MANAGEMENT PLAN

Serpentine National Park

2000-2010

PLANNING TEAM

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for the
National Parks and Nature Conservation Authority
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PREFACE

The Serpentine National Park is a component of the Darling Range Regional Park. The Darling Range Regional Park Management Plan, when it is approved, will be an “umbrella” document co-ordinating existing and future planning for the Darling Range Regional Park. Implementation of the Serpentine National Park Management Plan will be consistent with the overall direction of the Darling Range Regional Park Management Plan.

National parks, conservation parks, and nature reserves in Western Australia are vested with the National Parks and Nature Conservation Authority (NPNCA). State forest and timber reserves are vested with the Lands and Forest Commission (LFC).

The lands and waters vested with the NPNCA and LFC are managed on their behalf by the Department of Conservation and Land Management. The NPNCA and LFC are required to prepare management plans for the lands and waters under their vesting and these are prepared by the Department of Conservation and Land Management.

Management plans set out strategies and guidelines for management for a maximum period of ten years or until such time that the plan is superseded by a new management plan.

The CALM Act (1984) specifies that management plans shall contain:

a) a statement of the policies or guidelines proposed to be followed; and
b) a summary of operations proposed to be undertaken.

This plan complements the Northern Forest Region Regional Management Plan (CALM 1987) and the Forest Management Plan (CALM 1994).

National park management provides for the public’s recreation needs as long as those needs are consistent with retaining the Park’s conservation and other values. The purpose of State Forest covered by this management plan is to achieve the purposes of conservation, recreation and timber production.

Inclusion of a name on the maps or within the text of this Plan does not necessarily imply approval of the name by the relevant nomenclature body.

ACKNOWLEDGMENTS

The Planning Team was assisted by Alan Sands and Jacqueline Pontré. The assistance of numerous other CALM staff in preparing the plan is also gratefully acknowledged. In particular, CALM's staff at Mundaring District and Swan Region; Rae Burrows for the Community Relations section; Julie Davies for assisting with document preparation; Alan Hordacre for the visual resource management section; David Lamont for providing advice on the Park's biological values; Chris Portlock and Burke Stephens of Management Plans Section for finalising the draft; Information Management Branch, for Tenure information and map preparation; and the Marine Operations unit for surveying of the Serpentine Falls pool (Figure 12).

Thanks also to the Aboriginal Affairs Department, the Australian Bureau of Meteorology, the Shire of Serpentine-Jarrahdale and the numerous individuals who have contributed valuable ideas and information in the preparation of this plan. In particular, the contributions of Neil Coy, who provided information on the Parks European history, fish species and recreational fishing; Peter Elliott who provided advice on mining activities by Alcoa; Steve Wilke (Water Corporation) who provided advice on Water Corporation facilities and water catchments; Robert Edkins, Joanne Murray and Roley White, who assisted with the visitor survey; and members of the Royal Australasian Ornithologists Union conducted bird surveys. These groups and individuals are gratefully acknowledged.

All the participants in the Workshop and those who sent submissions are gratefully acknowledged.

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SERPENTINE OVERVIEW

1. PARK OVERVIEW

Serpentine National Park is located on the edge of the Darling Scarp, 49 km south east of the centre of Perth and 28 km inland from the coast at Rockingham (Figure 1). It lies within the Shire of Serpentine-Jarrahdale, between the town of Jarrahdale, Serpentine Dam and the town of Serpentine. The South West Highway runs parallel to the Park's western boundary.

Reservation of land that became Serpentine National Park commenced in 1900 with the reservation of 20 ha around Serpentine Falls. Additions continued and in 1971 the name Serpentine National Park was formally gazetted. This area comprised some 635 ha. Serpentine National Park grew by nearly a factor of five with the addition of a "second stage" of 2727 ha in 1989. This rapid growth both helps secure and enhance the Park's values and provides new challenges for management.

The Park is vested in the National Parks and Nature Conservation Authority (NPNCA) and is managed by the Department of Conservation and Land Management (CALM). It is within the Mundaring District of CALM's Swan Region and forms the southern extent of the Darling Range Regional Park (DRRP).

The location of the Park near a large and growing population creates both opportunities and threats for managers. Opportunities relate to meeting people's needs for recreation in a bushland setting and increasing their awareness and knowledge of the Park. Threats relate to protecting the Park's values from the impacts of increasing numbers of people using and living near the Park.

The Park's values include:

- Proximity to the Perth metropolitan area.
- Large area of natural bushland.
- Adjoins the historical towns of Jarrahdale and Serpentine.
- Panoramic vistas over the Swan Coastal Plain and towards Perth.
- The grandeur of the deeply incised Serpentine River and Gooralong Brook valleys.
- Diverse landforms and vegetation types encompassing rugged scarp and valley landforms, forests, granite outcrops and open woodlands.
- Presence of water through the landscape as a recreational and conservation resource.
- A range of recreation opportunities, based on natural settings, are provided in the Park. These include sightseeing, bushwalking, camping and nature study.
- A rich historical importance.
- One of the few natural camping areas north of the Murray River.

2. KEY ISSUES

The function of a management plan is to consider all issues relevant to the management of the area in question. Some issues, however, are of greater concern than others. These "key issues" require more urgent action and are thus critical in terms of formulating management strategies.

The key issues in the Serpentine National Park are:

1. Tenure and Enclaves within the Park.

The Park currently consists of two "A" Class reserves (A28862 and A39825) with a purpose of "National Park" and covers an area of 4362.6 ha. The Park is vested in the NPNCA and managed by CALM. However, seven Crown Reserves, 21 freehold Locations owned by the Water Corporation, and 23 privately owned freehold Locations are either enclaves or impact on the boundaries of the Park. In addition, the eastern and southern management boundaries with State forest require field clarification. This issue is discussed in Section 5 Land Tenure and Park Boundaries.

2. Access and a Walk Track Network

Vehicle access to many of the Park's features is restricted because of steep slopes, changing land tenure and the threat of the further spread of dieback disease. Therefore, it is proposed to develop an extensive and varied system of walk tracks to provide visitors access to the Park's features, including linkage between Gooralong, Serpentine Falls and the Pipehead Dam recreation sites. The walk track network will be distinct from tracks for vehicles or horses wherever possible. The impacts of the tracks on water quality, stream banks, the steep terrain, fire management will need to be assessed. As will access through or adjacent to both private property and Water Corporation lands. These issues are discussed in Sections 21 and 26 Access and Bushwalking.

3. Dieback and Rehabilitation

Significant areas of the Park are severely degraded by factors such as gravel extraction, the impact of dieback disease and past clearing. Many of the gravel pits have not been effectively landscaped and rehabilitated. Disease impact has been very high on many areas in the southern and eastern parts of the Park, particularly on the areas of "black gravels". In addition, any areas of pasture on acquired private property will need rehabilitating. To rehabilitate all highly disturbed sites, both understorey and overstorey native species will be reintroduced onto the site. The rehabilitation process may requireintensive site disturbance within the Park. Refer to Section 17 Rehabilitation.

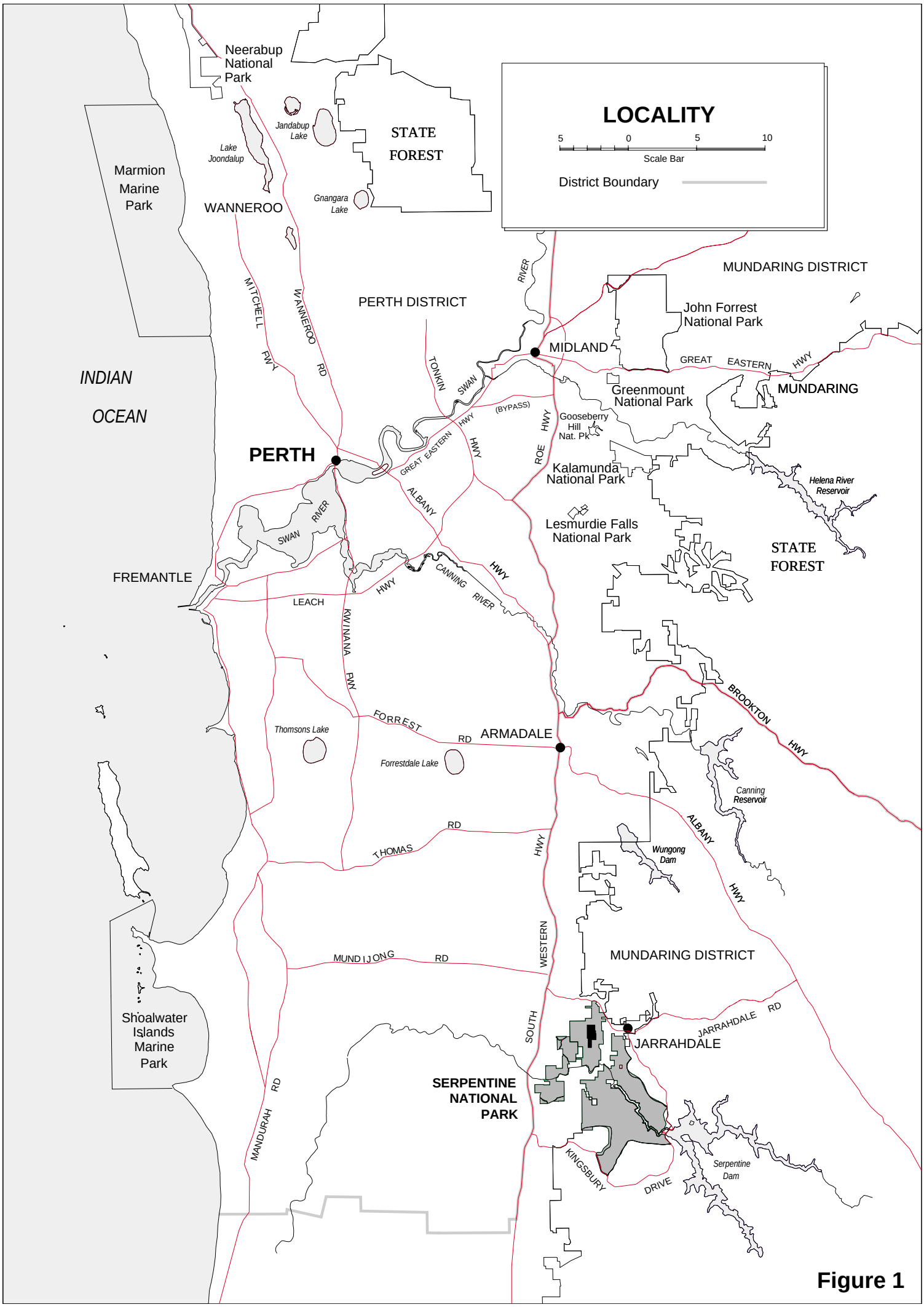
LOCALITY
5 0 5 10
Scale Bar
District Boundary
Neerabup National Park
Jandabup Lake
Lake Joondalup
STATE FOREST
Gnangara Lake
Marmion Marine Park
WANNEROO
MUNDARING DISTRICT
PERTH DISTRICT
John Forrest National Park
MIDLAND
GREAT EASTERN HWY
MUNDARING
Greenmount National Park
Gooseberry Hill Nat. Pk
Kalamunda National Park
Helena River Reservoir
Lesmurdie Falls National Park
STATE FOREST
INDIAN OCEAN
PERTH
FREMANTLE
LEACH
CANNING RIVER
SWAN RIVER
MITCHELL FWY
WANNEROO RD
TONKIN HWY
SWAN HWY
(BYPASS)
ROE HWY
ALBANY HWY
KWINANA FWY
FORREST RD
ARMADALE
Thomsons Lake
Forrestdale Lake
BROOKTON HWY
Canning Reservoir
Wungong Dam
ALBANY HWY
THOMAS RD
WESTERN HWY
MUNDIJONG RD
MUNDARING DISTRICT
SOUTH WESTERN HWY
JARRAHDALE RD
JARRAHDALE
Shoalwater Islands Marine Park
SERPENTINE NATIONAL PARK
MANDURAH RD
KINGSBURY DRIVE
Serpentine Dam

Figure 1

4. Water Catchment and associated infrastructure

The Serpentine (main) Dam, upstream of the Park boundary, and the Serpentine Pipehead Dam, within the Park, provide water to the Metropolitan Water Supply Scheme. A proposal exists to develop a small pump-back dam by Water Corporation (or a hydro electric pump storage facility by Western Power) close to the junction of the Gooralong and Carralong Brooks. Most of the Park is within the gazetted catchments of these dams, therefore, all activities within the Park must be compatible with water quality objectives set by the Water Corporation. Associated with the dams major infrastructure, the Water Corporation has recreation facilities and a range of utilities (pipelines, power, roads) which can impact adversely on the Park's values. This issue is discussed in Section 9 Hydrology and Section 37 Utilities and Services.

5. Behaviour at Serpentine Falls and Gooralong

The rocky slopes surrounding the Serpentine Falls and the pool below it have been the scene of numerous major accidents, including fatalities over the past 15 years. These accidents have been associated with people diving/jumping into the water from the top of the falls and off the rocks at the edge of the pool, as well as people slipping on rocks when climbing around the falls area. Vandalism and unacceptable behaviour are significant problems at Gooralong. Unacceptable behaviour will require increased ranger presence and enforcement during the evenings, particularly during school holidays and weekends. This issue is discussed in Section 22, Visitor Safety and Sections 23.1 Serpentine Falls and Section 23.2 Gooralong Recreation Areas.

6. Fire Management

Fire has historically been a recurrent natural event in the history of the Park whilst arson is a particular modern and unfortunately, future threat which must be considered. Wildfires are a particular concern for this Park given prevailing weather patterns and the steep topography. Conservation values requiring protection include the diverse vegetation types and communities, threatened or fire prone species and communities, steep valleys and scarp soils that are prone to erosion if disturbed, and the visual landscape seen from roads, recreation sites, walk trails and lookouts. Given that uncontrolled fire can threaten visitors and nearby residents, and destroy Park facilities, natural values and adjoining property, and that incidents of arson may also occur, it is critical to the future of the Park to have a well developed and executed Fire Management Plan. This issue is explored in Section 15 Fire Management.

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3. POLICIES AND GOALS

Serpentine Draft Management Plan is based on relevant sections of the Conservation and Land Management Act 1984 and the Wildlife Conservation Act 1950, and associated regulations. Policies of CALM and the NPNCA also guide this Plan and are available to the public on request. In the CALM Act (Section 56) the overall aim for managing national parks is:

> *To fulfil so much of the demand for recreation by members of the public as is consistent with the proper maintenance and restoration of the natural environment, the protection of indigenous flora and fauna and the preservation of any feature of archaeological, historic and scientific interest.*

The following management goals for Serpentine National Park cover the major management issues.

Conservation
Conserve biological, physical, cultural and landscape values.

Recreation
Facilitate public enjoyment of natural and cultural values in a manner compatible with conservation and other goals.

Community Relations
Promote awareness, appreciation and understanding of the natural and cultural values and facilitate liaison with the community.

Commercial and Other Uses
Ensure that commercial and other uses are controlled and managed in a manner that minimises impact on other values.

Interaction with Nearby Lands and Waters
Promote cooperation, and minimise conflicts in matters associated with use of nearby lands and waters.

Research and Monitoring
Seek a better understanding of the natural and cultural environment and the impacts of management activities and visitor use.

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4. COMMUNITY INVOLVEMENT IN THE PLAN

The community has been involved in preparing this management plan, which has involved meetings, submissions, workshops and surveys. Most of this plan's management strategies are based on the views expressed by the many people who have become involved in the planning process.

Submissions
Public submissions were sought in preparing this plan which involved:

- placing in State and local newspapers advertising that the Plan was being prepared and inviting contributions.
- circulating a leaflet encouraging input to the draft plan to over 90 specific individuals and groups and sent to all those placing submissions or enquires.
- Newspaper articles calling for public input.

Workshop
The planning process commenced February 1992 an internal meeting of CALM officers from Jarrahdale office and Swan Region discussed concerns and ideas relating to the management of the National Park.

A "Public Meeting and Workshop" was held on the evening of 23 September, 1992, to provide a forum to discuss major community issues affecting Park management. The workshop was specifically aimed at gaining public input into the Draft Management Plan, and was attended by 55 members of the public. The proceedings of the Workshop were produced and circulated to all participants.

Visitor Surveys
Two (one week) visitor surveys were conducted to identify patterns, opinions and attitudes of visitors towards facilities at the two main recreation areas within the Park - Serpentine Falls and Gooralong (Lejeune 1987; Brown, Edkins and Murrey 1993). Much information has been obtained from the survey, some of which is included in relevant sections of this Plan.

Meetings
Further input was received in the following ways:
- Discussions were held with numerous interested individuals.
- More formal talks were held with interested groups and subsequent comments received.
- Serpentine-Jarrahdale Shire Council and staff were consulted on several occasions.
- Written submissions were received from 55 organisations and individuals. The submissions received have raised many issues and points of view regarding Park values, access, recreation facilities, information, interpretation, bushwalking, horse riding and more.

The Serpentine National Park Draft Plan was released for public comment on 24 September 1997, the public submissions period closing 28 November 1997. Twenty one submissions were received and comments made were considered in the preparation of this Final Plan. A separate document, the Analysis of Public Submissions, documents changes to the Draft Plan as a result of the public submissions received.

The contributions of all groups and individuals who participated in surveys and workshops, and provided submissions to the Draft plan, form a vital part of this Management Plan.

LAND USE MANAGEMENT

5. LAND TENURE AND PARK BOUNDARIES

Objectives:

1. *Rationalise and simplify Park management by adding to the Park unused road reserves, Crown reserves and private property enclaves where appropriate.*
2. *Minimise the impact of adjoining land uses on the Park.*
3. *Review Park boundaries so they can be readily located in the field.*

This section addresses all land tenure issues within the area shown in System Six "red book" Figure 150 concerning Serpentine National Park (M85), Gooralong MPA (M84), Karnet MPA (M86) and Serpentine MPA (M87) (Department of Conservation and Environment 1983). This area includes freehold land held privately and by government agencies, Land Administration Act reserves, State Forest and water catchment areas (Figure 2).

Major issues include: managing freehold land owned by the Water Corporation, assessing System 6 recommendations concerning privately owned freehold land and Crown reserves adjoining the Park, and locating Park boundaries on existing tracks.

Serpentine National Park
The Park currently consists of two Class "A" reserves (A28862 and A39825) with a purpose of "National Park" and covers an area of 4362.6 ha (Figure 2). The Park is vested in the NPNCA and managed by CALM.

