as is. There is no current link with State of the Parks reporting.

The Rapid Assessment Program (RAP) has been Queensland's response to the need for assessing management effectiveness. The agency started with the ANZECC best practice guidelines as a basis for reporting (through RAP) but these guidelines were not readily understood by staff without extensive explanations and did not measure some of the elements of management of interest to managers. The agency continued to refine the questions within RAP so they were relevant to most systems of reporting and the terminology used within Qld EPA. There were some concerns regarding duplication given that regional pest and fire strategies already had their own reporting and monitoring implementation processes and systems. Currently staff are working to get RAP to feed into regional and park level reporting.

RAP includes good practice indicators or targets that vary depending on a park's ranking. All parks in the state are valued, categorised and ranked based on their cultural heritage, nature conservation and presentation values, and the threats they face. Performance benchmarks for plans and strategies, such as vegetation maps, weed plans and visitor facility plans, are set based on a park's ranking and then refined by the park manager.

> We thought that the performance of park management may be better left outside of the actual management plan document and hence more of a focus on the RAP and

> the Park Folio…We…try and achieve desired outcomes through the implementation of the actions, to improve trend and condition, and set a good practice indicator through the Rapid Assessment Program.
>
> We know what we have to manage in parks: where do we want to be and how do we get there? If you use that model you would say that the background is where are we now, desired outcomes are where we want to be and how do we get there, the actions are the measures.

The management actions from each management plan are included in the park folio for the park of interest. These actions can then be assessed, as part of the park folio system, to determine how effective each action has been in maintaining the park's values and improving its condition. The relationships between RAP and park folios are still being developed, with the current intentions of each and differentiation between the two not inherently clear to those with limited familiarity regarding planning and park management in Queensland. Queensland EPA is proposing to review the effectiveness of its management planning framework over the next 12-18 months:

> We are going to be reviewing RAP (Rapid Assessment Program) next financial year and this whole framework is part of that review – the RAP, the park folios, the management planning, we are hoping to review it and to create a planning framework. We have an ad hoc one at the moment, trying to clarify how they are linked and how we input data and get a product that we want on the end of it. During next financial year, a review of all our systems including update of park folios, develop a database that would be able to do all of that for us. [That] is where we need to go and what we want to do.

Key performance indicators

No protected area agencies in Australia, with the exception of WA DEC include key performance indicators in management plans (Higginbottom et al., in prep.). NSW DECC noted that they were supposed to have performance indicators but find them difficult to write (asking do you write about the output or the outcome?) and commenting that 'at the moment [writing indicators] is not a priority. The Directors want to get plans finished, they want them simplified not complicated.' In Victoria, indicators are developed at a corporate level (for key performance areas such as compliance, tourism, scientific research). In planning they are interested in measurable targets that reflect their management activities rather than performance indicators.

5.7 Role of the internet

The use of computers, software and the internet is growing in protected area agencies overseas and in Australia. Current use of the internet in management planning by Australian protected area agencies is summarised in Table 8. In recent years in the United Kingdom many county agencies and the major nature conservation NGOs have introduced the Conservation Management System (CMS). The CMS ensures management plans are both reference documents and a working system central to site management. Information is recorded online and stored in a central data storage bank. This ensures CMS staff have the tools they need to drive the work plans to ensure that management plans are integral to day-to-day management (Alexander, 2008).

Table 8. Summary of the role of the internet in management planning by Australian protected area agencies

Agency	Role of internet
Parks Australia	Management plans and best practice reports available on web.
NSW DECC	Management plans and policies available on web.
Parks Victoria	Use of wiki, blogs, comments on plans through web. Connected policies/strategies available.
WA DEC	Management plans available on web.
NT Parks and Wildlife Commission	Management plans and relevant Acts available on web.
SA DEH	Management plans available on web. Link to Acts.
QUEENSLAND EPA	Web-based Park Folios for regional staff but are not accessible to public. Management plans and management strategies available on web. Used extensively through public consultation periods.
Parks and Wildlife Service TAS	Publications available on web.
GBRMPA	Management plans and strategies available on web. Management plans have links to relevant web pages.

Sources: Protected area agencies web pages.

Parks Victoria is using the internet, through their *wePlan Alpine* website (http://weplan.parks.vic.gov.au/), to describe and run the planning process for the Alps National Parks. This process is enabling full disclosure of the planning process. People can blog, upload photos, join committees, do social networking and contribute to writing the plan through an online table of contents and then edit the plan as it is written. The site is moderated.

5.8 Achieving agency change

A number of protected area agencies in Australia are in the middle of dramatically changing how they do management plans or will be soon. Staff from three agencies were asked in interviews how they were creating (and managing) the associated change in their agency. They were also asked to provide their thoughts on how WA might best achieve the changes they wanted to management planning.

Queensland EPA commented that support for management plans in their agency is widespread because field staff want management plans. They suggested that in WA engagement with field staff is critical, especially talking with them and asking them what they need to manage a park more effectively and efficiently and to build ownership of the plan. In Queensland for each plan, a plan proposal is prepared, key staff identified and the proposal is signed off by the Regional Manager and the Manager for Planning. Also get sign off from the state level team leaders of pests and weeds and other natural resource management areas. Important to do this because the plan also affects their business planning and resourcing.

NSW DECC also closely involve field staff in management planning. An example follows:

> I [planner] had a meeting with the staff basically every month and I would go out there and discuss our objectives and then I would go away and write it out and then come back. And I would do the thing of 'next month we are going to be discussing pest animals or something and I want you to write me down half a page of dot points of what you see are the issues and what we should do about them, on pest animals in your area'. Next meeting we go back and discuss our objectives again but then I would

> get their comments back on the pest animals, I would go away and write it up in to a page or two and then give it to them the next month. Then I would go back to them with it and say 'you look at this and have I got right what you are saying, do you see any problems or any strategies that you have come up with, I have tried to do it based on what you are saying but what do you think'. I got a great deal of support, and they were involved in every little thing because they were writing the basics even though I was putting the words together…I would get them to write what they saw where the issues and some of the background information and what they thought the solutions were. So they would write down and then I would take that, plus some extra research that I would be doing from references, as well to fill out the background a bit more and then some consultation…

Parks Victoria staff provided the following advice on how to run a review process (as it worked for them):

> Give the agency a chance to comment on and review the brief. Let the agency know that you have every confidence in the consultant and about their expertise. Run workshops with a group of people across the organization. Also combine staff and stakeholders in the same workshop because stakeholders love it and staff really get a lot of confidence in the review process. It is part of that organisational change because staff need to be able to talk to the community about everything we do and there are all sorts of barriers. Get the consultant to brief the Chief Executive and the General Manager of Parks.

6 Challenges for the future

Producing concise plans quickly. Public consultation is integral to planning processes for public lands so plans will always take time to complete. The duration of other parts of the planning process, however, can be reduced. Two key challenges are getting the 'right' information into management plans in a time and cost-effective way and ensuring there is adequate information in plans to act in an informed way without producing lengthy documents.