The first area within the Park to be reserved was a small 20 ha "Public Recreation" reserve (A3355) surrounding Serpentine Falls, which was gazetted in August 1900. Over the next 50 years an additional six reserves (A8615, A8650, A8651, A20357, A21904, A23894) were gazetted to protect the adjoining Darling Scarp north and south of the Falls. In March 1968 these seven reserves were amalgamated into a single 635 ha Class "A" reserve (A28862) for the purpose of "National Park" and vested in the National Parks Board (later to become the National Parks Authority and the NPNCA). However, it was not until 15 October 1971 that the name "Serpentine National Park" was officially gazetted.

The "second stage" of the Park was gazetted in January 1989 with the addition of the 3727 ha reserve A39825 which included substantial portions of Gooralong, Karnet and Serpentine Management Priority Areas (MPAs) of State forest No. 22. Significant portions of the buffer areas of Karnet and Serpentine MPAs were excluded from being added to the Park. Reserve A39825 is yet to be formally named "Serpentine National Park".

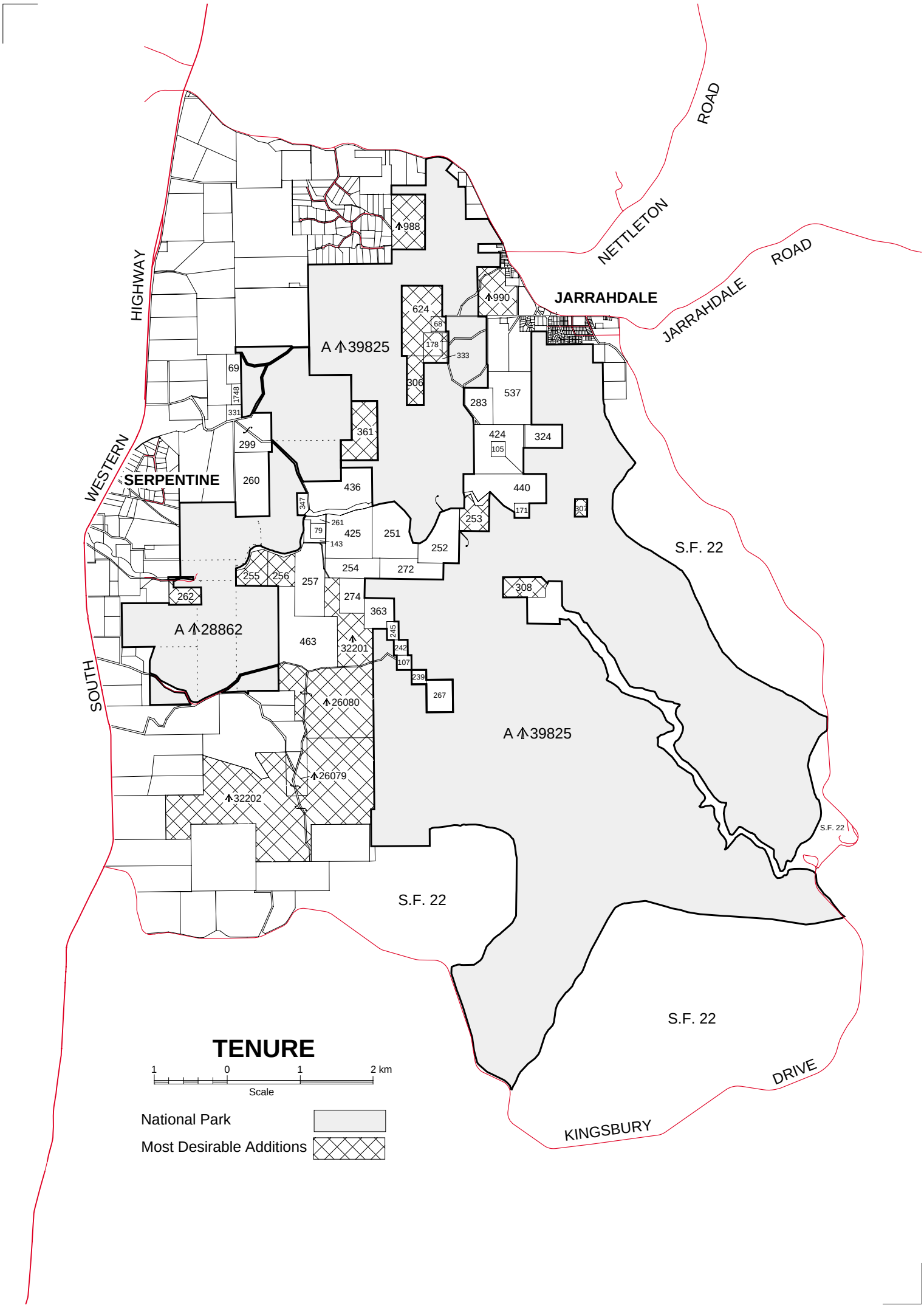
Crown Land Reserves within the National Park Boundary
Seven Crown reserves with purposes other than "National Park" are located within or adjoin the Park. Most are undisturbed, with the native vegetation in good condition, and they have been managed as if they were part of the Park for many years. The System 6 report recommends that these reserves be added to the Park.

The four Land Administration Act reserves (C26079, C26080, C32201 and C32202) to the south-west of the Falls area are proposed to be added to the Park. Ongoing discussions with the vesting authority of each reserve will continue.

The main water body upstream of the Serpentine Pipehead Dam up to the dam high water mark (following approximately the 170 m contour) and the facilities at the dam wall are included in State forest 22 and the water catchment reserve C16634 (vested in the Water Corporation).

Unused Road Reserves
A number of surveyed roads lie within the Park boundary (most of which were never built). This plan proposes that these be amalgamated into the Park.

Water Corporation Freehold Lands
The Gooralong recreation area and Bell pine plantation are on Cockburn Sound Locations 68, 178, 306, 333, 624 which are held freehold by the Water and Rivers Commission. The Gooralong recreation area also includes CT 1077/331 which is VCL and CT 1074/192 held by the Water and Rivers Commission. They were purchased to protect the Gooralong Brook water catchment from further degradation and clearing. The Gooralong recreation and camping area is managed by CALM under informal agreement with the Water Corporation. However, CALM has ongoing problems in managing land vested in another agency. The Water and Rivers Commission is conducting an investigation to determine the suitability of water quality for uses by the Water Corporation. When this study is complete, the Water Corporation may seek to construct various infrastructure or the land may be declared surplus to its needs. If the latter occurs, CALM would seek to have the lands added to the national park. CALM recommends that the Gooralong recreation area be added to Serpentine National Park but accepts that this is not feasible until the requirements for water supply are evaluated and therefore recommends that a formal management agreement under Section 16 of the CALM Act be established..


ROAD
NETTLETON
HIGHWAY
JARRAHDALE
ROAD
JARRAHDALE
WESTERN
SERPENTINE
SOUTH
988
990
624
68
178
333
306
283
537
A 39825
69
1748
331
299
260
361
424
105
324
436
440
347
171
307
261
79
143
425
251
253
252
S.F. 22
254
272
255
256
257
274
308
262
363
A 28862
463
32201
245
242
107
239
267
26080
A 39825
26079
32202
S.F. 22
S.F. 22
S.F. 22
DRIVE
KINGSBURY
TENURE
1
0
1
2 km
Scale
National Park
Most Desirable Additions

Consideration may be given to the closure of the Gooralong recreation site due to the significant management cost and public safety concerns arising out of vandalism which has occurred at the site.

Location 361 held freehold by Water and Rivers Commission, is a completely forested block within the Gooralong Brook valley that includes the Kitty's Gorge gauging station. This Location has been managed by CALM as part of the surrounding forest for many years and CALM recommends it be incorporated into the Park. This location is also subject to the Water and Rivers Commission investigation which will determine its future suitability for water resource use. CALM recommends that location 361 be added to Serpentine National Park but accepts that this is not feasible until the requirements for water supply are evaluated and therefore recommends that a formal CALM Act management agreement be put in place in the interim.

The Water Corporation owns the majority of the freehold land (Cockburn Sound Locations 79, 143, 251-54, 256, 257, 261, 272, 347, 425 and 436) along the Serpentine River between the Serpentine Falls and the Pipehead Dam. These Locations (and the two sections of Reserve C16634 along the river) are within the Lower Serpentine Catchment Area and may be affected by a proposed dam just below where the Carralong and Gooralong Brooks merge with the Serpentine River. The majority of these blocks are to be retained by Water Corporation over the period of this plan. Rationalisation of the Park boundary between remaining forest and the cleared paddocks within some of these Locations will be assessed.

The freehold Location 308, immediately to the west of the Pipehead Dam wall, is owned by the Water and Rivers Commission and is completely forested. It has been managed by CALM as part of the surrounding forest for many years. Water Corporation facilities associated with the dam wall are confined to the adjoining Crown reserve C11634. This location is also subject to the Water and Rivers Commission investigation which will determine its future suitability for water resource use. CALM recommends that freehold location 308 be added to Serpentine National Park but accepts that this is not feasible until the requirements for water supply are evaluated and therefore recommends that a formal CALM Act management agreement be put in place in the interim.

Private Property Enclaves in the National Park

The System 6 Report does not make direct recommendations concerning private property freehold Locations listed, except that the "general recommendations on planning and management of Regional Parks be applied to this area". The Report does discuss in very general terms the need to consolidate boundaries, and problems associated with wildfires, stray stock and weed invasion.

Currently these Locations are included within the Metropolitan Region Planning Scheme (MRS) "Recreation and Parks".

Cockburn Sound Location 262, which overlooks the Serpentine Falls recreation area, provides spectacular views and supports extensive stands of rock sheoak (*Allocasuarina huegeliana*). It was purchased by the Western Australian Planning Commission (WAPC) in 1993 and will be incorporated into the Park.

Cockburn Sound Locations 260, 299, 331 1748 and 69 on the western edge of the Park and Cockburn Sound Locations 105, 171, 283, 324, 424, 440 and 537 to the south-west of Jarrahdale town site have been cleared for many years, are highly disturbed by agricultural land use and do not inhibit Park management. The former do provide spectacular views and indent somewhat into the western boundary of the Park. The latter are within the Lower Serpentine River Catchment and separate Gooralong and Serpentine blocks of the Park. Their scenic, native vegetation and water catchment values can be adequately protected by current and proposed town planning mechanisms, and do not need to be incorporated into the Park.

Six privately owned, freehold Locations (Cockburn Sound Locations 107, 239, 242, 245, 267 and 363) along the Carralong Brook are in various stages of development. If the land owners wish to sell, the blocks will be considered for purchase and incorporation into the Park.

Lots 3 and 4 on Cockburn Sound Locations 255/256 are adjacent lots just to the east of Serpentine Falls. They restrict access, both vehicles and walk tracks, from the Falls area to the rest of the Park. Lot 4 has been acquired by the (WAPC) for incorporation into the Park at some stage. Lot 4 has a dwelling on it which may have a use as some form of park facility at some future date. Lot 3 should be included into the Park if the opportunity for acquisition arises.

Cockburn Sound Location 307, to the north-east of the Pipehead Dam, is an isolated, private property block within the Park. It should be included into the Park if the owner wishes to sell.

Cockburn Sound Location 463, a semi-cleared block owned by Western Power to the south-east of the Serpentine Falls area, is the proposed site of the Western Power hydro-electricity pump storage facility planned for early next decade (see *Hydrology*). If Western Power decides not to go ahead with the facility, Location 463 should be incorporated into the Park.

Private Property adjoining the Park

The historical timber town of Jarrahdale adjoins the north-east corner of the Park (Figure 1). The presence of Jarrahdale and the provision of essential services (eg Western Power and telephone lines, and water supply) have implications for the management of the Park. Regular fuel reduction burning is carried out in the Park surrounding Jarrahdale to protect the town from wildfire.

Most other land adjacent to the Park is being used for farming pursuits. Small areas are used for Special

Rural (accommodation on lots of around 0.4-2 ha), recreation and community camps, small farm management, town site and extractive industry (gravel removal).

The Shire of Serpentine-Jarrahdale Rural Strategy (Mortlock, 1994) and the various planning documents associated with the Metropolitan Region Scheme (Department of Planning and Urban Development, 1990) are expected to continue to direct land use adjacent to the Park. The direction given in these plans are seen as compatible with this management plan. Changes to land use, zoning, planning schemes and development are referred to CALM as part of statutory processes. CALM will continue to provide comment and seek to protect the Park and its values through these processes. Various arbitration systems are in place to resolve conflicts.

State forest
The eastern and southern boundaries of the larger reserve A39825 of the Park adjoins State forest No. 22. For much of their length these boundaries do not follow designated roads or other easily located features. The System 6 Report proposes that the boundaries of these two blocks (Karnet M86 and Serpentine M87) follow Kingsbury Drive.

Neighbouring State forest is managed for multiple purposes including recreation, water production, bauxite mining and timber production. Alcoa intends to mine the bauxite adjacent to the Park (see *Mining*). Most activities in State forest have limited impact on the Park and its values.

STRATEGIES

1. **The whole of the Park, including reserve A39825 (forming the "second stage" of the Park), to be formally named "Serpentine National Park".(L)**

2. **Implement the changes in status proposed for Crown reserves and gazetted road reserves shown in Figure 2. These proposals will increase the Parks size by 553 ha (12.7%). (H)**

3. **(A) If a study by the Water and Rivers Commission finds that the freehold locations at Gooralong are surplus to water requirements, seek to include those freehold locations into the Park.**
   (B) In the interim, negotiate a formal CALM Act management agreement with the Water and Rivers Commission and the Water Corporation for the effective management of the Gooralong Recreation Site.
   (C) In the case of (A) or (B) not occurring, closure of the Gooralong Recreation Site will be considered. (H)

4. **By purchase or exchange, acquire private property enclaves, when available, that have: high conservation or recreation value; management benefits; that protect areas with these values within the Park; and agreement from the land owner to sell. (M)**

5. **Liaise with relevant authorities, departments and land owners to ensure land uses on adjoining land do not adversely affect Park values. CALM will continue to comment on such issues as:**
   - **likely environmental impacts**
   - **drainage and water quality within catchments draining into the Park**
   - **dieback implications**
   - **fire management**
   - **access to CALM managed lands**
   - **pets, stock, pests and weeds**
   - **boundary fencing**
   - **impact of public utilities on CALM managed lands**
   - **threatened species and plant communities**
   - **access to basic raw materials. (H)**

6. **No further private property emergency access should be approved for subdivisions adjoining the Park boundary. (M)**

7. **The eastern and southern boundaries of reserve A39825 of the Park that adjoins State forest No. 22 should, if possible, be located to follow existing tracks or other features, so that they can be easily located in the field. (M)**

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6. ZONING

The objective is to introduce a system of management zones that maximises the enjoyment of visitors and minimises the impact of recreational uses upon conservation values, minimises conflict between recreational users, and provides a basis to regulate access and facility development.

Management zones establish a framework to protect the Park's environment, provide a range of recreation uses, and indicate the different levels of management required. The Serpentine National Park zoning plan considers research undertaken on the Park's vegetation, dieback disease, the intensity and types of recreation uses, and future requirements for fire management. The zoning scheme will be used as a guide for future management (Table 1 and Figure 3). A detailed study of the Park's vegetation, flora and dieback disease distribution and impact needs to be completed. On completion of these studies the zoning scheme should be reviewed.

The management zones identified in the Park are:

Recreation Zone
Intensive recreation activities are concentrated in a few localities (Figure 11), although much of the Park is used for passive recreation activities such as bushwalking. The areas designated within the recreation zones can sustain high usage levels, are accessible to all traffic (including tourist buses) and

contain the major recreational facilities (include barbecue sites, toilets, information shelters and walk tracks).

The existing major recreation sites at Serpentine Falls and Gooralong will now be formally zoned as focal points for the recreation zone within the Park (see *Recreation Areas and Existing Use*). The Water Corporation recreation facilities at the Serpentine (main) Dam and the Pipehead Dam are also designated within the Recreation Zone as they impact on the values of the adjoining National Park.

Natural Environment Zone
The remainder of the Park not specified Recreation Zone will be designated Natural Environment Zone. Extensive areas of the Park will be retained in their natural state. Vehicle access will be restricted to management vehicles only, except for a few tracks to be retained for public access. Some walk tracks will be provided within this zone.

It is important to protect dieback disease-free areas, steep slopes, granite outcrops, water courses and the Pipehead Dam catchment within the Natural Environment Zone. Both internal and external funding will be sought for detailed biological and dieback disease surveys within this zone. Following surveys a review of the zoning plan will be required.

The western side and upslope of the high water level of the Serpentine Pipehead Dam reservoir contains areas of the Murray Vegetation Complex on the valley's mid to upper slopes that has minimal past disturbance and is in relatively good condition. Elsewhere, major areas of the Murray Vegetation Complex have been flooded following damming for Perth's water supply.