Integrating management plans with other policies and agency activities. Given the recent re-acknowledgment of the centrality of management plans to the work of protected area agencies it is essential that the vertical and horizontal linkages with other policies and agency activities are in place and work effectively and efficiently.

Planning in the face of uncertainty. Recent global events such as climate change, peak oil and the recent economic downturn emphasise that all protected area management must necessarily be conducted in the face of uncertainty. The challenge is to provide sufficient direction to protect the values of area while ensuring the flexibility needed to deal with change.

Developing a protected area management (planning) framework. Parks Victoria in its recent reform has put forward a model that links management/policy activities through out the agency. The challenge for all agencies is to produce management plans within a framework that allows plans to be implemented and the effectiveness of this implementation to be evaluated and reported back to stakeholders.

Developing objectives that allow for the measurement of management effectiveness and *adaptive management*. There are two associated challenges: ensuring that objectives allow for adaptive management and being able to craft objectives that enable measurement of management effectiveness given incomplete knowledge about protected areas and their visitors.

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Appendices

Appendix 1. Guiding questions for the management planning review provided by the Conservation Commission (February 2009)

The Conservation Commission is most interested in:

1. What good quality (best/good practice) subregional, concise, non-aspirational plans might look like
2. How resource inventory information might be separated from the core management plan.
3. How special issue / area plans might be 'nested' within wider plans.
4. How management plans and related policies (e.g. regional conservation strategies and PVS master plans) might be integrated across the Department.
5. How the transition to the new framework might be efficiently and effectively achieved.
6. How plans might be designed so that management effectiveness can be readily determined.

Appendix 2. Excerpts from Australian management plans

Environment Australia: Kakadu National Park Management Plan 2007-2014

5.8 Native plants and animals

Our aim

Through working with Bininj, ecological processes are maintained to ensure the viability of populations of native plants and animals currently occurring in Kakadu.

Measuring how well we are meeting our aim

- Extent to which distribution and abundance of selected plants and animals are at acceptable levels
- Extent to which priorities in EPBC Act threat abatement and recovery plans are implemented
- Extent to which species important to Bininj's customary economy, ceremonial responsibilities and land management practices are available and accessible

Background

Bininj have been using and managing the land for thousands of generations, contributing to the structure and composition of plant and animal communities seen in Kakadu today. The arrival of Balanda caused dramatic changes to country within a relatively short period. Altered fire regimes and the spread of weeds and feral animals have influenced the composition of native plant and animal communities in the Park.

Under aboriginal cultural tradition, plants and animals have a totemic role, linking clans and individuals with their estates and giving rights and responsibilities concerning particular country and its totemic

figure. Rights in relation to plants and animals cover their roles as a food or other material resource and images of them are often depicted in rock art located throughout Kakadu.

Historically, Bininj have used, and continue to use, plants for bush tucker and medicines, and to make a variety of tools and implements. Bininj also hunt animals according to the seasons, and the movement of people around their clan estates has always been determined by the condition of the wildlife. Some of the native animals most often hunted by Bininj include magpie geese, turtles, wallabies, fish, file snakes and goannas.

The many different types and numbers of native plants and animals in Kakadu is of national and international significance and is recognised in the Park's World Heritage listing. Significant plant and animal species include those listed as threatened under the EPBC Act, and many of these are restricted to certain habitat types. A substantial number of animal species are listed as either marine or migratory under the EPBC Act and are also subject to the provisions of international agreements and treaties (such as Ramsar, JAMBAa and CAMBA). Significant species, as at 2006, are listed in appendices d and e. Many other species may also be considered management priorities because of their restricted distribution, population size, susceptibility to certain threats, or cultural significance.

All major top end habitats are represented within the Park. These include mangrove and samphire communities, lowland and escarpment rainforest, eucalyptus open forests and woodlands, melaleuca forests, and seasonal floodplains (Russell-Smith1995). Nearly 1600 species of plants have been recorded within the Park, many of which are only found within the alligator rivers region.

Conserving the distribution, abundance and diversity of native plants and animals and communities is a fundamental objective of Kakadu national Park management. For the most effective approach to management of native plant and animal populations, land management programs must integrate fire, weed, feral animal and visitor management considerations. Current management programs designed to assist in the conservation of native plants and animals in Kakadu include:

- dedicated research projects to monitor plant and animal distribution and abundance and long-term changes in communities
- fire management including undertaking controlled burns, and monitoring and mapping fire impacts
- controlling weeds and feral animals
- compliance and enforcement effort to try to minimise the illegal take of animals, especially in relation to illegal commercial fishing and hunting activities
- minimising habitat clearing
- cooperating with northern territory and other agencies when undertaking research and monitoring programs.

Under s.354 of the EPBC Act, a person may not kill, injure, take, trade, keep or move a member of a native species except in accordance with a management plan. The EPBC regulations also prohibit taking animals and plants into the Park, and cultivating plants in the Park, except with the approval of the director.

Issues

- It is important that Bininj knowledge of native plant and animal communities is recognised, maintained and used in the management of plants and animals in the Park.
- There is evidence of decline in the abundance of some native plants and animals in Kakadu, and causes of these changes are often unclear.
- There is a need for updated information to guide management actions to address the potential threats to the range and numbers of native plant and animal species in the Park (see also Section 8.6,research and monitoring).
- Feral pigs, cats and cane toads have been formally recognised as threatening processes under the EPBC Act. All are present in the Park, creating particular management obligations.
- For many plants and animals there is not a clear understanding of the relationships between fire

regimes and the changes in their range and numbers.

- Some plants and communities, such as Callitris communities, slow-growing heath in escarpment areas, bamboo thickets and monsoon forests, are sensitive to frequent or intense fires. There is evidence that the distribution of these communities has declined in some locations within Kakadu (see Section 5.7 of this Plan in relation to fire management).
- There is a need for regular monitoring to identify trends in the range and numbers of all EPBC Act and northern territory listed threatened plants and animals.
- Plant communities have not yet been mapped in sufficient detail for the whole Park. In particular, there is a need to map sandstone communities due to the high number of endemic or rare species present and fire sensitivity of some species.
- There are hazards associated with people undertaking recreational activities in and near waterways within the Park, particularly in relation to interaction with crocodiles. Due to increased population densities and prevalence of larger crocodiles, there is a greater risk of crocodile attack than in the past.
- In addition to crocodiles, other animals such as snakes, scorpions, stonefish and box jellyfish pose hazards to visitors.

What we are going to do

Policies

5.8.1 Bininj will continue to exercise their traditional and legal rights to fish and hunt native animals and gather plants and plant material within the Park (see also Section 4.3, Customary use of resources).

5.8.2 Bininj and Balanda knowledge of and priorities related to the management of native plants and animals and their habitats will be incorporated into management programs.

5.8.3 the director will encourage and support Bininj to:

– be involved in research and surveys of native plants and animals
– carry out land management work eg fire, weed and feral animal management, and record their knowledge of native plants and animals and their habitats.

5.8.4 data on the location of EPBC Act and northern territory listed plant and animal species and other species of conservation or cultural significance will be maintained and management programs and activities will ensure that they are protected from inappropriate disturbance.

5.8.5 monitoring programs will be directed at indicator species identified in regard to major threats and management issues such as fire, weeds and feral animals (see Section 8.6, research and monitoring).

5.8.6 the director will support research and monitoring programs for EPBC Act and northern territory listed plants and animals, and others of conservation or cultural significance.

5.8.7 Crocodiles will be managed in accordance with the Park's Crocodile management Policy to protect the natural abundance of crocodile populations and minimise the risks of crocodiles to people who visit and live in Kakadu through the following measures:

- educating and warning visitors, residents and tour operators about crocodiles
- maintaining data on crocodile numbers, size and behaviour, particularly in waterways frequented by Park residents and visitors
- assessing risks posed by crocodiles to people
- endeavouring to detect and remove all estuarine crocodiles from any location where swimming is to be allowed
- managing individual crocodiles in other locations that present a higher than usual risk to people
- closing water bodies temporarily, seasonally or permanently if crocodiles present a high risk to visitors

- ensuring that any take of crocodiles and eggs is undertaken legally (see Section 5.10, Commercial use of native wildlife)
- ensuring that all staff involved in crocodile management are appropriately trained and experienced to carry out crocodile management activities.

5.8.8 native animals and plants may be brought into the Park in accordance with a permit issued by the director and where it is consistent with policies and actions in this Plan. Plants may be brought into leasehold areas and other occupancies in the Park with the director's approval.

5.8.9 the director may take actions concerning native species that are otherwise prohibited by the EPBC Act where they are necessary to implement this Plan, or where they are otherwise necessary for preserving or protecting the Park, protecting or conserving biodiversity, or protecting persons or property in the Park.

5.8.10 the director will cooperate with northern territory management agencies in the protection of native plants and animals within the Kakadu region.

5.8.11 as appropriate, Park staff will continue to provide plant specimens from the Kakadu area to the northern territory Herbarium.

5.8.12 to minimise the risk of introducing diseases into the Park, people will not be allowed to take injured or orphaned animals out of the Park and then bring them back in except with the director's approval.

Actions

5.8.13 Commence 1:25000 mapping of vegetation communities across the Park. Give priority to sandstone communities.

5.8.14 Continue photo monitoring and surveys of plants and communities at reference sites across Kakadu commenced in 1994.

5.8.15 Implement relevant actions from species threat abatement and recovery plans.

5.8.16 Update the Park's database of EPBC Act listed species and species of conservation or cultural significance at least once every three years.

5.8.17 Implement the Park's Crocodile management Policy, as updated from time to time, in consultation with Bininj.

5.8.18 Provide information to visitors about potentially dangerous animals in Kakadu, and ways to minimise risk.

5.8.19 Provide training to Park staff or authorised volunteers in techniques for capture, handling and rehabilitation of injured native animals.

5.8.20 Continue specific research into the longer-term impacts of the cane toad and potential natural recovery of animal populations such as the northern quoll and goannas.

5.1 SOIL EROSION, WATER QUALITY AND LAKE ENTRANCE MANAGEMENT

Soils

The soils in the park and reserve are generally sandy in nature and relatively infertile. On the gentle slopes of the areas of *Wandrawandian Siltstone*, yellow podzolic soils and solodic soils occur, while the sandstone plateaus have deep regolith and lateritic yellow earths and peaty swampland. Flood plains and adjacent terraces have weakly developed prairie soils and weakly to strongly developed podzolic soils respectively. Present day beaches typically consist of weakly calcareous beach sands while behind these the dune systems show varyingly developed podzol profiles.

In general the soils are highly erodable but major erosion has been minimal due to the relatively flat topography. Where vegetation in the park and reserve has been removed in the past as a result of activities such as quarrying and uncontrolled vehicular access, measures may be required to minimise soil erosion.

Water quality

The different sections of the park and reserve provide some catchment protection for Currambene, Carama and Moona Moona Creeks, which flow into Jervis Bay, for Coonemia Creek which flows into Lake Wollumboola and for Stony Creek flowing into St Georges Basin. Most of the Jervis Bay catchment is dominated by surface runoff processes with groundwater of minor importance except in areas of Quaternary dunes such as around Lake Wollumboola. The clear waters of the bay are potentially very vulnerable to the impacts of land-use change in the catchment *(Kowari* 1995).

The Southern Rivers Catchment Management Authority covers the Jervis Bay area and works to ensure the protection and sustainable development of land, vegetation and water resources within the catchment. Shoalhaven City Council carries out water quality monitoring at a number of sites around Jervis Bay, at Lake Wollumboola and in Currambene Creek. The results indicate that water quality is good to excellent, attributable in part to the high proportion of native vegetation in the catchment.

Stormwater enters the national park from a number of adjacent villages, particularly Huskisson and Culburra Beach, and the long-term effects of this relatively high nutrient load have begun to be assessed by NPWS. Some early studies have shown the effects to be fairly localised with the establishment of introduced plants close to drain outlets causing the most concern (Harris 1997).

Climatic conditions determine the level and water quality of Lake Wollumboola. Water levels fluctuate significantly, along with salinity and nutrient concentrations, influencing what can grow and causing changing rates of decomposition. Differences in salinity, pH, temperature and dissolved oxygen have been observed between the surface water and the bottom waters on the bed of the lake, indicating that Lake Wollumboola is stratified most of the time. Surface pH levels are very high for a natural estuarine environment and it is possible these high levels are the result of the large algal productivity within the water column (Haines 2002).

The sediments in Lake Wollumboola are generally high in nutrients at a level considerably greater than the annual inputs from the catchment (Kinhill 2000). This indicates that nutrients in the bed have accumulated over a long period of time and may therefore be latent and not have a significant impact on the overlying water quality (Haines 2002).

Lake Wollumboola odours

Hydrogen sulphide is produced naturally within the sediments of Lake Wollumboola and under certain conditions occasionally can be released to the atmosphere. This can then be detected by the human nose as a rotten egg gas smell. Sulphate- reducing bacteria present in the sediments of the lake break down organic matter using the sulphate ion from water to form hydrogen sulphide and other compounds. This process only takes place in the absence of oxygen at the interface of the sediments and water column.

Under normal circumstances hydrogen sulphide is prevented from reaching the atmosphere. There are two circumstances when this is not the case. Normally the waters of the Lake are stratified and hydrogen sulphide remains at the base of the water column. When destratification occurs (usually wind generated) the bottom waters are mixed through the entire water column, placing massive demand on oxygen to oxidise hydrogen sulphide back to sulphate. If there is insufficient oxygen the gas escapes to the air and produces odours. Secondly, 60% of Lake Wollumboola is above sea level and when the lake opens, water drains from the lake exposing sediments directly to the air and hydrogen sulphide is released into the atmosphere producing odours (Haines 2002).