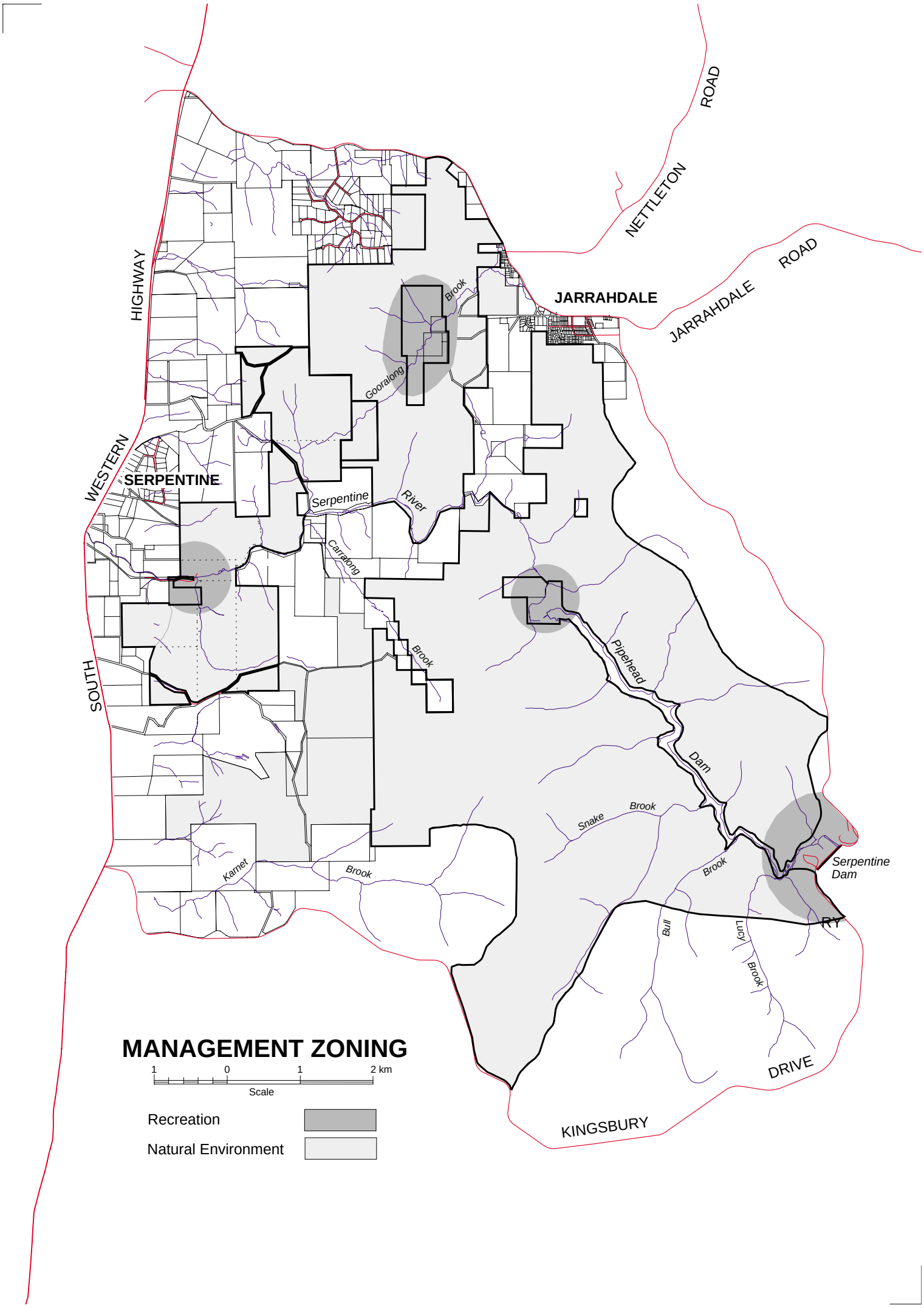
STRATEGIES

1. **Develop appropriate access and recreational facilities in each of the recommended zones as indicated in Figure 3 and Table 1. (H)**

2. **Use the zoning scheme to separate incompatible uses. (H)**

Table 1. ZONING SCHEME

Description	Recreation Opportunities	Level of Facilities	Evidence of Management
Natural Environment Zone			
Areas that can sustain, with minimum impairment, a selected range of low-density activities with a minimum of related facilities.	Non-motorised access except for management purposes. Experience of an environment with little human modification. May be contact with other people.	Very few facilities provided.	Moderate
Recreation Zone			
Areas that can sustain a range of recreation opportunities of medium to high density with related facilities.	Motorised and non-motorised access. Experience of an environment with some modification. Usually contact with other people.	Developed facilities provided, eg. BBQs, picnic areas, toilets, information, shelters and walk tracks.	High


ROAD
NETTLETON
HIGHWAY
JARRAHDALE
ROAD
JARRAHDALE
Brook
Gooralong
WESTERN
SERPENTINE
Serpentine
River
Carralong
Brook
SOUTH
Pipehead
Dam
Snake
Brook
Brook
Serpentine
Dam
Karnet
Brook
RY
Bull
Lucy
Brook
DRIVE
KINGSBURY
MANAGEMENT ZONING
1 0 1 2 km
Scale
Recreation
Natural Environment

MANAGEMENT FOR CONSERVATION

7. CLIMATE

The objective is to consider the effects climate will have on all aspects of planning and operation.

The Park experiences a Mediterranean climate with characteristically hot dry summers and cool wet winters. Two weather stations are located close to the Park boundary and have records dating back many years - Serpentine town site (1905-1994) and Jarrahdale town site (1882-1994). Mean maximum temperatures vary from 30 C in February to 7 C in July.

From the foot of the Scarp to the top, rainfall increases rapidly, with the annual rainfall for Serpentine approximately 951 mm and Jarrahdale 1187 mm. June and July are the wettest months and about 80% of annual rainfall falls in the six months from May to October. The average monthly rainfall varies from 199 mm and 234 mm in July to 9 mm and 11 mm in February for Serpentine and Jarrahdale respectfully (records supplied by the Australian Bureau of Meteorology 1994).

The possible effects of long-term climatic changes during the life of this plan are unlikely to have significant implications for the Park's flora and fauna.

STRATEGIES

1. **Consider available weather data, when developing management strategies for the Park, particularly: high rainfall and the implication for erosion from earthworks, wind speed and direction at times of high fire risk. (L)**

2. **Locate and design recreational facilities to minimise unpleasant climatic effects. (M)**

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8. GEOLOGY, LANDFORM, SOILS AND EROSION RISK

The objectives are to:
1. *Protect and conserve geological and geomorphological values, features, landforms and soils.*
2. *Rehabilitate eroded areas.*

The Park is sited on the western edge of the Darling Plateau, an ancient plateau composed mainly of granite rock with dolerite intrusions and capped with laterite.

As a result of past weathering the Park has a number of distinct landscapes, namely lateritic uplands, minor valleys, major valleys and scarps. The landscapes can be grouped into landform mapping units based on topography and soils and have been broadly mapped by Heddle *et al* (1980). The Park's soils are influenced by the granite bedrock and physical geological processes. Within the Park, the soils are sharply divided into those that are developed on site from either dolerite or granite. Plant communities are closely linked to landforms and soils (Beard 1979).

Landform units have relevance to:
- firebreaks, walk tracks and road construction and maintenance;
- siting of recreation facilities and activities;
- prescribed burning;
- conservation values;
- visitor education and interpretation;
- site drainage structures; and
- distributions of biotic components (vegetation, flora and fauna).

The erosion risk (or how susceptible each landform unit is to erosion) is based on the interaction between soil erodibility, rainfall erosivity, slope steepness and length, vegetative cover and site management (King and Wells, 1990). Steepness and length of slope are two major factors contributing to erosion in the Park. The Park varies from 60 m to 300 m above sea level and features steep slopes (some greater than 5:1) associated with the scarp and incised valleys of the Serpentine River and Gooralong Brook (Figure 4).

Granite outcrops have a high conservation value because of the diverse and unique fauna and flora communities associated with them. Granite outcrops shed large amounts of water from their surfaces and erosion can be a major problem if vegetation is disturbed or uncontrolled access allowed. Disturbance to the fragile granite outcrops and boulders should be minimised during all operations or activities.

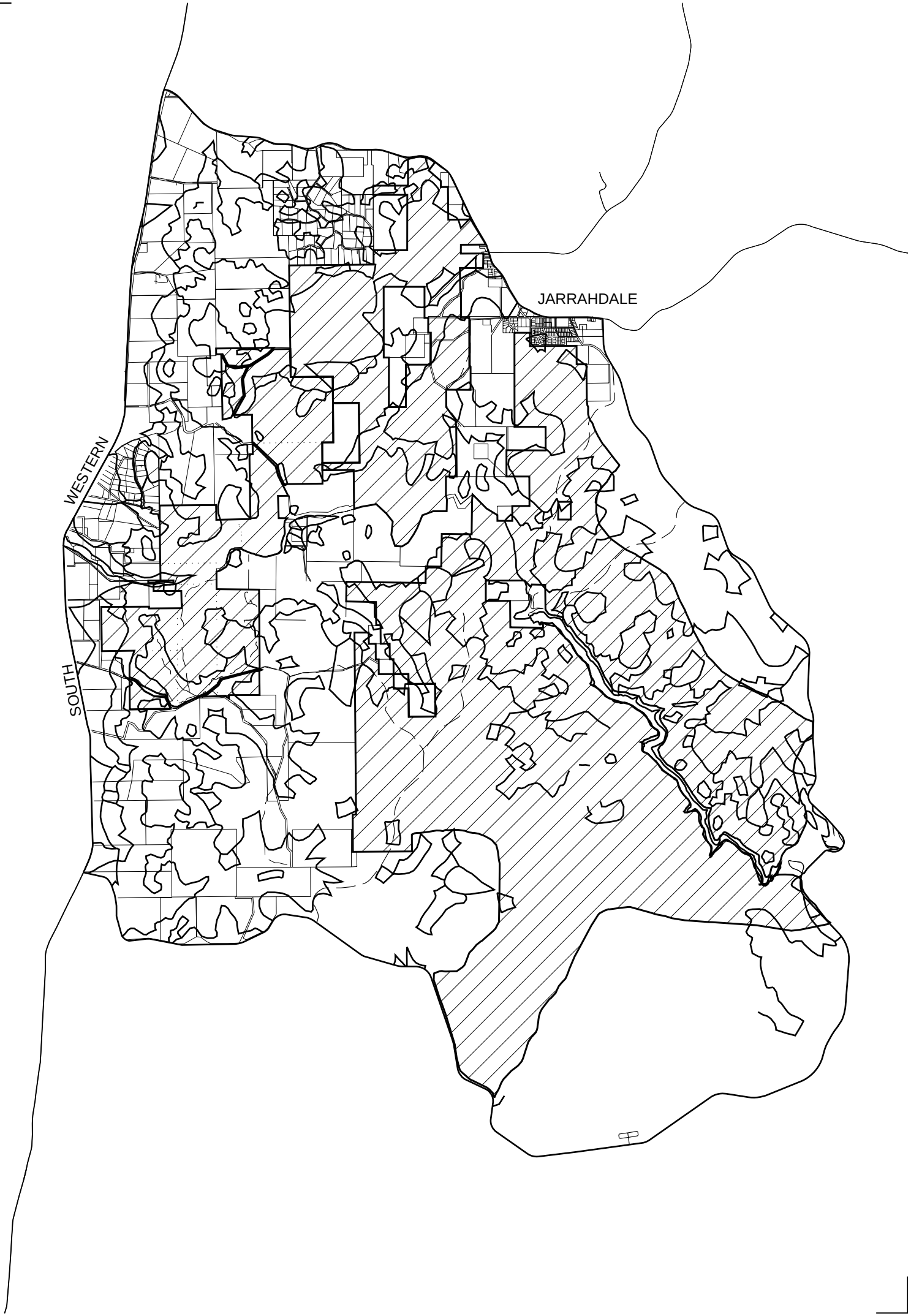
STRATEGIES

1. **Identify and protect geological sites and landform features that have scientific and educational values. (M)**

2. **Develop and maintain stable access routes to major destinations within the Park, realigning or upgrading sections causing erosion or damage to geological and landform features (see *Access and Parking*). (H)**

3. **Monitor the effectiveness of erosion control techniques, and incorporate new practices where appropriate. (M)**

4. **Control recreation activities in areas of high erosion risk. (H)**


JARRAHDALE
WESTERN
SOUTH

9. HYDROLOGY

The objectives are to:

1. *Protect and manage the Park's water resources and, in doing so, maintain or improve the quality of the Park's surface and ground water resources.*
2. *Protect the conservation values of the Park's rivers, streams and soaks.*
3. *Take into account Aboriginal concerns relating to waterways when developing Park planning and management actions.*
4. *Ensure Water Corporation provides sufficient water to flow over the Serpentine Falls for 12 months of the year for health and aesthetic reasons.*

Catchments

The Serpentine River and its tributaries flow through and drain much of the Park. Normally the Serpentine River, Gooralong Brook and Carralong Brook remain flowing all year round, while all other streams generally flow from May to November.

The catchments of the main streams in the Park consist of steep slopes with shallow soils over granite and clay. Laterite dominates the flatter upland parts of the catchments. The V-shaped valleys and smaller gullies ensure a fast run off that flushes the creek system.

The Park's permanent and intermittent water resources have special significance as fauna habitats. Any changes to natural drainage may adversely affect the riverine fauna and their habitat.

The presence of water enhances the recreation experience of visitors, especially along the Gooralong Brook and Serpentine River with their associated waterfalls. The Park's streams also have significance to Aboriginal people because of the presence of the mythological Waugal (refer to *Aboriginal Cultural Heritage*).

Changes to land use outside the Park, but within the catchment areas, have the potential to change the quality and quantity of the Park's water resources. CALM will seek to be involved with any catchment management plans for the area.

Water Storage and Catchments

Much of the Park is gazetted as water catchment under the Metropolitan Water Supply, Sewerage and Drainage Board Act (1912), although only part is currently harnessed (Figure 5).

The Serpentine River is an important source of fresh water and is currently dammed at two sites. The Serpentine Catchment Area is upstream of the existing Park boundary and the recreation facilities associated with the dam wall are just outside the Park boundary on State forest. The Serpentine Pipehead Dam is totally surrounded by the Park and approximately 60% of its catchment area (total 29 km^2) is within the Park. The water body floods an area of 61 ha within Reserve 16634 which is vested in the Water Corporation (Figure 2).

While the Pipehead Dam receives water from stream flow originating within its catchment the major source of inflow is from the Serpentine (main) Dam. This large dam has no direct connection to the Metropolitan Water Supply Scheme. Water is allowed to escape under controlled conditions from the main dam and discharge into the lower Serpentine River and ultimately into the Serpentine Pipehead Dam. Water leaves the Pipehead Dam via two large trunk mains (1220 and 1370 mm diameter).

The Serpentine Pipehead Dam has a capacity of 2.5% of the capacity of the Serpentine (main) Dam. This means that little opportunity exists for solids and any other pollutants that may be introduced into the water to settle or dilute. While the Serpentine Pipehead Catchment Area is in a mainly forested area, any activities that are permitted or encouraged (eg recreational) within the Park must not be allowed to compromise water quality within this sensitive catchment area.

The watershed below the Serpentine Pipehead Dam, known as the Lower Serpentine Catchment Area, includes the sub-catchments of the Carralong and Gooralong Brooks. While all streams contain fresh water, the quality of the water entering the Park in the Gooralong and Carralong Brooks is affected by the land uses outside the Park. The Gooralong Brook has its origins on land used for orchards and passes through the Jarrahdale township. The Carralong Brook passes through a "string" of properties engaged in a number of land uses including livestock breeding and orchards, before it re-enters the Park. Both Brooks enter the Serpentine River approximately 4 km downstream from the wall of the Pipehead Dam.

A small weir was built at the base of the Serpentine Falls in the 1920s, and the enlarged pool is used as a swimming hole. The flow of water over the Serpentine Falls has been affected by the dams upstream and needs to be maintained all year round to ensure the river through the recreation site does not stagnate and the falls do not stop flowing.

Regular patrols of the Catchment Areas and water sampling are carried out by Water Corporation Catchment Rangers.

Water Storage Proposals adjacent to the Park
The Water Corporation owns a large parcel of freehold land in the middle of the Park (see *Land Tenure and Park Boundaries*). The intention in purchasing this land was to secure an area suitable for a small pump-back dam close to where the Gooralong and Carralong Brooks join the lower Serpentine River. The proposal is to pump water back to the Pipehead Dam or directly into the trunk mains adjoining the proposed dam site. In addition, Water Corporation have proposed an alternative pumpback system with a dam on private property below the Serpentine Falls (1995). This proposal includes a new pipeline through the Park to connect with the Serpentine Pipehead Dam and the Serpentine (main) Dam. Both proposals will be assessed for their acceptability and environmental impacts under the normal EPA evaluation processes and Section 33 (1) (dc) of the CALM Act 1984 which requires CALM "to promote the conservation of water, as to both quantity and quality", on land managed by CALM.

Western Power has completed a preliminary design for a hydro-electric scheme based on a pump storage facility that would include the construction of a dam on the same site as that proposed by Water Corporation for their pump back dam. The dam would be connected by an underground pipe to an upper pond on Location 463 (owned by Western Power). During periods when electricity demand is low, the pump storage facility would pump water from the lower dam to the upper pond. During periods when electricity demand is high, the facility runs in reverse, with the water flowing back to the lower dam and generating electricity. The facility would also require other infrastructure to the site, including a diversion pipeline, access road and transmission line with a 60 to 110 m easement. Western Power is currently reviewing the feasibility of the project, however, believes it would not be required until the next decade.

STRATEGIES

1. **Protect the Park's water quality and water resources while implementing all management activities. (H)**

2. **Consider Aboriginal concerns relating to the Park's waterways during all activities (see *Aboriginal Cultural Heritage*). (H)**

3. **Provide input into the EPA assessment processes on the impacts the proposed Water Corporation and Western Power dams and infrastructure will have on the Park's values. (M)**

4. **Minimise adverse environmental impacts on stream line vegetation and stream banks. (H)**

5. **In association with Water Corporation and Water and Rivers Commission, ensure that sufficient water flows over the Serpentine Falls for 12 months of the year. (H)**

6. **Liaise with other government departments, Local government authorities and landowners to ensure the land-use practices upstream of the Park do not adversely affect the Park's water quality and quantity. (L)**

7. **If other agencies and land holders prepare a catchment management plan for waters flowing into the Park, CALM would assist where required. (L)**

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10. LANDSCAPE

The objective is to protect and conserve landscapes by sensitive design of new developments, renovating existing facilities and rehabilitating degraded areas to enhance and restore the Park's natural beauty.

Description of Park's Natural Landscapes
Serpentine National Park offers visitors a rich variety of scenery. Enclosed forests, the spectacular grandeur of the deeply incised Serpentine River valley, panoramic vistas over the Swan Coastal Plain, granite outcrops, open woodlands, rock pools and an harmonious mosaic of vegetation types combine to make the area attractive to visitors.

To the west, at the edge of the Darling Escarpment, the Park fringes the agricultural landscape of the coastal plain. To the east it stretches through forest covered hills and agricultural clearings to the historical timber town of Jarrahdale.

Dramatic seasonal changes occur to the Park's natural and surrounding landscapes: the spectacular wildflower display of spring, the golden browns of the dry pastures contrasts with the grey green of the forest during summer, and the greening of autumn grasses after the first rains. Winter rains turn the dry stream beds and the trickle of the Serpentine River to a foaming torrent below the towering granite outcrops.

These and many other contrasting and more subtle landscape changes ensure that even the regular Park visitor is treated to something new on every visit.

Description of Park's Developed Landscapes
Only a small area of the Park around Serpentine Falls and Gooralong is developed for recreational activities. The Park is relatively undeveloped, but the opportunity exists to enhance the experiences of visitors wishing to discover the spectacular scenery. The major influences on developing the Park are the powerlines, water pipelines and various associated buildings that service the Serpentine Dam and Pipehead Dam. Numerous roads and tracks are maintained to access these facilities and private property. Many of these tracks were once used for forest management and timber harvesting, however they are now rarely used or maintained.

The eastern addition to the Park with its less incised landforms and where forest practices have influenced forest structure and appearance of the landscape, contrast with the Park's deeply incised western precinct.

Attractive views can be accessed at the base and top of Serpentine Falls, from Bauldwin Bluff and Water Corporation facilities at the Serpentine and Pipehead Dams.

Past land use practices have led to some significant changes to the natural landscapes in the Park (see *Rehabilitation*). It is possible to rehabilitate these alterations to a condition that is closer to the natural landscape.