The processes associated with the generation of hydrogen sulphide from Lake Wollumboola are natural, but when the gas escapes the lake, nearby residents are likely to detect the unpleasant odour. This odour can be detected at very low concentrations and affects individual olfactory systems differently. Severe health effects can be caused by hydrogen sulphide but these are confined to industrial situations, where levels are many orders of magnitude above the levels that can be detected by the human olfactory system (Illawarra Public Health Unit advice and brochure).

A number of management options for minimising the impact of the odour have been investigated including harvesting of macroalgae, maintaining high water levels in the lake, oxygenation of lake waters through natural tidal flushing or through water recirculation plants or bubbler systems and preventing stratification of the lake (Kinhill 2000 and Haines 2002). Recent research by Geoscience Australia has indicated that microscopic algae rather than macroalgae are the major source of organic matter in the lake (Murray 2003). It is likely that the source of the odour is sulphate-reducing bacteria acting on microalgae and thus it would be futile to remove sea grass to reduce odours. Other options have been raised such as the use of iron to neutralise the hydrogen sulphide or introduction of large numbers of mullet to reduce the organic detritus. If not ineffective these options are either financially prohibitive, unachievable or may have significant environmental impacts.

Management options will continue to be considered, but until a scientifically and environmentally sound and feasible one becomes available the emphasis will be on continued education of the local residents. Shoalhaven City Council and the NPWS, with contributions by the Illawarra Public Health Unit have produced a brochure outlining

health effects of hydrogen sulphide, and an information sign about the source of the odour has been installed at the main access point to the lake.

Lake Wollumboola entrance management

Lake Wollumboola has a history of both natural and artificial openings along the length of the beach berm. The entrance of the lake will breach naturally after periods of high rainfall if the initial lake levels are quite high. Records indicate that since 1959 the lake has opened approximately 25 times. Just fewer than 40% of the openings are likely to have occurred without human intervention, while over 60% were probably artificial (Kinhill 2000 and Campbell 2001). The lake can remain closed for several years during dry periods. The longest period the lake has been closed is for nearly 8 years from August 1998 until July 2006 when a trench was illegally dug across the berm. On average, the lake remains open for just less than 12 weeks at a time.

Maintenance of natural lake entrance behaviour is consistent with NPWS policy and legislation, Department of Primary Industries policy and the recommendations of the Healthy Rivers Commission and the Lake Wollumboola Estuary Management Plan. Any interference with the Lake Wollumboola entrance should only be to alleviate significant asset damage or public safety issues that cannot otherwise be reasonably overcome. Any decision to breach the lake's entrance will only be made in the above circumstances and will carefully follow a set of guidelines that have been approved under the Review of Environmental Factors (REF) process. Property owners will be informed of any possible entrance opening proposals and close contact will be kept with Council during the operations of the flood mitigation event.

Desired Outcomes

- Human induced soil erosion in the park and reserve is minimised.
- Catchment values and the water quality and health of park and reserve streams and Lake Wollumboola are maintained.

Strategies

- *Design and implement all works carried out in the park and reserve to minimise interference with natural drainage patterns and prevent soil erosion and water pollution.*
- *Undertake appropriate control measures where erosion has been accelerated by human activity or is threatening significant habitats or other values.*
- *Liaise with local government and other authorities to maintain and improve the water quality of the park and reserve catchments. Ensure appropriate water quality monitoring programs are in place in order to build on existing baseline data.*
- *Continue to undertake studies to determine the present and future impacts of urban stormwater, their significance and what, if any remedial measures are required to protect the park and reserve, and the marine park. If needed approach Shoalhaven Council to implement strict controls through their stormwater plan, to minimise the impacts of urban stormwater.*

- *Close and rehabilitate trails not required for public access, utility maintenance or management purposes.*
- *Continue liaison with Council, health authorities and scientific institutions regarding odour from Lake Wollumboola and its management. Measure ambient levels of hydrogen sulphide in the air and water if/when valid and feasible scientific equipment and techniques are available. Support qualitative monitoring by the Culburra Beach community.*
- *Improve community understanding of the aquatic plants and vegetation communities of Lake Wollumboola and the interactions with the terrestrial, physical and fauna variations of the lake.*
- *Encourage research into Lake Wollumboola entrance-opening regimes, positions and geological history.*
- *Maintain a natural entrance-opening at Lake Wollumboola unless alleviation of severe social hardship or public safety issues cannot be reasonably overcome through other asset protection measures. Regularly monitor the height of the lowest point of the sand berm to determine if natural lake opening will occur prior to flooding risk to assets. In conjunction with Council, only consider artificially opening the lake entrance when there is a real threat of flooding at the floor level of houses, when lake levels are close to affecting sewer inspection points on East Crescent, and the forecast is for continued rain.*
- *Erect signs to indicate that unauthorised opening of the Lake Wollumboola entrance is prohibited.*

4 STRATEGIES FOR NATURAL VALUES CONSERVATION

4.1 Landscape

Greater Bendigo National Park, together with the Bendigo Regional Park, and certain other reserves and areas of Crown land, provide the setting for the City of Bendigo, which is becoming increasingly known as the 'City in the Forest' (section 2.1). Many residents regard the forested areas as the 'Lungs of the City' and an important source of wellbeing. The major viewing site is the One Tree Hill lookout tower, which provides expansive views of the surrounding landscape. The ridgetop at Big Hill provides views of the farmland to the south of the park and the City to the north. A walking track to a lookout on this ridge is proposed (section 6.5).

The southernmost section of the park at Big Hill has steep slopes rising to a broad ridgetop. The Mandurang and One Tree Hill blocks and parts of the Whipstick block are characterised by low, undulating hills. The Whipstick landscape to the north of Eaglehawk can be viewed from the Flagstaff Hill lookout. In the more northern sections of the park, lower in the catchments at Whipstick and Kamarooka, the land flattens out and is characterised by Sandstone Ridge Shrubland and Grassy Woodland vegetation.

Spectacular wildflower displays in spring and the mosaic of contrasting Box–Ironbark trees are a special feature of the park.

As part of *Country*, all elements of the landscape are rich in meaning for Jaara Jaara people, who honour their tradition (section 5.1). The landscape also has cultural significance for many non-Indigenous families (section 5.2).

Past land use activities have significantly modified the natural landscape and add considerable visual interest to the area (section 2.3). Areas where trees were cut over repeatedly are characterised by a high density of small, multi-stemmed trees. These are particularly evident at One Tree Hill and in some areas of Big Hill and Whipstick. Because the Mandurang block has had a somewhat different land use history, it has a more natural forest landscape than many other areas of the park (section 4.5).

Vegetation disturbance, soil disturbance and park management activities can alter the landscape values of the park temporarily or permanently. Where these activities are detrimental to park values in the long-term, action should be taken to halt degradation and rehabilitate if appropriate. Some management activities, such as burning, may have a temporary impact on landscape values.