STRATEGIES

1. **Refer to CALM's Landscape Management Policy No 34 and landscape character typing publication "Reading the Remote", and seek specialist advice when implementing the management plan. (H)**

2. **As resources become available, progressively replace existing facilities and structures that do not aesthetically blend with the natural landscape. (H)**

3. **Design and construct all new park facilities in keeping with natural colours, lines, forms, textures and scales and subordinate to the natural landscape. (H)**

4. **Design and construct walk tracks and viewpoints that maximise visitor access to scenic locations without detracting from the Park's natural landscape. (M)**

5. **Seek the cooperation of other agencies, neighbours and community groups that impact on the Park's landscape to protect and rehabilitate the Park's landscapes and that of surrounding lands. (M)**

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11. VEGETATION AND FLORA [2]

The objectives are to:

1. *Determine the distribution and structure of the Park's flora and plant communities and use this knowledge to facilitate management.*
2. *Protect and maintain viable populations of local plant species and communities with an emphasis on those threatened and those with key roles in plant communities.*
3. *Minimise the impact of plant diseases and introduced plants.*
4. *Provide opportunities for visitors to gain an appreciation of the Park's flora and its management.*

One of the Park's most distinguishing features is its diverse vegetation structure, ranging from jarrah-marri forest to wandoo woodlands, scarp heath lands and specialised granite outcrop communities (Beard, 1979). The vegetation complexes at the edge of the Darling Scarp and the Swan Coastal Plain are of particular interest as they continue to be under threat from urban and rural development outside of conservation areas.

However, no detailed studies of the Park's vegetation communities have been undertaken, either based on structure or floristics. Surveys of similar scarp reserves, such as John Forrest National Park (Department of Conservation and Land Management 1994), have identified a very diverse flora and range of vegetation communities within that Park. Such studies are urgently required for Serpentine National Park.

Broad scale vegetation surveys and mapping by Beard 1979 and Heddle *et al* (1980) have included the area within the Park. They found plant communities are closely linked to the landforms and soils. The Park lies within the Dale (Darling Range) Botanical subdistrict of the Darling Botanical District (Beard 1979). Heddle *et al* (1980) identified five broad vegetation complexes within the Park (Figure 7):

- Lateritic Uplands - Dwellingup Complex.
- Minor Valleys - Yarragil Complex.
- Major valleys combining slopes and floors - Murray and Helena Complex.
- Major valley floors and scarps - Darling Scarp Complex.
- Ridge Hill Shelf - Forrestfield Complex

The Dwellingup and Helena vegetation complexes are adequately represented in conservation reserves in the Region. The Yarragil vegetation complex (minimum development of swamps) consists predominantly of jarrah-marri open forest with yarri and bullich on the valley floors.

The Murray vegetation complex occurs on the moderately incised valleys on the western fringes of the Darling Plateau. Major areas of this complex, except for the Murray River, have been flooded after damming for Perth's water supply. The Serpentine Pipehead Dam floods the largest area of this complex within the Park, although areas of this complex still exist within the Gooralong Brook catchment.

[2] Vegetation refers to plant communities and their structure, while flora refers to the plant species present.

Management for Conservation

The Darling Scarp Complex is restricted to a linear, north-south strip less than 2 km wide on the western edge of the Darling Plateau and is itself a unique geological feature. The Complex includes a diversity of vegetation communities and flora, ranging from wandoo woodlands with mixes of marri through open forests of sheoak, heath, herb fields and lichens on granite rocks. Although well represented in conservation reserves, the area of Darling Scarp complex within the Park is, therefore, of regional importance.

The Forrestfield Complex is dominated by open forest of marri-wandoo-jarrah on the heavier soils and marri-jarrah-sheoak on sandier soils. It is estimated that only 3% of this complex remains uncleared and little is protected within conservation reserves. The block of this complex, which is located south of the Falls, therefore, has very high conservation value.

Granite outcrops have a high conservation value, because of the diverse and unique fauna and flora communities associated with them. The granite communities are the last refuge of fire sensitive plants, some of which are quite rare/restricted (Hopper, pers. comm.). They are under some recreational pressure.

Flora

Two localised surveys of the Park's flora have been completed. The WA Wildflower Society, in conjunction with CALM, established five flora plots in the Ridge Hill Shelf communities on the western edge of the Park in Spring 1994. CALM established several monitoring plots in the Park in locations that are representative of major vegetation communities. Recordings within these plots of species present, flowering and vertebrate fauna, were made during spring and autumn, 1990. Data from these plots show that some parts of the Park are floristically very rich, particularly in jarrah-sheoak forest. The two surveys will provide useful benchmarks for future research, however, further work is required.

A new declared rare flora species, *Lasiopetalum pterocarpum* and two priority listed flora species: *Pimelea rara* (this species is now priority listed) and *Acacia horridula* (Priority 3), have been found within the Park. In addition, two geographically restricted eucalypt species occur within the Park. Darling Range ghost gum (*Eucalyptus laeliae*) occurs on the sides of granite hills and is a feature on the hillsides above Serpentine Falls. salmon white gum (*Eucalyptus lane-poolei*) favours clayey soils on the scarp.

The *Wildlife Conservation Act (1950)* protects all native flora and the declared rare flora is given special protection.

STRATEGIES

1. **Survey the Park's vegetation and prepare detailed vegetation maps. (H)**

2. **Systematically, over a period of five years, record the distribution, abundance and other details of the Park's flora including threatened species. (M)**

3. **Minimise the introduction, spread and impact of plant disease on native flora by implementing strategies in Sections *Disease* and *Access*. (H)**

4. **Rehabilitate degraded vegetation communities in the Park (see *Rehabilitation*). (H)**

5. **Use the established monitoring plots as long term reference areas. (M)**

6. **Minimise damage and restrict access to herb fields on granite outcrops. (H)**

7. **Expand and maintain the Park's herbarium. (L)**

12. FAUNA

The objectives are to:
1. *Survey the Park's fauna, habitat distribution and community structure and to use this knowledge to facilitate management of the Park.*
2. *Maintain viable populations of all existing native fauna within the Park, with an emphasis on threatened and other priority species.*

The Park has important regional values in terms of its fauna: it has a diversity of fauna species supported by a variety of vegetation types and associated habitats; it forms a corridor for animals moving along or across the Darling Range, with the east-west corridor being particularly important for the seasonal migration of birds; and it is an area that retains a representative sample of the fauna species and their habitat that has disappeared or been highly disturbed elsewhere on the Coastal Plain and along the Scarp.

No comprehensive survey of the Park's fauna has been undertaken. Opportunistic observations, particularly for birds, have been carried out for a number of years by CALM staff and Birds Australia (formerly the Royal Australasian Ornithologists Union). The following discussion includes these historical data and the results of two preliminary fauna surveys of the Park conducted by CALM (Wardell-Johnson 1982; Lamont, personal comm.).

The Park has eight species of native mammal (including one threatened species), and 70 species of birds (including two threatened species), 24 species of reptiles and three species of frogs. Feral animals that have become established in the Park include six mammal and two bird species (see *Feral Animals and Domestic Pets*).

Mammals
Dell (1983) recorded 23 native mammal species on the Darling Scarp, seven of which have declined not only on the Darling Scarp but throughout the south-west. This decline has been attributed to introduced species, such as the fox, disease, habitat modification and land clearing.

Eight native mammal species have been recorded in the Park - Echidna, Mardo, Dunnart, Southern Brown Bandicoot, Brushtail Possum, Western Brush Wallaby, Western Grey Kangaroo and possibly the Quokka (Wardell-Johnson 1982; Lamont pers. comm.).

It is believed that the Chuditch (*Dasyurus geoffroii*), Brush-tailed Phascogale (*Phascogale tapoatafa*), Fat-tailed Dunnart (S*minthopsis crassicaudata*), Honey Possum (*Tarsipes rostratus*) and the Water Rat (*Hydromys chrysogaster*) also occur in the Park. No surveys have been undertaken to determine the presence or status of the nine bat species likely to occur.

The Chuditch is a threatened species declared to be specially protected under the Wildlife Conservation Act (1950). Quokkas have not been collected in the Park but indications of their presence were recorded by Wardell-Johnson (1982) in gully vegetation on the western side of the Pipehead Dam.

Birds
Of the 100 bird species known to occur on the Darling Scarp (Dell, 1983), 70 have been recorded within the Park (Lamont pers. comm.). Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris) and* Baudin's Black Cockatoo *(C. baudinii*) are threatened species declared to be specially protected under the Wildlife Conservation Act 1950.

Several bird species, or groups of species, rely heavily on particular vegetation types and habitats in the Park. Parrots, owls and tree-martins require hollow trees for nesting. Smaller bush birds, such as wrens and robins, require and thrive in the dense thickets of hakea and grevillea found around granite outcrops. Creek and stream line vegetation also provide important habitat for wrens and robins, as well as the Grey Shrike-thrush and Red-eared Firetail.

The Park also provides important habitat for migratory and nomadic bird species. Honeyeaters are often regarded as nomadic species, their movements being related to honey and nectar supplies. The Park provides essential refuge for breeding of several such species. Most bird species recorded in the Park are sedentary.

Amphibians and Reptiles
Of the 41 species of reptiles and 10 species of frog recorded from the Darling Scarp (Dell, 1983), 24 reptile species and three species of frog have been recorded in the Park. Further work would no doubt reveal the presence of more reptile and frog species.

Granite outcrops provide specialised habitat for reptiles. The gecko *Gehyra variegata*, which occurs in the Park, is only known from granite outcrops. Stream zones also provide specialised habitat for several amphibian and reptile species with the Long-necked Tortoise (*Chelodina oblonga*) found below the Falls.

No threatened species have been recorded in the Park. However, one species of snake, the Carpet Python (*Morelia spilota imbricata*), which is specially protected under the Wildlife Conservation Act 1950, is likely to occur in the Park.

Fish
The Serpentine River maintains populations of Freshwater Cobbler (*Tandanus bostocki*) and Western Minnow (*Galaxias occidentalis*), with Pygmy perch (*Edelia vittata*), Nightfish (*Bostockia porosa*) and the migratory Pouched lamprey (*Geotria australis*) found downstream of the Serpentine Falls. While the introduced Brown Trout (*Salmo trutta*), Rainbow Trout (*Oncorhynchus mykiss*) and Mosquito fish (*Gambsusia holbrooki*) have established in the river (Coy 1979; Coy pers. comm.), the status of other fish species is not known.

Terrestrial and Aquatic Invertebrates
Little is known of the Park's invertebrate fauna. They are important in the Park's ecological processes as they are important components of food chains, and they also have a major role as decomposers, recycling nutrients. Stream zones tend to have greater numbers and diversity of invertebrates.

STRATEGIES

1. **Survey the Park's fauna to determine presence or absence of species within the major landform and vegetation types. (M)**

2. **Monitor the Park's threatened fauna populations every three years using permanent monitoring sites. Maintain a register of sightings and road kills for the Park. (M)**

3. **Implement management strategies to protect and enhance fauna populations and their habitat, and to minimise the impact of threatening processes, including dieback disease, fire and predation. (M)**

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13. FERAL ANIMALS AND DOMESTIC PETS

The objectives are to:
1. *To minimise the impact of feral animals on the Park's environment.*
2. *Ensure that domestic pets (dogs and cats) are not brought into the Park.*
3. *Control, or where possible eradicate, feral animals causing conservation, safety or health problems, where this does not compromise other conservation objectives.*

Seven species of introduced mammal (House Mouse, Black Rat, Rabbit, Fox, Feral Cat, Feral Pig) and two species of introduced bird (Laughing Kookaburra, Spotted Turtle-Dove) have been recorded in the Park. Nonetheless, the full extent of introduced animals in the Park is unknown.

Non-indigenous animals predate native fauna, compete for food and shelter, and cause damage to native plants and habitats by grazing, trampling and digging. Foxes and feral cats can severely reduce or eliminate native fauna by preying on them or competing for food and territory. The placing of fox baits as part of Operation Foxglove is now occurring. The dumping of cats in the forest and domestic neighbour's cats continues to be of concern. Domestic dogs are not permitted within national parks.

Feral pigs are a major concern, not only in the Park where they disturb vegetation and may be involved in the spread of dieback, but also to rural neighbours. Annual control programs are conducted by CALM and Water Corporation. Rabbits are a concern on granite outcrops.

STRATEGIES

1. **Monitor feral animals and implement a control program, with priority given to feral pigs, foxes and cats. (M)**

2. **Implement an education program to inform local residents and visitors of the impacts pets and feral animals have on the Park's values. (L)**

3. **Prohibit pets in the Park. (H)**

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14. DISEASE

The objectives are to:
1. *Minimise the spread of dieback and other plant diseases.*
2. *Rehabilitate areas affected by dieback and other plant diseases.*

Dieback Disease (*Phytophthora* spp)
Dieback disease, associated with *Phytophthora cinnamomi*, has been in the Park for many years, probably having been introduced and spread by machinery used in logging operations and in constructing roads, and presumably during the use of tracks by vehicles, horses and walkers. In addition, it has spread down hill from infected areas high in the landscape.

In February 1992 the bulk of the area between the Serpentine River east to Kingsbury Drive was mapped and demarcated for disease symptoms by Alcoa from 230 mm photography. Some 62% of the area was infected by *Phytophthora* and impact was generally high (Figure 8). Vegetation types associated with the Serpentine lower valley appear to show lower impact than upland sites.

In October 1992, 400 ha of the Gooralong Block of the Park was field demarcated and mapped by a consultant interpreter using 1:20,000 colour photography. Some 35% was infected and impact was generally moderate to high (Figure 8). All *Phytophthora* infections initially resulted from tracks, then spread down hill to infect large areas of forest. As most roads were already infected they could remain open.

The remainder of the Park (Reserve A39825) and adjoining State forest had dieback maps produced in the 1970s (Figure 8). The 1970s information is not very accurate and can not be relied upon for management or dieback disease mapping. It has been shown as a broadscale indicator only. This information and field observations indicate much of the Park south and west of the Serpentine River was dieback infected and impact has been very high, particularly on the "black gravel" soils. Large areas of this block are grave-yard sites with little regeneration of overstorey or understorey in the years since infection. They would require significant

rehabilitation work to reinstate a forest canopy or vegetation structure with local plant species.

No dieback maps are available for the original section of the National Park (Reserve A28862), although much of the area would be uninterpretable because of granite complexes and scattered patches of wandoo woodland with insufficient numbers of indicator species.

Dieback disease is believed to have infected a large proportion of the Park, therefore the areas which remain free of the disease have a high conservation value (Figure 8). Despite the presence of dieback, the Park's conservation values remain high as dieback infected areas still help to support the Parks fauna, landscape and recreation values.

Dieback alters the forest environment by:
- killing susceptible species such as jarrah, banksia and many species of understorey vegetation. The families of plants that are known to be affected include Proteaceae, Myrtaceae, Epacridaceae and Papilionaceae, which make up a significant proportion of the Darling Range species.
- affecting hydrology, fauna habitat and visual resources as a result of vegetation death.
- indirectly affecting some species when the water table rises after transpiration decreases.

Honey Fungus (*Armillaria luteobubalina*)
The survey of the area between Kingsbury Drive and the Pipehead Dam in 1992 located several areas infected with honey fungus and further scattered infections are expected through the Park. The fungus fruiting bodies generally grow in clumps on tree bases, stumps or roots, and appear in June/July each year. Infections range from many trees dying at some sites to single trees dying at others. Although *Armillaria* occurs naturally in the south-west, its normal slow rate of spread by direct root contact may be exacerbated by the movement of infected root material associated with management and construction works.

STRATEGIES

1. **Evaluate all proposed maintenance and development activities to determine their impact on the spread of dieback (CALM Environmental Evaluation). (H)**

2. **Include disease management specifications in appropriate contract documents and job prescriptions. (H)**

3. **Complete dieback disease survey and mapping of the Park. (H)**

4. **Implement disease management strategies to protect dieback disease-free areas, minimise further spread and impact and rehabilitate degraded sites. (H)**

5. **Monitor the presence of other plant diseases, such as Armillaria, and take appropriate actions to limit their spread. (M)**

6. **Inform Park users about plant diseases and the need to stay on well-formed roads or tracks. (H)**

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15. FIRE MANAGEMENT

The objectives are to:
1. *Protect the lives of Park visitors, neighbours, fire fighters and staff.*
2. *Protect community values in or near the Park, including settlements, private property, recreation facilities, public utilities and water resources.*
3. *Encourage and maintain diversity and composition of plant and animal communities.*
4. *Provide for the survival of populations of rare or restricted plant and animal species by the maintenance of required habitat.*
5. *Minimise the spread of disease and weeds.*
6. *Protect landscape values from severe damage by uncontrolled fire, inappropriate burning regimes or suppression techniques.*

Fire History
Fire was and continues to be a recurrent event in most eucalypt forests in Australia. Lightning strikes and the use of fire by Aborigines were the source of forest fires for thousands of years before European settlement.

Wildfires have occurred regularly along the scarp, north and south of Serpentine Falls, and less frequently further east. The most recent major fire occurred in December 1999 in steep topography immediately north of the carpark. In 1991, a major fire burnt the south-western part of the Park and in 1992 a fire began at the Falls that burnt the block to the north of the river. Since the early 1970s prescribed burns have been carried out in the eastern section of the Park as part of a regular fuel reduction program. The increasing numbers of wildfires in the scarp near Perth, many of which are deliberately lit, may significantly change the vegetation communities in only a few years. These fires are also of major concern to land holders and the general public.

Assets within and near the Park
Some of the special values within or near the Park needing protection from fire are:
- Life and safety of the Park visitors, adjoining residence and fire fighters.
- Property and assets within the towns of Jarrahdale and Serpentine, private property which includes several semi-rural subdivisions, CALM recreation sites at Serpentine Falls and Gooralong, Water Corporation infrastructure and recreation facilities and Karnet Prison Farm.
- Heritage values of "Spencers Cottage".

- Conservation values including the diverse vegetation types and communities, threatened or fire prone species and communities, steep valleys and scarp soils that are prone to erosion if disturbed, the visual landscape seen from roads, recreation sites, walk trails and lookouts.

Fire Behaviour
Fire behaviour is affected by the amount and type of fuel, air temperature, fuel dryness, wind speed and topography (Sneeuwjagt and Peet, 1985). Different vegetation types accumulate fuel at different rates and have different fire spread characteristics. Two major vegetation types exist in the Park - jarrah-marri forest with a mixed understorey vegetation in the east and heathland associated with granite outcropping with pockets of wandoo in the west.

A typical summer wind pattern includes strong katabatic easterly winds associated with the scarp that characteristically blow during the night and early morning each day. In the early afternoon often quite fresh south-west sea breezes occur that return to the east later in the evening. Some variation occurs across the Park with the more easterly areas being less influenced by the sea breeze and the katabatic winds.

These weather patterns in association with the Park's steep topography make wildfires difficult and dangerous to control and can promote erratic and severe fire behaviour.

It is desirable to maintain a range of fuel ages for each vegetation type so that there is maximum diversity in vegetation structure and habitat types. An extensive fire that burns most or all of each major vegetation association is considered undesirable. The necessary fuel reduction burns will reduce wildfire size and intensity. However, very frequent fires can reduce the species diversity of an area and habitat availability while favouring the spread of weed species and impacting on an area's visual quality. The impact of fire on plant species correlates with the period of time required for the plant to produce viable seed. It is important, therefore, to manage burning regimes to vary both season (Autumn/Spring) and fire intensity.

STRATEGIES

In order to achieve the overall objectives of protecting life, property and environmental values and to manage natural ecosystems, a system of three separate fire regimes will be implemented.

No Planned Burn for the Period of Plan
Designated areas will not be burnt by prescribed fire within the life of the plan and future burning will be reviewed at the end of the period of the plan. Maximum protection needs to be ensured for these areas, including maintenance of good perimeter access and regular burning of parts of adjacent areas.

The single No Planned Burn area is within the Serpentine Pipehead Dam Catchment, located away from likely ignition sources such as major roads and recreation areas, and can be protected by burning surrounding areas.

Vegetation Management Regime (VMR)
VMR aims to contribute to ecological diversity within the Park's vegetation communities. It is planned these regimes will entail rotation burns of about 10-20 years when fuels have accumulated to about 12-14 tonnes per ha. However, this will be reviewed annually in light of additional scientific knowledge on the impact of burning on the area's ecological values, the occurrence of wildfires and strategic protection reasons.

The two VMR areas on the scarp are south of the Serpentine Falls recreation area. They contain unique heath and woodland vegetation on the steep slopes of the scarp. These vegetation types are difficult to prescribe burn under light fuel loads, however, they can burn fiercely with strong summer winds. In addition, the aggressive bulbous weed Watsonia has invaded similar areas north of the Falls after a summer wildfire in 1992 and further wildfire may increase its spread. It is planned that bushland around the Falls recreation site will be regularly control burnt to reduce the risk of wildfires entering the VMR area.

Fuel Reduction Regime (FRR)
FRR will be applied to designated areas based on Wildfire Threat Analysis whenever ground fuel loads exceed critical levels at which fire containment by direct attack, under hot summer conditions, becomes very difficult and unsafe for firefighters. Fuel tonnage within these areas will be set between six and 8.5 tonnes per ha. The rotation period between burns will vary from approximately five to eight years, depending on the rate of fuel accumulation.

Fuel reduction burning within the Gooralong area has major strategic significance in protecting Jarrahdale town site, adjoining subdivisions and Gooralong recreation area from wildfires. This strategic significance and steep terrain has necessitated in smaller burns being planned for this area.

Figure 9 outlines the overall fire management strategy for the Park. The plan achieves the greatest diversity of regimes possible within the constraints of protecting life and property.

STRATEGIES

1. **Develop and implement fire management programs based on the Wildfire Threat Analysis of the Darling Scarp.. (Figure 9). (H)**

2. **Maintain an effective fire detection system and fire fighting forces to protect values within and adjoining the Park. (H)**

3. **Plan and implement fire management strategies to ensure their feasibility under a range of weather conditions. (H)**

4. **Maintain close liaison with local Bush Fire Brigades, Park neighbours, the Shire of Serpentine-Jarrahdale and other agencies to establish cooperative fire management systems. (H)**

5. **Minimise construction of any new firebreaks and fire lines. Where possible use existing tracks for suppressing wildfires or conducting prescribed burns. Where new fire lines are essential, construct them subject to strict dieback disease hygiene principles using minimum impact techniques. Rehabilitate as soon as practicable after fire suppression operations are completed. (H)**

6. **Carry out all fire management and suppression operations according to visual resource management principles. (M)**

7. **Promote public education and awareness of fire risk, safety and survival. (M)**

8. **Close parts or all of the Park to visitors if necessary during periods of very high and extreme fire dangers. Prepare a contingency plan for total closure in the event of a wildfire within or threatening the Park, or in periods of fire emergency as declared by the Minister for Emergency Services. (M)**

9. **Develop a fire emergency plan (covering aspects such as visitor evacuation), for the Park. (H)**

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16. WEEDS

The objectives are to:

1. *Control or contain weeds that have the potential to cause major conservation problems.*
2. *Minimise any adverse effects that control measures may have on the Park.*
3. *Liaise with Local Government, other authorities, adjacent landowners and residents to coordinate the control and spread of weeds in the vicinity of the Park.*
4. *Gradually replace introduced planted species with local plant species.*

Weeds displace native plants, particularly in disturbed sites, by out competing the local species for light, nutrients and water. Changes to native plant communities by weed infestations consequently affect animal habitats. The potential exists for weeds to spread into the Park from town sites, surrounding farmland, rubbish-dumping and along water courses from sources upstream.

Many species of weeds have been identified within the Park. They include Patterson's curse, capeweed, lupins, castor oil bush, cotton bush, blackberry and cape tulip. Bulb-producing species, such as watsonia and chasmanthe, have invaded areas where there has been little disturbance and the native vegetation is in good condition, particularly along Serpentine River, its tributaries and areas of the scarp. Although some measures to control watsonia have already been instigated at the Falls, the control of all watsonia species must be a priority to limit further spread. Also of concern are the perennial grasses that are invading heath land.

In addition, many species of non-local plants that have been used in gravel pit and dieback rehabilitation, research plots or from previous land uses grow in the Park.

Control of weeds is not possible without the cooperation of adjacent land holders, as reinfestation can rapidly occur from untreated areas.

At Water Corporation recreation areas associated with the main Serpentine Dam and the Pipehead Dam sites, many non-local species are planted. Some of these, particularly the wattles and poplars, are currently or potentially major environmental weeds. These can spread into adjoining forest and along the watercourse down stream to infect much of the Park.

STRATEGIES

1. **Prepare and initiate a five-year weed management program. Give priority to control of the following:**
   - **invasive bulbous plants (such as watsonia),**
   - **blackberry,**
   - **caster oil plant,**
   - **cotton bush,**
   - **arum lily,**
   - **woody weeds. (H)**

2. **Conduct control programs in areas of:**
   - **greatest conservation value**
   - **greatest perceived environmental threat**
   - **small and new infections**
   - **with species which are easily controlled. (M)**

3. **Revegetate areas denuded by weed control measures with appropriate local species from that habitat. (M)**

4. **Liaise with neighbours, local government, Agriculture WA and Water Corporation regarding weed control on Park boundaries and adjacent properties. (M)**

5. **Avoid unnecessary disturbance associated with management actions, such as road maintenance and frequent burning. (M)**

6. **Ensure all earth-moving machinery is thoroughly cleaned before entering the Park. (H)**

7. **Liaise with townspeople and neighbours to discourage cultivation of any species that may be a threat to the Park. (L)**

8. **Remove non-local trees where considered necessary. (L)**

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17. REHABILITATION

The objective is to rehabilitate degraded areas with local indigenous species where possible.

Disturbance Processes
Gravel Extraction: Significant areas of disused gravel pits occur within the proposed additions to the south-western area of the Park within reserves C26079, C26080 and C32201. The majority of these pits have not been properly landscaped and rehabilitated, although areas have been colonised by thickets of parrotbush (*Dryandra sessilis*) and scattered native species. In addition, small scattered pits through the eastern part of the Park have been replanted with a range of non-local tree species during the 1970s. These need further rehabilitation. A range of weeds have established within pits and need to be controlled during the rehabilitation process.

Dieback disease: Dieback disease is widespread through the Park (Figure 8). Disease impact varies on different sites and correlates to the areas site and vegetation characteristics. Disease impact has been high in many areas in the southern and eastern parts of the Park, particularly in the areas of "black gravels" where the jarrah and a large component of the forest understorey and shrub layer are commonly killed, resulting in irreversible decline in the diversity of vegetation. On these sites resistant species such as marri recolonise to form an open woodland with either an open understorey of resistant species or a dense thicket of parrotbush. The rehabilitation of high impact dieback disease sites aims to return an overstorey of eucalypts and to increase the understorey diversity.

Water Erosion: Owing to the Park's steep topography, water erosion of disturbed areas and tracks continues to be a major factor. Currently erosion problems are associated with Western Power structures and easements, Water Corporation pipe lines and associated infrastructure, fire breaks and walk trails. The correct design and maintenance of the access network are important to minimise the worst impacts of erosion.

Cleared areas: In addition, any areas of pasture on acquired private property will need rehabilitating. Areas from which weeds are removed may also need revegetation with native plants.

Access: All existing access tracks not required for future management need to rehabilitated.

Local species grown from seeds or cuttings collected in the Park will be used to revegetate degraded sites. Where the seeds cannot be collected, an appropriate source should be considered. Environmental damage must be kept to a minimum during seed collection. The propagation of suitable local plants for Park rehabilitation projects by CALM or private enterprise must be done under strict hygiene measures.

Owing to the nature of high impact dieback disease sites, particularly on "black gravels", intensive disturbance may be necessary. This may include felling of dead stags, heaping and burning of logs, and ripping or scarifying prior to seeding or planting.

STRATEGIES

1. **Prepare a comprehensive rehabilitation plan for existing degraded areas, giving priority to areas of highest value. (H)**

2. **Rehabilitate very high dieback impact sites within the Park, particularly those in the south-eastern section of the Park. This may involve intensive site disturbance. (M)**

3. **Monitor, evaluate and record progress of rehabilitation techniques used. Investigate more effective rehabilitation techniques. (M)**

4. **Revegetate degraded sites by using local species grown from seeds or cuttings collected in the Park. (M)**

5. **Ensure gravel pits are rehabilitated immediately after use. (H)**

6. **Encourage and provide opportunities for volunteers to help in rehabilitation projects. (L)**

7. **Ensure the long-term dieback disease research plots within the Park are not destroyed during the rehabilitation program. (M)**

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18. ABORIGINAL CULTURAL HERITAGE

The objective is to protect the Park's Aboriginal cultural heritage and encourage greater public understanding and appreciation of Aboriginal cultural heritage.

All Aboriginal sites in Western Australia are protected under the *W.A. Aboriginal Heritage Act 1972-80* regardless of whether or not they have been recorded with the Aboriginal Affairs Department. It is an offence under Section 17 of this Act to damage, disturb, alter or destroy any Aboriginal site unless

acting with the written consent of the Minister for Aboriginal Affairs under Section 18(2) of the Act.

The Aboriginal Affairs Department have one Aboriginal site recorded within the Park, the Serpentine River, which is regarded as a site of mythological significance. Two other Aboriginal sites have been recorded from just outside the boundary of the Park, an archaeological site and a camp site (Aboriginal Affairs Department, pers. comm., February 1995).

The Aboriginal Affairs Department records indicate virtually no research has been conducted in the area and it is quite likely that some unrecorded sites exist within the Park. Ideally a comprehensive archaeological and ethnographic survey of the Park should be completed. Such a survey would involve archival research, wide ranging consultation with relevant Aboriginal people and on-ground inspections. However, with existing resources it would be more practical to survey in full small areas that are to be developed (eg roads, car parks, toilet facilities etc), rather than conducting broad scale archaeological surveys over large areas of the Park.

The Park provides interpretive and educational opportunities for visitors. These opportunities should be developed in liaison with local Aboriginal communities.

STRATEGIES

1. **Liaise with the Aboriginal Affairs Department regarding activities associated with the Park that may impact on Aboriginal sites. (H)**

2. **Consider Aboriginal concerns relating to the Park's waterways in all management activities. (H)**

3. **Contact the local Aboriginal communities to seek input and advice as to the existence of significant ethnographic sites and ongoing interests in the Park. (M)**

4. **Develop interpretive and educational opportunities for visitors relating to Aboriginal cultural heritage in liaison with local Aboriginal communities. (H)**

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19. EUROPEAN HISTORY

The objective is to protect and encourage greater understanding and appreciation of the Park's European cultural heritage.

The historical heritage of the Park and adjoining lands is significant. The Serpentine Falls area, originally surveyed in 1864 and owned by Fremantle Prison Superintendent Henry Maxwell Lefroy, was repurchased by the Government and declared an 'A' class "Public Recreation" reserve in 1900. However, it was not until 1968 that a 635 ha "A" class reserve (A28862) along the scarp was gazetted as "National Park". It was named Serpentine National Park in 1971. The western part of the Park (reserve A28862) was placed on the Register of the National Estate in 1978 and the eastern section (reserve A39825) has been nominated for inclusion.

Early Settlement

Neil Coy in his book "A history of the Shire of Serpentine-Jarrahdale" includes a detailed account of the early history of the town sites of Serpentine and Jarrahdale and surrounding lands. During the period between 1850 and 1865, a small band of pioneers cleared strategic 10 acre locations on permanent water, built rough cottages and dug in small plots of wheat for their own supplies. Pioneer families with an association with the National Park and Serpentine Gorge include Giblett, Longbottom, Lefroy, Baldwin, Batt, Spencer and Mead (Coy 1984).

In the mid-1850s Joseph Batt constructed a large, water-powered flour mill at "Gooralong" (Location 68) on Gooralong Brook and a smaller wheat gristing mill at "Carralong" (Location 79) on the Serpentine River. The Spencer family began their 115 year long association with "Carralong" when they purchased the property in 1860. "Spencer's Cottage" originates from that time and was placed on the Register of Heritage Places on a permanent basis in the Government Gazette on 11 October, 1994. At one time seven dwellings were located along the Serpentine River between Carralong and the Pipehead Dam. In the 1880s Robert Mead's family lived at "Happy Valley" (Location 307) in a house on stilts that still stands today. These locations were linked to the South West Highway at Serpentine and Whitby Falls by bullock trails (Figure 10).

Timber and Gold

In 1870 a lease was negotiated to cut timber from the 100,000 ha Jarrahdale Timber Concession, which included the eastern section of the Park (Figure 10). Over the next 50 years a number of mills and a network of wooden railway lines were established throughout the lease. Jarrahdale's history was inseparably linked with this Concession and the timber industry. In the booming timber days between the mid 1870s and 1900, Jarrahdale was the largest centre of population between Fremantle, Bunbury and York. However, it was not until 1913 that the Jarrahdale town site was at last gazetted and blocks opened for sale to settlers.

From 1898 to 1913 timber was extracted in large quantities from within the Serpentine valley and cut at the "Number 5 and 6" mills at Big Brook upstream of the Park. A railway formation ran down the valley from the mills to almost the wall of the Pipehead Dam and along the gullies of the Bull and Snake Brooks. The lease finally expired in 1929. The eastern half of the Park (Reserve A39825) remained State forest until 1989.

In the mid 1890s there was a minor gold rush to the area when the quartz reefs to the north of the Serpentine Falls were mined. The mine shafts were

filled in some time after the second world war, as they posed safety risks for stock and humans.

Trout and Dams on the Serpentine

During the 1950s the Serpentine River was acknowledged as one of the best rainbow trout waters on mainland Australia with the Serpentine-Jarrahdale Trout Acclimatisation Society boasting 250 members at its peak. However, the completion of the Pipehead Dam in 1957 and the Serpentine Dam in 1961 put an end to the river being a substantial trout fishery (Coy 1979).

STRATEGIES

1. **Ensure that all management decisions concerning the conservation and restoration of places of historic interest within the Park adhere to the principles of the Burra Charter**[1] **(Australia ICOMOS, 1988). (H)**

2. **Continue to protect the Park's historic buildings and sites. (H)**

3. **Prepare and maintain a Sites and Building Record (archaeological index) for the Park. Collate written material on the Park's cultural history and maintain copies in the CALM library and Shire of Serpentine-Jarrahdale library. Seek support for resources for this project from the Shire of Serpentine-Jarrahdale.(L)**

4. **Recommend any cultural sites, buildings and structures considered worthy of statutory protection to the Heritage Council of WA to be included on the list of places of historical interest. (L)**

5. **Seek external funds to evaluate the local, regional and national cultural significance of each historic site. (M)**

6. **Seek external assistance to record oral histories from people who know of the area's cultural history. (H)**

7. **Consider ways to interpret sites in conjunction with the Heritage Council of WA, the National Trust and other agencies as part of wider management schemes. (L)**

[1] The Australia International Council on Monuments and Sites (ICOMOS) Charter for the Conservation of Places of Cultural Significance (the Burra Charter) contains principles concerning the preservation of structures considered to have historical value.

Figure 10

MANAGEMENT FOR RECREATION

20. REGIONAL RECREATION OPPORTUNITIES

The objective is to develop recreation opportunities within the Park that complement attractions and facilities elsewhere within the region.

A range of recreation opportunities are available on lands managed by CALM, including National Parks, Conservation Parks, State forest, some Nature Reserves and Marine Parks, depending on their primary purpose. Recreation facilities are also provided by local Government and other Government Departments, such as the Water Corporation of WA, the Department of Planning and Urban Development (DPUD) and on private property.

It is essential that a regional perspective is maintained when planning the Park's recreational opportunities. The integration of recreation opportunities in the Park with those of the surrounding area will become increasingly significant as greater numbers of people come to the area to live, as new housing subdivisions are developed near the Park and greater numbers of visitors use the Park for recreation.

Several CALM policies and strategies form the basis of the strategies in this Plan and include though not limited to: CALM's Recreation and Tourism Strategy (People in CALM Places); Recreation, Tourism and Visitor Services Policy; Regional Management Plan for the Northern Forest Region; Recreation and Tourism Plan for Swan Region. These strategies will continue to be implemented as recreational opportunities in the Mundaring District and Serpentine National Park are planned.

STRATEGIES

1. **Provide recreation opportunities in the Park that complement opportunities available elsewhere in the Region. (H)**

2. **Do not cater for recreation activities that are incompatible with or adversely impact the Parks values. Alternative areas should be used. (H)**

3. **Advise visitors of alternative areas prior to busy days. (M)**

21. ACCESS

The objectives are to:
1. *Control access to protect the Park's conservation and recreation values.*
2. *Provide and maintain safe access.*
3. *Ensure that erosion control and disease management receives high priority when designing and maintaining access.*
4. *Facilitate access for people with disabilities.*

The major access route to the Park from Perth and the south-west of the State is by the South West Highway, which runs just to the west of the Park, along the base of the Darling Scarp. The Park itself is accessed via four secondary roads and a number of management tracks from the South West Highway and the "Jarrahdale Scenic Drive" which follows Jarrahdale Road and Kingsbury Drive. No public transport services or regular day tours operate to or in the Park. However, there are daily public bus services to Jarrahdale town site.

Management access tracks in the Park were constructed in the 1930s, 1940s and 1950s. Some of the tracks were constructed in association with timber harvesting, others were developed for park management purposes. Although the standard of roads vary, most roads are open to the public and trafficable by 2WD vehicles. Access for management activities such as fire control, maintenance of recreation areas, feral animal and weed control, research, and search and rescue is also required.

Emergency access is provided through the Park from the Millbrook Estate. Access to private property locations along Carralong Brook and behind the Serpentine Falls require further clarification and discussions between CALM, Water Corporation and the land holders. Access is available for CALM vehicles through Water Corporation lands for management reasons. Water Corporation personnel require some access through the Park to management and monitoring the water catchment area.