Threats to the landscape character of the park include increasing visitor pressure on sites, inappropriately designed visitor facilities, and public utilities. Inappropriate designs, materials and siting of developments adjacent to the park can also adversely affect the landscape character of the park.

Aims

- Protect the landscape, particularly of areas of high scenic quality or traditional or cultural significance, while allowing natural processes to continue.
- Minimise the visual impact of management, recreation and other activities on the landscape.

Management strategies

- *Identify and assess cultural landscapes in accordance with section 5.2.*
- *Consider and respect the significance of the landscape to Traditional Owners in planning and implementing management activities (sections 5.1, 6.1 and 8.2).*
- *Ensure that the restoration of vegetation communities and degraded areas is consistent with the protection of landscape and cultural values (sections 4.5 and 5.1).*
- *Work with relevant authorities to minimise the visual impact of public utilities on landscape values (sections 7.1 and 8.3).*
- *Protect landscape values from inappropriate development in or adjacent to the park (sections 6.2, 6.5, 7.1 and 7.2).*

4.2 Geology and landforms

The park contains a variety of significant geological and geomorphological features, including one of state significance (DPI 2003).

WA DEC: Millstream-Chichester National Park and Mungaroona Range Nature Reserve, 2007

20. ENVIRONMENTAL WEEDS

An introduced plant, pest plant, or environmental weed, can be defined as an unwanted plant species growing in natural ecosystems. Weeds displace indigenous plants, particularly on disturbed sites, by competing with them for light, nutrients and water. They can also have a significant adverse impact on other natural values by altering animal habitats, harbouring pests and diseases, and have the potential to create a fire hazard.

An integrated approach to environmental weed management was developed in the *Environmental Weed Strategy for Western Australia* (CALM 1999b). As part of this Strategy, environmental weeds are rated as high, moderate, mild or low in terms of their environmental impact on biodiversity. The criteria used to determine the rating for each weed were:

- *Invasiveness* - ability to invade bushland in good to excellent condition or ability to invade waterways;
- *Distribution* - current or potential distribution including consideration of known history of wide spread weeds elsewhere in the world; and
- *Environmental Impacts* - ability to change the structure, composition and function of ecosystems. In particular an ability to form a monoculture in a vegetation community.

The Department's (Draft) *Policy Statement Environmental Weed Management (subject to final consultation)* is used in conjunction with the *Environmental Weed Strategy* (EWS) to guide the approach and priority setting for the control of environmental weeds on lands and waters managed by the Department. Priorities for action are to first control any weed that impacts on threatened or priority flora, fauna or ecological communities, or that occurs in areas of high conservation value, and then address high, moderate, mild and low EWS-rated environmental weeds in decreasing priority as resources allow. The impacts of weeds and their potential spread in local conditions should also be considered.

Options for environmental weed management include prevention, eradication, control, containment, or do nothing. It is the preferred option to prevent the introduction of environmental weeds through appropriate management, as eradication is rarely feasible. Methods of control include managing disturbance, the use of herbicides, biological control, manual control, and control through the application of fire. Effective control programs encourage the growth of native species and the suppression of weeds with the overall aim of boosting the area's resilience to further weed invasion.

Landholders are obliged to control weeds declared under the *Agriculture and Related Resources Protection (ARRP) Act 1976*. Control of such declared weeds is subject to inspection and penalty if control is not undertaken to the required standard. Declared species, which occur at Millstream, are Parkinsonia (*Parkinsonia aculeata*) and Mexican poppy (*Argemone ochroleuca*). While restricted to watercourses, Mexican poppy is not subject to control in the Pilbara. Parkinsonia is also listed as one of 20 weed species of national significance.

Weeds in the Planning Area

The last 135 years has seen 31 different weed species introduced to the area (see Appendix 5). The most significant include buffel grass, Parkinsonia, date palm, Indian water fern and ruby dock. Some were planted because of their economic benefit to the pastoralists, others for aesthetic reasons, and some were introduced by mistake.

Weeds within the planning area have been prioritised based on local management issues, the small or discrete nature of the infestation and for their potential invasiveness; distribution and environmental

impacts (see Appendix 5). In several instances the weeds with a high priority for management in the planning area, differ quite markedly from those with a high rating in the Environmental Weed Strategy. Weeds rated as 'high' in the planning area are given higher priority than those rated as 'high' in the Environmental Weed Strategy. The four priority weed species for management in the planning area are Parkinsonia, date palm, Indian water fern and ruby dock.

Buffel grass (*Cenchrus ciliaris*), a tough perennial bunch grass, was actively spread by the pastoral industry throughout the Pilbara. Buffel grass can displace native species and can rapidly establish a monoculture. It favours lighter sandy soils, particularly along water courses. The impact of buffel grass within the Pilbara has been significant and has become widely distributed across the region. Buffel grass was planted at Millstream for its fodder value as a stock feed during the 1880s and is now established along almost every water course. Its control is difficult due to its rigorous establishment after fire and varied reproduction capacity (can be vegetatively through rhizome or stolon production or sexually by seed). No single control method is effective, particularly in light of the landscape scale of control required in the planning area. Hence, the eradication of buffel grass within the planning area is likely to be impossible. The key to management of this species is the prevention of new infestations or the control of small infestations where management can be effective.

Kapok bush (*Aerva javanica*) has spread throughout the Pilbara, favouring areas of soil disturbance. Its direct effects on native flora are unknown. Within the planning area, kapok bush has followed road and rail construction, and is present throughout the Pilbara.

Ruby dock (*Acetosa vesicaria*) was first recorded in the 1890s from the Pilbara, and has since spread throughout the region. It is an annual whose full ecological effects are unknown. Ruby dock is common in the planning area due to infestation along the Pilbara Iron access road and railway line and is becoming a very big problem for the Millstream-Chichester National Park. A concerted effort will be required during the construction of the sealed Karratha-Tom Price Road to ensure that this does not result in the greater spread of ruby dock through the Millstream-Chichester National Park. Recent research by the Botanic Gardens and Parks Authority has improved understanding about the germination, dormancy, longevity and soil seed banks of this weed and made recommendations about effective chemical control methods (Anthony and Dixon 2006). However, there is still limited understanding of the impact of fire on ruby dock.

Introduction of the date palm (*Phoenix dactylifera*) has had the biggest effect on the Millstream-Chichester National Park in the last 135 years. The palms were spread along transport routes in the north-west wherever there was permanent water. Pastoralists planted dates to harvest the fruit, and this is how the date palms were introduced to Millstream. In the last 40 years the palms have multiplied so much that they now spread along the Fortescue River (*Yarnda Nyirranha*) from Deep Reach Pool (*Nhangghangunha*) to Gregory Gorge. Date Palms out compete and replace the riparian flora in these important ecosystems.

Parkinsonia is a serious weed in the Pilbara and Kimberley and is found along the Fortescue River, forming dense thickets. It was introduced to pastoral areas for shade and ornamental purposes. The seed pods float, so are readily dispersed by floods. Like the date palm, Parkinsonia can choke riparian and wetland ecosystems (Hussey *et al.,* 1997).

The start of the 1900s saw the introduction of species that would make the Millstream homestead area more attractive and appear less isolated than it was. Tamarisk (*Tamarix aphylla*) and Albizia (*Albizia lebbeck*) were planted in dry areas, and cotton palms (*Washingtonia filifera*), date palms (*Phoenix dactylifera*), bamboo (*Arundo donax* var. *donax*) and oleander (*Thevetia peruviana*) were planted near the springs and streams. Water lilies (*Nymphaea* sp.) and Indian water fern (*Ceratopteris thalictroides*) were put into Chinderwarriner Pool (*Jirndawurrunha*) and spread to other wetland areas with the watercourses themselves providing a vector for spread. Other species spread into the area by the movement of stock, vehicles and people. These include Mexican poppy, khaki weed, Parkinsonia and Gallon's curse

(*Cenchrus biflorus*).

Weeds in the planning area have had a significant impact on some of the natural values of the planning area. Many species (such as the date palm) have been aggressive invaders of riverine and wetland habitats. In some instances colonisation has seen the total replacement of native vegetation, significantly altering the ecology of the Millstream wetlands. Stream flow and wetland habitats can be altered by weeds such as date palms and Indian water fern. Large infestations of weeds can also promote large intense wildfires that can kill native species such as *Melaleuca* and *Eucalyptus* species which may take many years to regrow.

Several major weed eradication or control programs have been undertaken in the Millstream-Chichester National Park. Targets have included oleander, morning glory (*Ipomoea* sp.), Parkinsonia, stinking passion flower (*Passiflora foetida*), Gallon's curse, cotton palm, date palm, Indian water fern, water lilies and khaki weed, as well as various garden plants in the homestead surrounds. Joint Department and Department of Agriculture and Food WA control programs continue for Parkinsonia around the delta and along the edges of the pools and river. This includes a trial of the release of biological controls to reduce the Parkinsonia infestations, which has only had limited success to date.

Exotic palm control has been undertaken according to the Department's Interim Management Guidelines (1996). The control program aims to remove exotic palms to reduce the risk of fire damage in key areas, eliminate the seed source upstream and rehabilitate treated areas. Controls on a small scale were carried out in the mid-late 1980s. About the same time, Perth-based landscape architects showed an interest in transplanting large palms and many hundreds of mature palms were transported to Perth for landscaping. Removal of exotic palms from delta drainage channels since 1997 has significantly improved water flow back to the Millstream delta area.

Given the presence of date palms around the Millstream Homestead for over 100 years, they have important cultural values associated with the European settlement of the area. In addition, visitors are attracted to the "oasis" created by the palms. In order to retain these cultural values, male date palms will be kept around the Millstream Homestead and Chinderwarriner Pool (*Jirndawurrunha*) and the area rehabilitated with native species. Once these male date palms die, they will be removed and the gaps replanted with native species.

Due to limited access into Mungaroona Range Nature Reserve, the impacts of weeds in the area are low.

20 – Environmental Weeds Key Points

- Buffel grass, ruby dock and kapock bush are widespread throughout the Pilbara.
- Major weed eradication programs have been implemented in the Millstream-Chichester National Park for oleander, morning glory, Parkinsonia, *Passiflora*, Gallon's curse, cotton palm, date palm, Indian water fern, water lilies and khaki weed.
- Parkinsonia is a declared weed under the Agriculture and Related Resources Protection Act and is one of 20 weed species of national significance. Mexican poppy is also a declared weed under the Agriculture and Related Resources Protection Act but its impact on the planning area is minimal.
- The four priority weed species for management in the planning area are Parkinsonia, date palm, Indian water fern and ruby dock.
- Date palms have had a considerable impact upon aquatic communities in the Millstream-Chichester National Park and a significant control program has been implemented.

The objective is to minimise the impact of environmental weeds on values of the planning area. This

will be achieved by:

1. implementing the Department's commitments to the *Environmental Weed Strategy* Department (Draft) *Policy Statement 14 – Weeds on CALM Lands* (or revision thereof), and the policy statement for environmental weeds (in preparation);
2. preparing a priority environmental weed control plan, where impacts on natural values are found to be negative, based on:
    - the existing and potential impact of the species;
    - the efficiency and effectiveness of control measures;
    - location and availability of resources;
    - level of participation of stakeholders; and
    - the capacity for long-term monitoring of the program;
3. undertaking (and maintaining) baseline weed mapping as part of the preparation and implementation of a prioritised weed control plan cognizant of the Environmental Weeds Strategy for Western Australia and local knowledge;
4. ensuring that weed species that pose a threat to significant flora, fauna and communities are given high priority for control;
5. eradicating new and emerging weeds before they become established;
6. limiting the opportunity for weeds to be introduced and established within the planning area by minimising disturbance to soil while carrying out management activities, particularly in areas adjacent to sources of weeds. Applying entry hygiene controls as required;
7. identifying and mechanically removing or poisoning all immature date palms and mature female date palms from the planning area. This will be an ongoing process due to the presence of a seed store in the ground. Mature male trees will be retained for their historical value at selected sites (see Section 23 – *Indigenous and Non-Indigenous Heritage*), however, as these die out, they will replaced with native vegetation;
8. using fire for both weed control (for example burning heaps of poisoned exotic palms) and fuel reduction following weed poisoning programs in the Millstream delta area, where and when appropriate;
9. containing and controlling ruby dock along all road and railway corridors in conjunction with mining companies and Main Roads WA;
10. encouraging research into the effects and control of buffel grass. Adapting weed control management if appropriate in response to findings;
11. conducting research into the relationship between fire, buffel grass and native species;
12. liaising with the Department of Agriculture and Food, landholders, the Pastoral Lands Board, local authorities, mining companies and the community to facilitate effective, coordinated weed management in the planning area on adjoining lands that ensures integration with relevant management agreements; and
13. rehabilitating disturbed areas with native flora species (using only local seed) in accordance with Department policy. Maintain a nursery at Millstream to grow small numbers of plants for rehabilitation work in the planning area.