During the 1992 dieback disease survey of the Gooralong area of the Park it was found that all *Phytophthora* infections were associated with tracks and roads, with the infection spreading down slope of the tracks infecting large areas of forest (see *Disease*). It is important to identify those tracks that pose a high risk and determine an appropriate management strategy to minimise the spread of the disease. New tracks should not be established without dieback assessment and hygiene management. Tracks through dieback disease-free areas should be permanently closed.

Many of the tracks in the Park are subject to erosion through natural and human activity, with some sections extremely rough because of exposed caprock or water erosion on steep grades. Emphasis needs to

be placed on drainage while carrying out grading operations, particularly on steep slopes.

Figure 11 indicates the proposed public access system for the Park and Figure 9 the existing management access. Maintaining existing access is a priority within the constraints of minimising dieback disease spread, avoiding steep slopes, improving landscape quality and protecting sensitive areas. As a result, most of the roads now accessible will remain so. It is not proposed to significantly improve the Park's road system and most roads will remain unsealed and accessible to cars only. In maintaining the Park's road system, bridge replacement and maintenance will be required. All tracks are accessible to walkers and bushwalking opportunities will be substantially increased (see *Bushwalking and Pedestrian Access*).

Tracks that are no longer required or pose significant environmental hazard should be permanently closed, rehabilitated and revegetated where this does not impact further on the area's conservation values.

STRATEGIES

1. **Develop and maintain stable access routes to major destinations within the Park (as indicated in Figure 9 and 11), realigning or upgrading sections causing erosion or damage to geological and landform features. (H)**

2. **Close, reinstate to the natural profile and revegetate all unnecessary access routes. (H)**

3. **Remove forest produce where appropriate, that is associated with essential works such as road construction under the approval conditions of the CALM Act. (M)**

4. **Design all roads so that they are safe for visitors and CALM staff. (M)**

5. **Maximise access for visitors with disabilities. (H)**

6. **Oppose further private property emergency access for subdivisions adjoining the Park boundary (see *External Boundaries and Surrounding Landuse*). (M)**

7. **"Off road vehicle only" tracks or areas will not be provided within the Park (see *Off-road Vehicles*). (H)**

8. **Prohibit vehicles and horses from moving off formed tracks. Encourage walkers to stay on formed tracks. (H)**

9. **Develop and maintain all access to a standard that will minimise the risk of spreading dieback disease. Develop new access routes as low in the topography where practical. Implement seasonal access restrictions in the Park. (H)**

22. VISITOR SAFETY

The objective is to minimise the likelihood and undesirable consequences of misadventure or injury to visitors to the Park.

There is always an element of risk in all outdoor recreation activities. Nevertheless, all reasonable and practicable efforts will be taken to ensure that risks are minimised.

In addition to the dangers inherent in any natural area, the Park poses some particular problems for visitors including:

- dehydration and heat exhaustion from insufficient intake of water and over-exposure to the sun;
- incidents associated with bushwalking on rough tracks in remote areas, e.g. sprained ankles, cuts and bruises;
- diving, jumping and swimming in Serpentine Falls;
- possibility of being bitten by native animals, e.g. snakes, ticks and ants, and
- threats of wildfire, particularly to bushwalkers on tracks.

Visitor safety will be promoted through information and education about potential problems and dangers, and considered in design of access and recreation sites.

The Police, the State Emergency Service (SES) and CALM manage accidents and search and rescue operations in the area.

Management actions to reduce safety hazards should, if possible, be planned in sympathy with the purpose of the Park and should not intrude unduly on the experience of visitors.

STRATEGIES

1. **Actively promote visitor safety within the Park. (H)**

2. **Continue to liaise with the Health Department, Police Service, Shire of Serpentine-Jarrahdale, FESA, Ambulance Service, and SES in accordance with plans for dealing with incidents and issues involving health or injury and search and rescue operations. (H)**

3. **Provide information for visitors that highlights potentially hazardous areas and activities. (H)**

4. **Regularly inspect roads and recreation sites for potential hazards and initiate appropriate action. (H)**

5. **Develop a wildfire contingency plan for the main visitor sites in the Park. Address the need for evacuation procedures. (H)**

23. RECREATION AREAS AND EXISTING USE

The objectives are to:
1. *Provide a range of high quality and maintained recreation sites.*
2. *Ensure that all recreation sites are capable of sustaining expected levels of use.*
3. *Design sites to minimise safety hazards.*
4. *Manage sites to protect the natural environment and maintain each site's attractiveness to visitors.*

The proximity of the Park close to Perth, its wide variety of attractions and facilities, makes it a very popular day trip venue for people of all ages. The increase in the numbers of people who are likely to seek recreation opportunities in the Park has the potential to degrade those values that attract them in the first place. For this reason, recreation use of the Park will be managed according to the zoning plan (see *Zoning*) that aims to protect the Park's conservation values by allocating recreation facilities and activities to those areas capable of sustaining use.

The needs of visitors should be periodically reviewed in order to determine how the opportunities provided in the Park meet these needs. Monitoring provides a useful tool to ensure the continued enjoyment of visitors.

The Park's two established barbecue and picnic sites, at Serpentine Falls and Gooralong, will remain focal points from where people have the opportunity to walk along tracks to other Park features. Rather than develop new recreation sites in the Park, the two existing sites will be consolidated and redesigned.

Camping is allowed at Gooralong (but not at Serpentine Falls, the Pipehead Dam or the Serpentine Dam sites). A commercial caravan park is situated just outside the Park on the corner of the South West Highway and Falls Road, and CALM provides for camping at Langford Park on State forest 3 km to the north east of the Park. No camping or caravan grounds are provided at Jarrahdale. Numerous institutional and commercial accommodation facilities adjoin the Park.

Other recreation sites adjoining the Park include:
- the "Jarrahdale Scenic Drive" with associated pull-overs at view points;
- Serpentine Pipehead Dam and Serpentine Dam;
- the historical towns of Jarrahdale and Serpentine;
- Langford Park on State forest, 3 km to the north east; and
- Jarrahdale Eco-experience site, 4 km east of Jarrahdale.

Campfires outside designated fire-places are not encouraged in the Park because of the risk of wildfire and also damage to native vegetation during firewood gathering.

STRATEGIES

1. **Separate incompatible uses where possible (see *Zoning*). (H)**

2. **Use the following criteria to assess requests for use of the Park for new recreational pursuits:**
   - **Appropriateness in a national park.**
   - **Appropriateness in the Regional context.**
   - **Compatibility with existing uses.**
   - **Likely environmental impact.**
   - **Availability of alternative opportunities.**
   - **Management and enforcement capability. (H)**

3. **Maintain recreation sites in a safe, clean and tidy condition. (H)**

4. **Monitor vehicle numbers and patterns of use at the Falls and Gooralong. Conduct periodic site surveys and interviews to determine visitor patterns, preferences and satisfaction with Park management. These findings will be considered for modifying management practices and assessing requests for alternative uses. (H)**

5. **Promote and initiate the strategy "Take your rubbish home" to visitors. (H)**

6. **Manage sites to minimise the incidence and effects of vandalism. (M)**

7. **Encourage Park visitors to provide their own gas barbecue cooking facilities. (L)**

8. **Liaise with individuals and organisations that provide complementary recreation and accommodation facilities on nearby or adjacent lands. Ensure that their activities do not adversely impact on the Park, and that they are aware of the potential of their activities on the Park's values. (H)**

23.1 Serpentine Falls Recreation Area ("The Falls")

Visitor Usage
The Serpentine Falls recreation area lies within an incised valley at the base of the Darling Scarp, on the western edge of the Park. The major natural features of the site are the Serpentine Falls (15m fall), the Serpentine River flowing through the site, and the steep slopes of the Scarp rising above it.

Visitors pay a daily vehicle entry fee or must hold a pre-purchased annual visitor pass. The fees collected at the gate are being used to maintain and improve the Park.

Visitor numbers to the Falls have been assessed using a traffic counter installed at the entrance gate to the Park. The number of vehicles using the site has been approximately 17,500 vehicles per year, equivalent to 61,250 visitors (at an occupancy rate averaging 3.5 people per car).

A visitor survey at the Falls recreation area was conducted in January 1993 (Brown, Edkins and Murray 1993). The survey showed that the Falls is predominantly used by local and Perth visitors, with 20% local, 14% from Rockingham and 38% from 'Perth Other'. Interstate and overseas visitors totalled 8% and 9% respectively. Generally visitors to the Falls form part of a family or friends group (93%) and groups were larger on weekends. Few clubs and school groups used the site during the survey period. The most popular reasons for visiting the Falls were barbecuing and picnicking (23%), swimming (19%) and seeing the Serpentine Falls (10%). The most popular "likes" were the friendly kangaroos, peaceful atmosphere, the waterfall, the swimming hole and general scenery.

Facilities
Public access to the Fall's recreation area is from the South West Highway via Falls Road. Parking is available for approximately 50 vehicles. The car-parking space is generally sufficient to cater for the number of people visiting the Park apart from peak periods when it fills to capacity. The car parking facilities at the Falls need to be upgraded and modified over the next five years, in accordance with the proposed site development plan .

Facilities at the Falls include a sealed loop road and car park, lawned picnic area with barbecues and tables, "bush" setting BBQ sites and a brick toilet block accessible to visitors with disabilities. The wood fired barbecues are free to the public. In 1989, an access track for people with disabilities was built from the car park to the Falls. Camping is not allowed at Serpentine Falls, but is available at Gooralong, 20 minutes away by car.

Public access to the rest of the Park from the site is restricted by private property blocks to the east of the site.

Management concerns
Historically, one of the most popular recreation activities in the Falls has been swimming in the pool at the base of the Serpentine Falls, although swimming is discouraged by CALM for health and safety reasons. Numerous accidents have occurred at this site with visitors diving, jumping or falling onto submerged rocks. Around the major swimming area from the small dam around to the front of the brick pump house the water is only 0.5-2m deep (Figure 12). The water under the ledge (near the falls), where many people jumped from, is less than 7m deep.

The water level of the pool was raised when the gauging dam was built in the early 1930s.

STRATEGIES

1. **Develop a site concept plan to provide quality facilities at the Falls. (H)**

2. **Reduce the environmental damage caused by gathering wood within the Park. Replace the existing wood barbecues with electric and/or gas barbecues. (M)**

3. **Progressively replace and rehabilitate existing facilities and structures that do not aesthetically blend with the natural landscape, including:**
   - **the pump house at the falls;**
   - **the pump back pipe line from the pool area at the base of falls;**
   - **the laterite boulders on the walk trail from the Car park to the falls;**
   - **the weir just down from the falls;**
   - **the area excavated just west of the entrance station;**
   - **the Water Corporation pipeline easement through the recreation site;**
   - **the eroded walk trails that access the top of the Serpentine Falls; and**
   - **wooden walkway leading to the main pool at the Falls. (H)**

4. **Assist Shire of Serpentine-Jarrahdale and local community initiatives to develop Falls Road as an entry statement to the Park. (M)**

5. **Consider options to improve safety at Serpentine Falls. Minimise safety hazards at Serpentine Falls pool associated with swimming and slipping, falling or jumping from the rocks surrounding the pool. (H)**

6. **Provide a safe access way and viewing point at the top of Serpentine Falls on the southern side of the Serpentine River. (L)**

7. **If feasible implement private involvement in the management of the Serpentine Recreational Area by a Commercial operator. (M)**

23.2 Gooralong Camping and Day Use Area

This recreation site caters for day-use visitors and overnight camping. It is located in the northern section of the Park within the Bells Pine Plantation, on Water and Rivers Commission freehold lands, close to Jarrahdale. Access to Gooralong is from Jarrahdale Road through the western edge of Jarrahdale town site. Approximately 27,000 visitors use the site each year. The site has been used by large numbers of people, particularly on weekends and school holidays. The roads and parking areas at this site are not bituminised. Firewood is not currently provided.

Gooralong will continue to be the only formal camping area within the Park. Camping fees are not currently charged. The main camping area at Gooralong was upgraded in 1990, with each camp site provided with a barbecue, table and car park. Toilets and non-drinking water are provided. However, since 1990 the camp sites have been vandalised and degraded, and are currently in poor condition.

The site development plan for Gooralong provides a significant increase in the number of camping sites to cater for a range of different spatial and social requirements of users (Figure 13). Different types of camping areas have been grouped and separated from each other to take advantage of the sites natural amenities. The commercial management of this site will be investigated

Day-use visitors to Gooralong generally use the facilities adjoining the oval and the banks of the Gooralong Brook on the edge of the pines. Toilets near the main car park were upgraded in 1990. Wood fired barbecues, tables and seats are provided in the adjoining bush and along the brook. The main car park will be upgraded and extended (Figure 13). The redesign and surveys of the car park have been completed.

The ruins of the historical "Batt's Mill" adjoins the day-use area near the oval. It was Serpentine-Jarrahdale's largest water-powered flour mill built by Joseph Batt in 1855 (Coy 1984).

Two popular walks start at Gooralong. Stacey's Track links the site to Jarrahdale town site through a patch of virgin Jarrah forest, and Kitty's Track follows the Gooralong Brook from the recreation site to the Water Corporation gauging station in Kitty's Gorge. Kitty's walk track is currently being upgraded.

Management concerns
Gooralong is located on the eastern edge and on the opposite side of the Park to the Falls, makes it difficult for the Park Ranger to patrol at Gooralong and the Falls recreation area. Vandalism and unacceptable behaviour are significant problems at Gooralong. Vandalism can be minimised through the choice of materials and through appropriate design and location. Unacceptable behaviour will require increased ranger presence and enforcement during the evenings, particularly during school holidays and weekends.

The current tenure of the Gooralong Recreation Area hinders good management as it limits CALM's role and authority. CALM would prefer to have the area added to the Park, however, this is subject to a study by the Water and Rivers Commission into future use of the potential water supply. If this study finds that the lands held by the Water and Rivers Commission are surplus, CALM will seek their addition. In the interim, the options are to seek a CALM Act management agreement or closure of the site. The tenure issues are fully discussed in Section 5 Land Tenure and Boundaries.

The Gooralong Brook is in the gazetted Lower Serpentine Catchment Area (Figure 5), therefore, it is important that activities at the Gooralong Recreation area do not adversely affect the water quality within the Brook and the banks of the streams are protected.

STRATEGIES

1. **Provide quality camping and day use facilities at Gooralong by implementing the site development plan (Figure 13). (H)**

2. **Pending the completion of the Water and Rivers Commission study into future use, negotiate to add the Gooralong recreation area to the Serpentine National Park or in the interim have put in place a formal management agreement or closure of the recreation site. (H)**

3. **Collect camping fees at Gooralong as soon as change in tenure is finalised with the Water Corporation and the Water and Rivers Commission. Use funds collected to help in Park management. (H)**

4. **If feasible implement private involvement in the management of the Gooralong camping and day-use site by a Commercial operator. (H)**

5. **Replace the existing wood barbecues with gas or electric barbecues at the day-use area. Provide fire rings for open wood fires only at camping areas. (M)**

6. **Properly maintain camping areas at Gooralong to keep environmental impacts within predetermined limits. (H)**

7. **Seal the road into the Gooralong site as funds are available. (L)**

Figure 12

Figure 13

24. NATURE OBSERVATION AND SIGHTSEEING

The objective is to provide visitors to the Park with opportunities that enhance their appreciation and understanding of the natural environment, landscapes and features.

Through greater awareness and understanding of the natural environment, visitors are likely to gain a greater appreciation of the Park's conservation values as well as the social values that the natural environment inspires.

The visitor survey conducted during January 1993 (Brown *et al* 1993), indicated that appreciation of the Park's flora, fauna and natural landscapes are the most popular activities undertaken by visitors. Spectacular scenery, including the Darling Scarp, incised valleys, views across the coastal plain, a range of vegetation types from granite heaths, forests and water courses, contribute to making the Park an excellent area for sightseeing and photography.

Limited opportunities are available for pleasure driving within the Park, however the "Jarrahdale Scenic Drive" just outside its boundary is a popular route for Park visitors. The drive features the historical timber town of Jarrahdale, extensive areas of forest, Serpentine (main) Dam and views from the top of the Scarp over the coastal plain.

Opportunities are also available to enhance visitor's appreciation of the environment through walk trails and interpretive programs (see *Information, Interpretation and Education*). These programs should be based on particular themes such as wildflowers, fauna, vegetation associations and cultural heritage.

STRATEGIES

1. **Provide visitors with the opportunity and programs to appreciate the Park's natural features. (H)**

2. **Provide information on the Park's physical and biological attributes. (M)**

3. **Although no vehicle-based sightseeing routes are developed within the Park encourage visitors to utilise pleasure driving and sightseeing opportunities presented by the "Jarrahdale Scenic Drive". (H)**

4. **Provide Park visitors with interpretive information, including nearby attractions, vegetation, landforms, fauna and cultural history. (M)**

5. **Consider the visual impacts of all Park operations, particularly those visible from facilities, walk trails and lookouts (see *Landscape*). (H)**

6. **Progressively develop an extensive and varied system of walks within the Park, distinct from vehicles or horses tracks, to provide visitor access to the major features of the Park (see *Bushwalking and Pedestrian Access*). (H)**

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25. RECREATIONAL FISHING AND MARRONING

The objective is to minimise the impact recreation fishing and marroning have on Park values.

Inland fishing is controlled in this State by the Fisheries Act and Regulations. Limitations are placed on species caught, season, number taken, areas that fish can be taken from and type of fishing. CALM cooperates with Fisheries Department to control fishing activities.

Brown and Rainbow trout were introduced to the Serpentine River at the turn of the century and marron were introduced into the Serpentine River, down stream from the Falls in 1940. During the 1950s the Serpentine River was acknowledged as one of the best rainbow trout waters on mainland Australia with the Serpentine-Jarrahdale Trout Acclimatisation Society boasting 250 members at its peak. However, the completion of the Pipehead Dam in 1957 and the Serpentine Dam in 1961 put an end to the river being a substantial trout fishery (Coy 1979).

The Serpentine River waters above the Serpentine Falls and below the Pipehead Dam are predominantly on freehold land owned by the Water Corporation. In an agreement with the Western Australian Trout and Freshwater Angling Association (Inc.) Water Corporation has given permission for members to stock and fish for brown trout on their lands along this section of the Serpentine River. This will be reviewed if the proposed dam is constructed during the life of this plan.

CALM does not permit fishing and marroning within the Park below the Serpentine Falls because of intense recreation use of this very limited body of water. Degradation of vegetation on river banks, visitor safety and open fires lit by marroners are of great concern.