Key Performance Indicators (see also Appendix 1):

Performance Measure	Target	Reporting Requirements
20.1 Area of environmental weeds (all species) treated in the planning area.	20.1 The area of environmental weeds (all species) treated in the planning area increases over the life of the plan.	Every five years

20.2 Changes in the area covered by Parkinsonia, date palm, Indian water fern and ruby dock in the planning area.	20.2 Reduction in the area covered by Parkinsonia, date palm, Indian water fern and ruby dock over the life of the plan.	Every five years
20.3 The introduction of new environmental weed species to the planning area and the response to these.	20.3 No new introductions of environmental weed species to the planning area. Ensuring that where there are new introductions, there is a rapid response.	Every five years

6.2 Water Resources

Our Aims

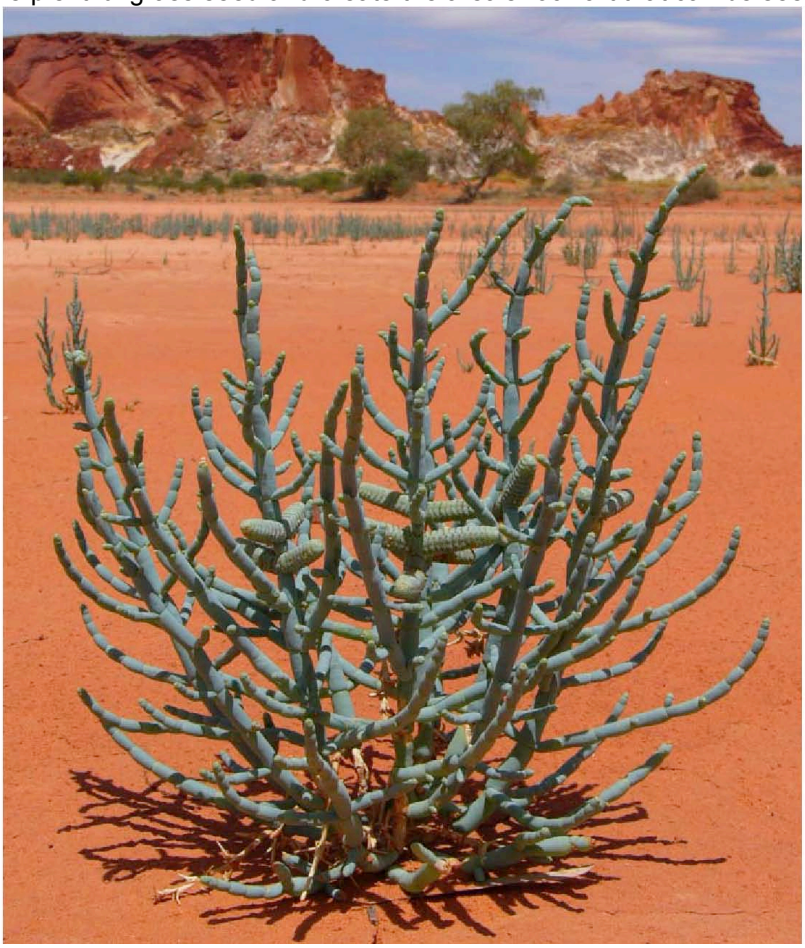
- Ground and surface waters free from contamination.
- Natural processes relating to surface and ground waters maintained.

Background

The reserve is located in Australia's arid zone. Rainfall is highly variable and periods of drought are common. The median annual rainfall for nearby Alice Springs is 286 mm. Evaporation is extremely high at more than 3000 mm per year.

There are no permanent surface waters within the reserve and few ephemeral waterholes in the eastern James Range. There is one rockhole on the Reserve that holds water for a long time after rain. This site is culturally significant. In old times it would have enabled Aboriginal people to use the area after rain, to harvest and grind the plentiful grass seed and create the area's rock art that can be seen today.

The Reserve's claypans are significant places for their cultural and natural value



31

The reserve overlies important underground aquifers in the Mereenie and Hermannsburg Sandstones. These aquifers, which yield good quality water, are recharged by the movement of ground water from both recent and ancient rainfalls, and from seepage from nearby creeks.

The reserve is located within the Alice Springs Water Control District and is subject to provisions under the *Water Act*. It is not known whether the reserve's ecosystems could be affected by ground water levels. Ground water levels in the reserve could be affected by uncontrolled extraction for nearby land

uses such as mining, horticulture, pastoralism or public water supply. As the aquifers are close to the surface, local contamination from toilets and fuel storage is a risk if not carefully managed.

There is one bore in the reserve equipped with a diesel motor. Bore RN 13669 yields about 1.25 litres per second of very high quality water suitable for human consumption. This bore supplies the nearby ranger camp. Under the terms of a long-standing agreement, the neighbouring land holder, Orange Creek Station, pumps large amounts of water from this bore to cattle watering points outside the reserve. The Parks and Wildlife Service maintains the bore.

The claypans adjacent to *Wurre* have significant value both culturally and as a wetland environment. They are a good example of large intermittent freshwater lakes that attract a variety of nomadic waterfowl after rain. This habitat is significant due to the presence of a rare plant (see Section 6.3 on page 33). When wet, the claypan environment is very vulnerable to damage if people, vehicles or large animals traverse it.

Directions

6.2.1 Any fuel storage facilities will incorporate appropriate spill protection measures.

6.2.2 Sealed system toilets will be installed at the ranger camp and visitor area to reduce the risk of ground water contamination.

6.2.3 Arrangements with Orange Creek Station regarding use of Bore RN 13669 will be monitored and the terms of use reviewed.

6.2.4 Access onto the claypans when wet will not be permitted under any circumstances.

8.3 Soil Erosion

Off-road vehicle use causes the most significant damage to the soils, topography and vegetation of the mound springs. The banks, sediments and spring morphology are disturbed as people enter and exit the spring, thus creating bank-wash. Camels, donkeys and brumbies, and cattle from adjacent properties, watering at springs, and damaging stabilising vegetation also cause mound, bank and soil erosion.

Soil erosion is the major threat to the ecological integrity of the stony tablelands and plains. Removal of the gibber (stone cover) and other surface crusts exposes friable soils that are prone to water and wind erosion. Off-road vehicle use has caused significant soil erosion on the stony tablelands. Furthermore, gullies that have developed from tracks, animal pads, wheel ruts and seismic lines create scars on the landscape, which will continue to erode for many years to come. Prevention of off-road vehicle use is a major management challenge at Witjira National Park.
Unnatural modification and accelerated erosion of the soils within the park is also threatening for Aboriginal people, whose ***Altyerre/Tjukurpa*** is closely linked with the park's natural landforms.

WHAT WE WANT – OBJECTIVES

Recognise and respect the cultural and spiritual value, to Aboriginal people, of the park's rocks, soils and landforms, and factor indigenous knowledge into park management.

Protect the soils in the park from unnatural modification and accelerated erosion.

HOW WE WILL DO IT – STRATEGIES

- Take account of Aboriginal spiritual and cultural values when undertaking management activities and development works that might impact on rocks, soils or landforms.
- Prohibit off-road vehicle use unless approved for specific purposes.
- Discourage off-road vehicle use by providing directional and interpretive signage, and by building and maintaining vehicle barriers where necessary.
- Monitor the impacts of swimming use on the springs.
- Ensure access to the springs for swimming is only by the steps and ladder provided.
- Maintain signage to prohibit diving and jumping into the springs.
- Develop walking trails to sites of interest to prevent visitors walking off-trail.
- Undertake road grading to minimise erosion.
- Disguise tracks, where necessary, to prohibit use by visitors.
- Undertake restoration activities in areas where excessive soil erosion has occurred, particularly in the gibber country.
- Manage feral animal populations to minimise impacts on soils.

4.2 Water

Values

Girraween's river systems drain to the west and form part of the Murray Darling catchment. Bald Rock Creek catchment drains a major section of the national park and is made up of a chain of high conservation value waterholes and swamps. Locally, swamps develop on perched water tables, on hardpans of siliceous or clay soils.