The Serpentine (main) Dam and Serpentine Pipehead Dam and their respective catchment areas are gazetted under the Metropolitan Water Supply, Sewerage and Drainage Board Act (1912). By-laws aimed to protect water quality within catchment areas arise from this Act. By-law 4.3.4 states that "*no person shall camp, or shoot, trap or hunt any game or catch, or attempt to catch, any fish or marron within a catchment area without specific permission in writing from the Board.*" The Water Corporation does not normally give such permission. Water Corporation Catchment Rangers and Department of Fisheries Officers regularly patrol these areas and

people caught fishing or marroning are liable to prosecution.

STRATEGIES

1. **Support Fisheries Department initiatives that help conserve marron populations. (H)**

2. **Prohibit fishing and marroning below the Serpentine Falls because of intense recreation use of this very limited body of water. (M)**

3. **Inform Park visitors of guidelines for fishing and marroning. (L)**

4. **Prohibit the restocking of non-native fish species in the Park. (M)**

5. **Monitor and manage access to fishing sites to prevent river banks from being degraded and open fireplaces from being used. (M)**

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26. BUSHWALKING AND PEDESTRIAN ACCESS

The objective is to provide a variety of bushwalking opportunities in the Park that do not adversely affect conservation and landscape values.

Walking is an activity enjoyed by people of all ages, interests and levels of fitness, and it enables visitors to explore and appreciate the natural environment at close range. Two walk tracks start from Gooralong. Stacey's Track, links Gooralong to Jarrahdale town site through a patch of virgin Jarrah, and Kitty's Track follows the Gooralong Brook from Gooralong to the Water Corporation gauging station in Kitty's Gorge. In 1989, an access track for people with disabilities was built from the car park to the Falls.

Significant opportunities exist to improve the Park's walk track network, especially to develop trails to link up the three recreation facilities at Gooralong, the Falls and the Pipehead Dam(Figure 11). The trails could also access several of the natural and cultural features in and adjoining the Park, including Kitty's Gorge, Jarrahdale town site, Spencer's Cottage, the Serpentine River and the extensive vistas over the Coastal Plain and incised valleys. Further walk tracks may be developed given appropriate environmental assessment and safeguards. Interpretive information should be supplied at points of interest along these trails.

Management access tracks provide walkers with the opportunity to explore those parts of the Park that are away from the main facility areas. These are generally accessible from the main recreation sites or public roads on the Park boundaries.

The impact of bushwalking, while generally low, is variable depending on soil conditions, landform, vegetation type and intensity of use. Where use levels are high, bushwalking can lead to the loss of vegetation as well as localised soil compaction and erosion problems. Other impacts such as the spread of weeds and plant diseases may also occur. These problems can usually be minimised through the sensitive location and design of walk tracks and suitable education of bushwalkers.

Wheelchair access has been provided at Serpentine Falls to the toilets and falls, and at Gooralong to the toilets in the family camping area. Potential exists to extend the existing wheelchair access. Wheelchair access also improves opportunities for other people with restricted mobility, such as people with a walking frame or those pushing strollers.

STRATEGIES

1. **Implement the strategies from Section 21: Access (H)**

2. **Progressively develop an extensive and varied system of walk tracks within the Park, distinct from vehicle or horse tracks, to provide visitors access to the Park's major features. (H)**

3. **Liaise with Water Corporation and private land holders to develop walk tracks to link Gooralong Camping area with the Falls and Pipehead Dam recreation sites. Carefully assess the impacts of the track on the stream banks, the steep terrain and access through Water Corporation lands. (H)**

4. **Encourage and provide information on "low impact" bushwalking to Park visitors. (M)**

5. **Promote the code of ethics for walking in the Park. (L)**

6. **Monitor the environmental effects of bushwalking and how bushwalking opportunities meet visitor needs. Close walk tracks temporarily or permanently and carry out remedial work where the results of monitoring indicates significant environmental damage is occurring. (M)**

7. **Where practicable, link the Park's walk track network with trails outside the Park. (H)**

8. **Signpost the walk track network. (H)**

9. **Produce a brochure for walk tracks within the Park from which visitors can choose the walk that is best suited to their needs and ability. (M)**

27. ORIENTEERING, ROGAINING AND CROSS-COUNTRY RUNNING

The objective is to direct competitive orienteering, rogaining and cross-country running to other lands.

Orienteering is an organised activity that requires participants to visit on foot a set number of control points in the bush in a given sequence in the shortest time. In past years, the Park has been used for orienteering events around Gooralong, with a maximum of one event per year. The design of the course should change from year to year.

Rogaining is a long distance cross-country navigation event that takes between 12-24 hours to complete. Participants visit control points on a course in any order, the aim being to accumulate the highest number of points possible. Only one course is set for each event and it involves less running and greater use of roads and tracks than orienteering. The area around Gooralong is not large or isolated enough to suit this activity

Cross-country running is a foot race that occurs outdoors over a variety of surfaces along a single, marked course. The objective is to complete the course in the shortest time. All competitors follow the same course. The area around Gooralong is too sensitive and fragile to suit this activity.

STRATEGY

1. **Permit a maximum of one orienteering event per year within the Park, at a time that does not impact on other visitors and minimises the risk of spreading dieback disease. (M)**

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28. CYCLING

The objective is tofacilitate non-competitive cycling ensuring the environmental values with the Park are not adversely affected.

Mountain bicycle facilities have been provided within the rehabilitation area at Langford Park, 3 km north east of the Park, and plans by CALM and Alcoa to upgrade these facilities have been completed. Comparatively few cyclists use Serpentine National Park and cyclists will continue to be directed to Langford Park in the future and discouraged in the National Park.

Concerns with cycling in the Park include:
- the ability of tracks to sustain use by bicycles;
- conflicts between cyclists and other Park visitors;
- the risk of spreading of dieback disease;
- the steep terrain, soil erosion and unstable track surfaces; and
- safety concerns for cyclists and other users

STRATEGIES

1. **Competitive cycling events are not permitted in the Park. (H)**

2. **Non-competitive cycling will only be permitted on the main access roads into the Serpentine Falls and Gooralong, and on tracks within the Gooralong site, and on designated mountain bike paths which are compatible with the Park's conservation values and Water and Rivers Commission Requirements. (H)**

3. **Cycling trails will be closed if weather conditions, erosion, disease, degradation, of vegetation or water resources, conflict with other users or lack of compliance to conditions of use warrant such closure (H)**

4. **Direct all other cyclists to use facilities outside the Park boundary. (H)**

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29. HANG GLIDING

This section applies to hang gliding, para gliding and all other forms of recreational flight.

The activities of hang gliders are regulated by the Air Services Australia, and are administrated by the Hang Gliding Association of WA with whom all pilots must be registered.

STRATEGY

1. **Require hang gliders to obtain a permit from CALM's District Manager to fly in the Park. The permit may place restrictions on such factors as the number of gliders using the Park at any one time and the level of impact on other Park users. Permission may be denied to craft or support activities that detrimentally affect on Park values. (M)**

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30. OFF-ROAD VEHICLES

The objective is to prohibit vehicles being driven off roads in the Park.

Off-road vehicles include 4WD or conventional vehicles, motorcycles, dune buggies or other motorised vehicles. Present use of off-road vehicles in the Park is restricted to CALM vehicles for management purposes, and search and rescue vehicles on management tracks that are not maintained for public vehicle use.

STRATEGIES

1. **Use appropriate measures to prohibit vehicles being driven off roads in the Park, except in emergencies. (H)**

2. **"Off road vehicle only" tracks or areas will not be provided within the Park. (H)**

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31. HORSE RIDING

The objective is to facilitate horse riding by providing designated trails for horses outside the Park. However, where practical alternatives can not be found outside the Park, and environmental values within the Park are not adversely affected, designated trails will be provided for horse riding.

Many of the major features within Serpentine National Park are very sensitive to adverse environmental degradation from uncontrolled or heavy public access, including horse riding. Some of these features include:

- steep slopes which predisposes the soils to erosion (Figure 4).
- gazetted water catchments, which provide Perth with drinking water, cover most of the eastern part of the Park (Figure 5).
- dieback disease occurs across the Park, although significant areas of the Park are still dieback-free (Figure 8).
- the vegetation communities on the scarp are of very high conservation value (Figure 3).
- four high use recreation areas exist within the Park where horse access would conflict with pedestrian use (Figure 3 and 11).

The NPNCA recognises that a number of people living close to national parks own horses and enjoy riding in the Park's natural settings. This attraction is however in contrast with the following:

- issues of possible damage by horses to nature conservation values that include introducing or spreading of dieback disease, eroding of soil, trampling and browsing vegetation, and introducing and spreading weeds through feed and droppings;
- the potential safety conflicts between vehicles, horses and bushwalkers; and
- past experience where horse trails in national parks have led to increased uncontrolled use of the parks by horse riders (caused by a combination of people's natural desire to explore and the ease with which horses can leave trails). The problem is exacerbated by the comparative difficulty of controlling any irresponsible use of horses compared to irresponsible use of vehicles.

Horse riding trails and facilities are provided in Gordon Forest Block near Langford Park for local riders and those willing to transport their horses in horse-floats. This area of State forest can be readily accessed from Jarrahdale, Millbrook Estate and adjoining private property. However, similar options outside the Park do not exist for local horse-riders near Serpentine town site. There are few subdivisions and pressure from horse riders to the east and south of the Park.

Commercial Equestrian Operations and Group Events

Currently there are no commercial equestrian operations using the Park. There has been an annual horse-riding event in the Park for the past few years. This has been planned in close consultation with CALM staff to ensure adverse environmental and social impacts are minimised.

Owing to the environmental sensitivity of a range of features within the Park and the access to adjoining State forest, both commercial equestrian operations and group horse-riding events will be excluded from the Park. Alternative horse riding areas, more capable of sustaining large groups of horses, will be identified outside the Park. Gordon Block and Langford Park may be a local alternative for once-off horse-riding events.

Individual Horse Riders - Special Horse Access Area

Horse riding by individuals will not be permitted in the Park except on designated horse trails within the "horse access area" (Figure 11). The "horse access area" is readily accessed from the Serpentine area where alternative horse-riding areas are very limited. It has been located to minimise potential impact on the Park's major environmental features. It avoids the steep slopes of the scarp and major valleys, has been heavily impacted by dieback disease, avoids conflict with current recreation sites and is outside existing water catchment areas. This area will not be linked to Gordon Block by horse trails through the Park.

Access for individual horse-riding has been excluded from the Gooralong area of the Park. This has been done because horse-riders from Jarrahdale, Millbrook Estate and surrounding private property can access horse trails within State forest to the north of the Park. In addition, Gooralong block has large areas of dieback-free forest, is relatively steep, is within the Lower Serpentine water catchment and horses would conflict with pedestrians.

CALM will establish a working group to recommend on the location of horse trails and to identify management issues within the "horse access area". The working group will include representatives from CALM, the Serpentine-Jarrahdale Shire, local and State horse-riding groups, and the local community. The working group will be disbanded once a plan of action has been prepared for the "horse access area".

STRATEGIES

1. **Exclude all forms of commercial horse-riding activities from the Park. (H)**

2. **Exclude all group horse-riding events from the Park, except a single annual horse-riding event that has been historically run in the Park. The event must follow an environmentally acceptable route and conditions. (H)**

3. **Horse riding by individuals will not be permitted in the Park except on designated horse trails within the "horse access area" (Figure 11). CALM will establish a working group to recommend to CALM management where horse trails within the "horse access area", should be located. (H)**

4. **Horse-riding zones and trails will be closed if weather conditions, erosion, disease, degradation of vegetation or water resources, conflict with other users or lack of compliance to conditions of use warrant such closure. (H)**

5. **Encourage horse riders to maintain and sign-post approved horse trails and to help establish a code of ethics for horse riding within the Park. (M)**

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32. SPECIAL EVENTS

The objective is to facilitate special events of national significance within the Park subject to strict management guidelines, approvals and post event rehabilitation.

It is possible that during the life of this Plan that "one-off" special events may occur in the region which may seek to use parts of the Park.

Such events may be permitted to use parts of the Park, subject to the approval of the NPNCA and subject to the following:

- The event must be of national significance;
- Strict hygiene requirements to eliminate the risk of spread of dieback be enforced;
- where appropriate, all activity must comply with the requirements of a Class 1 Water Catchment, as approved by the Water Corporation and Water and Rivers Commission;
- any allowed temporary fixtures, facilities, in support of such event to be removed from the Park at event completion;
- any site disturbance (eg a marked trail) to be removed and rehabilitated at event completion.

STRATEGIES

1. **Special events will be allowed subject to the approval and conditions stipulated by the NPNCA. (H)**

2. **Approved events must be of national significance. (H)**

3. **Strict hygiene requirements to eliminate the risk of spreading dieback infection be followed (H).**

4. **Where appropriate, approved "one-off" special events must be compatible with Class 1 Water Catchment requirements, approved by the Water Corporation and Water and Rivers Commission.**

5. **Event organiser to be responsible for the removal of any allowed temporary fixtures, facilities, in support of such event from the Park at event completion to the satisfaction of the NPNCA.**

6. **Event organiser to be responsible for the rehabilitation of any site disturbance at event completion to the satisfaction of the NPNCA.**

COMMUNITY RELATIONS

33. INFORMATION, INTERPRETATION AND EDUCATION

The objectives are to:

1. *Enhance the enjoyment, awareness, appreciation, confidence and safety of visitors through information and interpretation.*
2. *Encourage visitors to explore the Park.*
3. *Integrate the Park's information, interpretation and education programs with those provided elsewhere in the local area and in the region.*
4. *Promote suitable and safe use of the area.*

An effective information, interpretation and education program is an essential part of management. It informs the public of the attractions, facilities and opportunities available, and assists the public to appreciate and understand the natural and cultural environments. It also promotes appropriate behaviour so that impacts on the environment - and on the visitors themselves - are minimised.

The process consists of three parts:

- Information - provides details of facilities, activities, features and regulations. Includes off-site promotion of the Park and brochures.
- Interpretation - explains natural and cultural features and management activities. Includes on-site signs, and brochures, and interpretive activities.
- Education - provides resources and programs designed specifically for various educational groups. Includes work sheets and support materials.

According to the 1993 Visitor Survey (Brown *et al* 1993), most people visit the Park to enjoy the plants, animals and general scenery. Some interpretation currently provided at the Serpentine Falls assists in the appreciation of aspects of these features.

The major interpretive themes for the Park include:

- landscape modifications - rocks and erosion (Serpentine Falls);
- European and Aboriginal cultural heritage; and
- ecological succession

Stories developed along these lines should encourage respect and care for, and exploration of the environment. Because the major target audience is the local and Perth community (rather than tourists), interpretation and information at and about the area should also encourage understanding and awareness of the broader management issues.

Emphasis in promoting of the area should be given to encouraging family use, including low impact bush-walking. This attraction of family groups is designed to dissuade the hooliganism and unsafe behaviour.

A sign plan for the Park is urgently required, to ensure integration and coordination of messages and themes across the various sites and trails. Some of the topics highlighted during the planning process where the entrance statement for Serpentine Falls; code of ethics for bush walkers and horse riders; rehabilitated areas and special zones; danger spots; orientation and direction; a suite of signs that identifies the Park as an entity, rather than as several separate unconnected sites; zoning boundaries and expected codes of behaviour in each zone.

Other complementary recreation destinations within the local area - for example Langford Park and Jarrahdale Eco-experience site - should also be promoted in the Park to alleviate pressure on sites within the Park.

STRATEGIES

1. **Develop and implement a comprehensive communications plan for the Park that promotes its use by family groups. (H)**

2. **Encourage the use of Gooralong and Serpentine Falls by primary and secondary school groups by developing activities and programs on specific interpretive themes for each site. (M)**

3. **Develop a calender of special interpretive activities and events that encourages family groups to participate. (H)**

4. **Train staff in interpretation and education techniques. (H)**

5. **Prepare and implement a sign plan in accordance with CALM's Sign Manual (H)**

6. **Develop the existing trails - Stacey's and Kitty's Tracks - as interpretive trails with different and specific themes (For example, Stacey's "the jarrah ecosystem" and Kitty's "landforms and water management"). (H)**

7. **Enrol volunteers as interpretive guides at both Serpentine Falls and Gooralong. Guides to have the role of leading formal guided tours and activities, and talking informally with visitors. (M)**

8. **Provide interpretation in the form of panels at Serpentine Falls and at Gooralong. (M)**

9. **Assess and revise all programs and activities regularly. (M)**

34. LIAISON AND COMMUNITY INVOLVEMENT

The objective is to develop, encourage and facilitate effective communication to share information and integrated management.

Liaison, which facilitates effective communication, is an essential component of sound Park management. Well organised liaison provides a forum for the community to contribute to Park management and be informed about the Park and management issues. Liaison between neighbours and land managers also provides for integrated land management that is of particular importance when management issues go beyond the boundaries of the Park, such as fire, weed and visual resource management. Contingency plans in case of an emergency, such as rescue and evacuation in the event of a fire, have been prepared for the Park.

Groups and organisations interested in the Park and its management include visitors, neighbours, special interest groups, community, relevant local authorities and Government departments, commercial operators, lessees and the media.

STRATEGIES

1. **Provide opportunities for Park staff to continue to develop liaison skills. (M)**

2. **Establish an active volunteer group with interested members of the local community. (M)**

COMMERCIAL RESOURCE MANAGEMENT

35. LEASES AND COMMERCIAL CONCESSIONS

The objective is to maintain management area values while encouraging commercial concessions to assist in the provision of quality visitor services.

A commercial concession is a right granted by way of lease or licence for occupation or use, under appropriate conditions, of an area of land or water managed by CALM. Commercial concessions can increase the range of recreation opportunities and facilities within conservation parks.

Proposals are carefully considered by CALM and require approval by the NPNCA and the Minister for the Environment. Leases and concessions must be consistent with the purpose of the Park, the protection of its values and with the objectives of this plan.

Currently, the Park has no leases or commercial concessions.

There appears to be some potential for a commercial operator to manage the Gooralong and Serpentine recreation areas. This proposal requires further consideration and public debate. It cannot be initiated until the tenure issue has been resolved. It has been decided that commercial equestrian operations should not be allowed in the Park (see *Horse Riding*). In the user survey several people suggested shop facilities at Serpentine Falls and at Gooralong. However, with several privately owned shops within 1km of each facility it does not appear shop facilities are required within the Park.

STRATEGIES

1. **Consider concessions that:**
   - **are consistent with the Park's management objectives;**
   - **facilitate Park management or;**
   - **provide a service or facility that CALM would otherwise be unable to provide.**

2. **Include a lease or licence agreement as part of all approved commercial operations and review all operations regularly.**

3. **If feasible implement private involvement in the management of the Serpentine and Gooralong Recreational Areas by a Commercial operator. (H)**

36. MINING AND MINERAL EXPLORATION

The objectives are to:
1. *Implement Government policy on mining in national parks, and*
2. *Minimise the adverse impact of mining and exploration on adjoining lands on the Park's values.*

Most of the Park lies within Alcoa of Australia's Mineral Lease 1SA that was granted under the terms of the Alumina Refinery Agreement Act 1961. Substantial bauxite reserves exist inside the Park boundaries, particularly in the eastern part of the Pipehead Dam catchment.