Quart Pot and McLaughlin Creeks also drain large parts of the national park and feed into Storm King Dam, which provides the water supply for Stanthorpe. Northeast of Wallangarra, the park's creeks drain into Beehive Dam, which provides part of the water supply for Wallangarra and Jennings.

Riverine environments in the national park have high conservation significance, providing habitat for many rare and threatened species. Most of the endangered regional ecosystems in the national park occur in drainage flats, swampy valleys or riparian areas.

Status 2008	Desired Outcome 2018	Actions and Guidelines
Most of the catchment of Bald Rock Creek is contained in the park and so water quality is high. Water from the creek is used to supply park visitors and resident EPA staff as well as the Visitor Information Centre. This water is drawn from the creek near the day-use area. The relatively shallow substrate and broad expanses of granite tend to facilitate rapid drainage of the catchment. Water levels in the creek are subject to fluctuation and may drop to low levels between rainfall events.	Water supplies for the national park's recreational facilities are managed so that sufficient surface water is maintained to allow natural aquatic processes and for ecosystems to remain healthy.	A4. Water extraction will be reviewed regularly and reduced during dry periods as necessary, to maintain the health of the creek's aquatic environment. A5. Visitor use of water resources will be managed so as minimise impacts on the riverine environments and water quality.

4.5 Exotic Animal Control

The reserve's past use, close proximity to urban areas and altered flora, has allowed exotic animals to invade and naturalise in the reserve. Exotic mammals include *Mus musculus* (house mouse), *Rattus rattus* (black rat), *Felis catus* (cat), and *Oryctolagus cuniculus* (rabbit). Exotic birds are also present in the reserve.

Because adjacent urban areas provide a constant source for the spread of exotic species, management in the reserve must be pragmatic. Feral cats are occasionally trapped in the reserve, but are likely to be far outnumbered by domestic cats from nearby residences. Cats carry the disease Toxoplasmosis, which can be transmitted to other mammals (i.e. eastern barred bandicoot) and is often fatal. Sections 6.9 and 6.11 address the bringing of horses and dogs into the reserve.

Under the *Boundary Fences Act 1908*, the managing authority is not required to fence the reserve boundaries to exclude stock from neighbouring properties. It is the responsibility of the owners of stock to keep them out of the reserve. Under the National Parks and Reserves Management Regulations 1999 the managing authority may seize and impound any wandering stock found in the reserve.

Peacocks have been introduced to the area around First Basin at Cataract Gorge Reserve and sometimes enter the reserve. Peacocks sometimes disturb neighbouring residents and could have a minor impact on reserve invertebrates (i.e insects in forest litter). The management of these birds remains the responsibility of the Launceston City Council.

Although *Vulpes vulpes* (red fox) has not been reported in the reserve, the reserve provides ideal habitat given its interface with urban areas. Foxes would pose a significant threat to the reserve's fauna, particularly bettong and other ground-dwelling mammals.

Desired outcomes

- Exotic animals with the potential to significantly impact on the reserve's natural values have been eradicated where feasible.
- Where eradication of exotic animals is not feasible or of priority, their numbers or spread has been limited.

Prescriptions

4.5.1 Investigate and monitor the impacts of exotic animals and disease on the reserve's natural values, including establishing baseline data.

4.5.2 Develop and implement an integrated exotic animal management plan that includes:

- a program of feral cat control;
- working with relevant council and reserve neighbours to discourage domestic cats in the reserve; and
- liaising with relevant neighbouring landowners to ensure boundary fencing continues to exclude livestock from the reserve.

4.5.3 Only attempt to eradicate exotic animals where proposed eradication methods will not

threaten local native (indigenous) species, unless the threat from the exotic animals is greater than that of eradication methods.

4.5.4 Any proposal to introduce or translocate fauna (including Tasmanian fauna) not indigenous to the reserve, will require a comprehensive scientific assessment prior to approval.

Subdivision 4 Whales and dolphins

1.13 Values

(1) Whales and dolphins are an integral part of the Marine Park and the Great Barrier Reef World Heritage Area.

(2) The Marine Park is an important breeding and feeding ground for several species of whales, all of which are protected species.

(3) Migratory species of whales breed in the tropical waters of the Great Barrier Reef from May to September.

(4) Several species of dolphin inhabit the area.

1.14 Issues

(1) The following are protected species:

(a) humpback whale (*Megaptera novaeangliae*);

(b) dwarf minke whale (*Balaenoptera acutorostrata*);

(c) Australian snubfin dolphin (*Orcaella heinsohni*);

(d) Indo-Pacific hump-backed dolphin (*Sousa chinensis*).

Note See the Regulations for provisions declaring protected species.

(2) Whales in the Planning Area may be disturbed by human activities.

(3) Human impacts may result in interruption of mating or calving, noise induced effects, separation of calves and mothers, collisions, displacement from areas, or behavioural change.

(4) Further information is needed about species such as the humpback whale and the dwarf minke whale to further understand their distribution, abundance and key habitats, and also about the effects of human activities on the animals.

(5) Dolphins and whales are occasionally injured by vessels.

1.15 Strategies

(1) As part of its management of activities in the Planning Area, the Authority continues to monitor marine animals, plants and habitat and to develop conservation measures that address the interaction of vessels, aircraft and people with whales and dolphins.

Note 1 The document published by the Authority and entitled *Operational Policy on Whale and Dolphin Conservation in the Great Barrier Reef Marine Park* can be found on the Authority's website at http://www.gbrmpa.gov.au.

Note 2 Best environmental practices for whale and dolphin watching activities are encouraged by the Authority.

(2) The Authority will take a precautionary approach to minimise disturbance to whales, by limiting the number of relevant permissions for conducting swimming-with-whales activities in the Planning Area (see the Regulations).

Note ***Swimming-with-whales activity*** is defined in the Regulations.

Appendix 3. Interview Questions

PREPARING PLANS

1) How has your agency dealt with the large numbers of reserves requiring management plans, with special attention to how you might have spatially or thematically grouped reserves for planning purposes?

2) What is the relationship between area management plans and plans for clusters of reserves (if your agency 'groups' reserves for planning purposes)?

3) In WA, there is a strong interest in having plans with achievable, measurable objectives and strategies. Do you share this interest? If so, how are you seeking to achieve this?

PLAN CONTENT

4) What is included in and left out of plans and why?

5) How are you using or intending to use the internet as part of management plan preparation and implementation?

AGENCY MANAGEMENT

6) How are the different types of planning and management associated with protected areas (including management planning, site planning and State of the Parks reporting) integrated in your agency? What are the promises and pitfalls of your current approaches?

7) Do you have indicators for the effectiveness of protected area management? If so, what are the formal processes for setting and then reporting on management performance? What is the place of management plans in these processes?

8) How has (or will) needed change, associated with changing planning/policy approaches, been achieved in your agency?