In 1985, Alcoa agreed to forego mining the bauxite within the proposed conservation reserves, including those which now comprise the Serpentine National Park. However, the company retained right of access to construct and use bauxite transport facilities should this prove necessary in order to develop adjacent ore bodies (see *Utilities and Services*). The agreement on the System 6 reserves in Alcoa's mineral lease was ratified by the Alumina Refinery Agreement Amendment Act 1986.

With the decision by Alcoa to decommission the Jarrahdale Mine, mining in the vicinity of the Park has been postponed for more than 25 years. Alcoa does not currently foresee a need to construct ore transport facilities through the Park, but this will not be known with certainty until the long term mine plan for the Huntly Mine is developed.

STRATEGIES

1. **Follow Government policy on mining in national parks. (H)**

2. **Ensure that, as far as possible, any mining operations adjacent to the Park have minimum impact on the Park, particularly with regard to landscape values, spread of dieback disease and decrease in water quality. (H)**

37. RAW MATERIAL EXTRACTION

The objectives are to:
1. *Wherever possible obtain gravel and other industrial materials for internal construction work from outside the Park.*
2. *Prohibit the removal of the Park's raw materials for use outside the Park.*
3. *Minimise the risk of spreading dieback disease from activities associated with mining and transporting gravel and other industrial materials.*

Basic raw materials, including gravel, sand and rock aggregate, are needed to construct and develop roads and develop recreation sites within the Park. It is preferred that these materials are obtained from outside the Park or from areas that are already disturbed. Gravel and other industrial materials may only be extracted from the Park in accordance with CALM Policy Statement No. 2 (Basic Raw Materials).

Significant areas of disused gravel pits are located within the proposed additions to the south-western area of the Park within reserves C26079, C26080 and C32201. The majority of these pits have not been properly landscaped and rehabilitated, although areas have been colonised by thickets of Parrotbush (*Dryandra sessilis*) and scattered native species. In addition, through the eastern part of the Park there are scattered small pits that have been replanted with a range of exotic tree species during the 1970s. These need further rehabilitation. A range of weeds have established within pits and need to be controlled during the rehabilitation process (See *Rehabilitation*).

Occasionally, raw materials from the Park may be needed for maintenance and construction works (for example, stones dislodged by track maintenance for rock work repairs). The use of materials that harmonise with existing works and the surrounding natural environment, such as the rock work associated with the gardens and paths in the main picnic area, is justified.

STRATEGIES

1. **Follow CALM Policy Statement No. 2 (Basic Raw Materials) and NPNCA Policy Statement No. A5 (Government and Local Government Access to Conservation Estate, Basic Raw Materials) when assessing proposals to extract raw materials from the Park. (H)**

2. **Rehabilitate gravel pits in the Park's north-east corner by using local native species for revegetation and completing earthworks. (M)**

38. UTILITIES AND SERVICES

The objectives are to:
1. *Keep the Park free from future utility and service corridors.*
2. *Minimise the adverse impacts of maintenance operations occurring in existing service corridors on Park values.*

Water Corporation Utilities and Services
The Water Corporation has two large trunk mains that run through the Serpentine River valley from the Serpentine Pipehead Dam to the Swan Coastal Plain. These mains require regular inspection and maintenance, including painting, weed spraying (in the vicinity of the pipe) and servicing of valves and ancillary equipment. The Jarrahdale town site water supply comes direct from the Pipe-head Dam, piped through the Park into tanks south of the town site. Maintenance or upgrading of the towns water supply may impact on the Park.

Water Corporation currently provides picnic, barbecue and toilet facilities to the public (at no charge) at both the Serpentine (main) Dam and the Pipehead Dam. These facilities are located in the vicinity of the dam wall in both cases. Water Corporation also has a stream gauging station located at Kitty's Gorge and Serpentine Falls. This facility records water levels and stream flows in the Gooralong Brook and Serpentine River. Hydrologists visit the site regularly to obtain the recorded data.

Other Utilities and Services
In 1985 Alcoa agreed to forego mining the bauxite within the proposed Serpentine National Park. However, the company retained right of access to construct and use bauxite transport facilities should this prove necessary in order to develop adjacent ore bodies. Alcoa does not currently foresee a need to construct ore transport facilities through the Park, but this will not be known with certainty until the long-term mine plan for the Jarrahdale mine has been further developed (see *Mining and Mineral Exploration*).

Future Proposals
The Water Corporation plan to build a small pump-back dam close to where the Gooralong and Carralong Brooks join the lower Serpentine River. The Western Power has completed a preliminary design for a hydro-electric scheme based on a pump storage facility that would include a dam on the same site as that proposed by Water Corporation. Details of these two proposed projects are not finalised but it is anticipated that they may commence during the life of this Plan. (See *Hydrology*)

Any future proposals for utilities and services should be based on physical, biological, social and visual resource considerations and should be placed outside the Park. All proposals that may have an adverse impact on the environment will be referred to the Environmental Protection Authority (EPA), and are subject to environmental impact assessment in

accordance with the Environmental Protection Act (1986) but this will not be known with certainty until the long term mine plan for the Huntly Mine has been further developed (*see Mining and Mineral Exploration*).

STRATEGIES

1. **Wherever practical, negotiate to place new utility and service corridors outside the Park. (H)**

2. **If a utility or service corridor must go through the Park, ensure that its placement and maintenance have minimal adverse impact on the environment. (H)**

3. **Encourage the use of a single easement for more than one utility. (H)**

4. **Rehabilitate redundant utility works at the expense of the appropriate agency. (M)**

5. **Monitor the effects of utility corridors and their maintenance upon the Park's conservation, landscape and recreation values. (M)**

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39. BEEKEEPING

The objective is to ensure beekeeping is compatible with the Park's other values.

Currently five apiary sites are located within the Park and three in adjoining State forest between the Park and Kingsbury Drive.

Research indicates that the presence of honey bees may have potential adverse effects on the conservation values of conservation reserves. Therefore, beekeeping may be found to be an inappropriate commercial activity in National Parks.

STRATEGIES

1. **New permanent or temporary apiary sites will not be permitted in the Park. (M)**

2. **If necessary, cancel the existing sites without the possibility of reissue of these sites, if other values of the Park are found to be adversely affected. (M)**

3. **Evaluate all access associated with apiary sites for potential introduction and spread of dieback disease. (M)**

4. **Follow guidelines in Policy Statement No. 41 "Beekeeping on Public Land" with existing sites and assess changes proposed to the Policy as they may effect the Park. (M)**

IMPLEMENTATION

40. MANAGEMENT AND STAFF RESOURCES

The objective is to provide sufficient staff and funds to manage the Park and implement the Plan.

The Park is serviced by the Mundaring District with a National Parks Ranger, a part time Park Maintenance Worker and gate keepers who are based exclusively within the Park. Additional staff from the District, Region and specialist branches within CALM provide services, advice and assistance as required.

While current staff levels are considered appropriate to maintain the Serpentine Falls site, they are not adequate to manage the Gooralong camping area. Implementing the strategies contained in the management plan over the next 10 years will place considerable demands on existing staff. Use of volunteers should be investigated to assist Park managers.

CALM provides funds to manage the Park. External funding has also come from once-off grants for special projects. Implementation of this plan will require additional funding resources particularly in planning, design, supervision and interpretation. Alternative means of funding will be investigated, including the establishment of a trust fund for monies collected to be used in Park management.

STRATEGIES

1. **Provide sufficient staff or staffing arrangements at Serpentine National Park to implement strategies in this Plan and to maintain facilities. (H)**

2. **Investigate and implement revenue raising mechanisms. Use funds collected to increase, improve and maintain Park facilities and services. (H)**

3. **Review resources when the camping fees are initiated at Gooralong. (M)**

4. **Seek revenue from external sources that could be used to implement this plan. (H)**

5. **Investigate volunteer programs for the Park. (M)**

41. PRIORITIES

The objective is to manage the Park according to assigned priorities within this plan.

Many strategies are developed in this plan. While many are guidelines for management, others are prescriptions for specific actions and developments. These prescriptions require funding and will be implemented on a priority basis by CALM's Mundaring District, subject to the availability of staff and funds. Table 2 presents management priorities for all strategies in the plan.

Priorities will be reviewed on an annual basis or as circumstances change.

STRATEGIES

1. **Prepare a 10-year implementation plan taking into account the priorities outlined in Table 2. (H)**

2 **Prepare an annual progress report and review the implementation plan annually or as circumstances change. (H)**

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42. EVALUATION AND REVIEW

In the light of new information the Plan may need to be revised. If major changes to the direction of the Plan are proposed, the revised section of the Plan will be released for public comment. Implementation of the Plan should be reviewed periodically, priorities revised and the strategies contained in this Plan assessed when they are completed. When the final Plan is complete it will direct management of the Park for a 10 year period. It is a statutory responsibility of the NPNCA to monitor management plan implementation. At the end of the 10 year period the Plan will be revised.

STRATEGIES

1. **Review the implementation of the Plan periodically to assess its progress and revise the priority status of strategies. (H)**

2. **Review strategies in the light of new information, particularly from research and monitoring programs. If a major change in the direction of the Plan is required, any proposed revision is subject to NPNCA approval and if approved will be released for public comment. (There is provision for this under Section 61 of the CALM Act, 1984). (H)**

TABLE 2. STRATEGIES FOR SERPENTINE NATIONAL PARK BY LEVEL OF PRIORITY

HIGH PRIORITY

5. Land Tenure and Park Boundaries

2. Implement the changes in status proposed for Crown Reserves (Table 1) and gazetted Road Reserves (Table 2) shown in Figure 2. These proposals will increase the Parks size by 553 ha (12.7%).
3. (A) If a study by the Water and Rivers Commission finds that the freehold locations at Gooralong are surplus to water requirements, seek to include those freehold locations into the Park. (B) In the interim, negotiate a formal CALM Act management agreement with the Water and Rivers Commission and the Water Corporation for the effective management of the Gooralong Recreation Site. (C) In the case of (A) or (B) not occurring, closure of the Gooralong Recreation Site will be considered.
5. Liaise with relevant authorities, departments and land owners to ensure land uses on adjoining land do not adversely affect Park values. CALM will continue to comment on such issues as:
   - likely environmental impacts
   - drainage and water quality within catchments draining into the Park
   - dieback implications
   - fire management
   - access to CALM lands
   - pets, stock, pests and weeds
   - boundary fencing
   - impact of public utilities on CALM lands
   - threatened species and plant communities
   - access to basic raw materials.

6. Zoning

1. Develop appropriate access and recreational facilities in each of the recommended zones as indicated in Figure 3 and Table 1.
2. Use the zoning scheme to separate incompatible uses.

8. Geology, Landform, Soils and Erosion Risk

2.Develop and maintain stable access routes to major destinations within the Park, realigning or upgrading sections causing erosion or damage to geological and landform features (see *Access and Parking*).

4.Control recreation activities in areas of high erosion risk.

9. Hydrology

1. Protect the Park's water quality and water resources while implementing all management activities.
2. **Consider Aboriginal concerns relating to the Park's waterways during all activities (see *Aboriginal Cultural Heritage*).**
4. Minimise adverse environmental impacts on stream line vegetation and stream banks.
5. In association with Water Corporation, ensure that sufficient water flows over the Serpentine Falls for 12 months of the year.

10. Landscape

1. Refer to CALM's Landscape Management Policy No 34 and landscape character typing publication "Reading the Remote", and seek specialist advice when implementing the management plan.
2. As resources become available, progressively replace existing facilities and structures that do not aesthetically blend with the natural landscape.
3. Design and construct all new park facilities in keeping with natural colours, lines, forms, textures and scales and subordinate to the natural landscape.

11. Vegetation and Flora

1. Survey the Park's vegetation and prepare detailed vegetation maps.
3. **Minimise the introduction, spread and impact of plant disease on native flora by implementing strategies in Sections *Disease* and *Access*. (H)**
4. **Rehabilitate degraded vegetation communities in the Park (see *Rehabilitation*). (H)**
6. Minimise damage and restrict access to herb fields on granite outcrops.

13. Feral Animals and Domestic Pets

3. Prohibit pets in the Park and at Gooralong.

HIGH PRIORITY cont.

14. Disease

1. Evaluate all proposed maintenance and development activities to determine their impact on the spread of dieback (CALM Environmental Evaluation).
2. Include disease management specifications in appropriate contract documents and job prescriptions.
3. Complete dieback disease survey and mapping of the Park.
4. Implement disease management strategies to protect dieback disease-free areas, minimise further spread and impact and rehabilitate degraded sites.
6. Inform park users about plant diseases and the need to stay on well formed roads or tracks.

15. Fire Management

1. Develop and implement fire management programs based on the Wildfire Threat Analysis of the Darling Scarp (Figure 9).
2. Maintain an effective fire detection system and fire fighting forces to protect values within and adjoining the Park.
3. Plan and implement fire management strategies to ensure their feasibility under a range of weather conditions.
4. Maintain close liaison with local Bush Fire Brigades, Park neighbours, the Shire of Serpentine-Jarrahdale and other agencies to establish cooperative fire management systems.
5. Minimise construction of any new firebreaks and fire lines. Where possible use existing tracks for suppressing wildfires or conducting prescribed burns. Where new fire lines are essential, construct them subject to strict dieback disease hygiene principles using minimum impact techniques. Rehabilitate as soon as practicable after fire suppression operations are completed.
9. Develop a fire emergency plan (covering aspects such as visitor evacuation), for the Park.

16. Weeds

1. Prepare and initiate a five-year weed management program. Give priority to control of the following:
   - invasive bulbous plants (such as watsonia),
   - blackberry,
   - caster oil plant,
   - cotton bush,
   - arum lily,
   - woody weeds.
6. Ensure all earth-moving machinery is thoroughly cleaned before entering the Park.

17. Rehabilitation

1. Prepare a comprehensive rehabilitation plan for existing degraded areas, giving priority to areas of highest value.
5. Ensure gravel pits are rehabilitated immediately after use.

18. Aboriginal Cultural Heritage

1. Liaise with the Aboriginal Affairs Department regarding activities associated with the Park that may impact on Aboriginal sites.
2. Consider Aboriginal concerns relating to the Park's waterways in all management activities.
4. Develop interpretive and educational opportunities for visitors relating to Aboriginal cultural heritage in liaison with local Aboriginal communities.

19. European History and Cultural Resources

1. Ensure that all management decisions concerning the conservation and restoration of places of historic interest within the Park adhere to the principles of the Burra Charter (Australia ICOMOS, 1988).
2. Continue to protect the Park's historic buildings and sites.
6. Seek external assistance to record oral histories from people who know of the area's cultural history.

20. Regional Recreation Opportunities

1. Provide recreation opportunities in the Park that complement opportunities available elsewhere in the Region.
2. Do not cater for recreation activities that are incompatible with or adversely impact the Parks values. Alternative areas should be used.

HIGH PRIORITY cont.

21. Access

1. Develop and maintain stable access routes to major destinations within the Park (as indicated in Figure 9 and 11), realigning or upgrading sections causing erosion or damage to geological and landform features.
2. Close, reinstate to the natural profile and revegetate all unnecessary access routes.
5. Maximise access for visitors with disabilities.
7. "Off road vehicle only" tracks or areas will not be provided within the Park (see *Off-road Vehicles).*
8. Prohibit vehicles and horses from moving off formed tracks. Encourage walkers to stay on formed tracks.
9. Develop and maintain all access to a standard that will minimise the risk of spreading dieback disease. Develop new access routes as low in the topography where practical. Implement seasonal access restrictions in the Park.

22. Visitor Safety

1. Actively promote visitor safety within the Park.
2. Continue to liaise with the Health Department, Police Service, Shire of Serpentine-Jarrahdale, FESA, Ambulance Service, and SES in accordance with plans for dealing with accidents and search and rescue operations.
3. Provide information for visitors that highlights potentially hazardous areas and activities.
4. Regularly inspect roads and recreation sites for potential hazards and initiate appropriate action.
5. Develop a wildfire contingency plan for the main visitor sites in the Park. Address the need for evacuation procedures.

23. Recreation Areas and Existing Use

1. Separate incompatible uses where possible (see *Zoning*). (H)
2. Use the following criteria to assess requests for use of the Park for new recreational pursuits:
   - Appropriateness in a national park.
   - Appropriateness in the Regional context.
   - Compatibility with existing uses.
   - Likely environmental impact.
   - Availability of alternative opportunities.
   - Management and enforcement capability.
3. Maintain recreation sites in a safe, clean and tidy condition.
4. Monitor vehicle numbers and patterns of use at the Falls and Gooralong. Conduct periodic site surveys and interviews to determine visitor patterns, preferences and satisfaction with Park management. These findings will be considered for modifying management practices and assessing requests for alternative uses.
5. Promote and initiate the strategy "Take your rubbish home" to visitors.
8. Liaise with individuals and organisations that provide complementary recreation and accommodation facilities on nearby or adjacent lands. Ensure that their activities do not adversely impact on the Park, and that they are aware of the potential of their activities on the Park's values.

23.1 Serpentine Falls Recreation Area

1. Develop a site concept plan to provide quality day use facilities at the Falls.
3. Progressively replace and rehabilitate existing facilities and structures that do not aesthetically blend with the natural landscape, including:
   - the pump house at the falls;
   - the pump back pipe line from the pool area at the base of falls;
   - the laterite boulders on the walk trail from the Car park to the falls;
   - the weir just down from the falls;
   - the area excavated just west of the entrance station;
   - the Water Corporation pipeline easement through the recreation site;
   - the eroded walk trails that access the top of the Serpentine Falls; and
   - wooden walkway leading to the main pool at the Falls.
5. Consider options to improve safety at Serpentine Falls. Minimise safety hazards at Serpentine Falls pool associated with swimming and slipping, falling or jumping from the rocks surrounding the pool.

HIGH PRIORITY cont.

23.2 Gooralong Camping and Day Use Area

1. Provide quality camping and day use facilities at Gooralong by implementing the site development plan (Figure 13).
2. Pending the completion of the Water and Rivers Commission study into future use, negotiate to add the Gooralong recreation area to the Serpentine National Park or in the interim have put in place a formal management agreement or closure of the recreation site.
3. Collect camping fees at Gooralong as soon as change in tenure is finalised with Water Corporation. Use funds collected to help in Park management.
4. If feasible implement private involvement in the management of the Gooralong camping and day-use site by a Commercial operator.
6. Properly maintain camping areas at Gooralong to keep environmental impacts within predetermined limits.

24. Nature Observation and Sightseeing

1.Provide visitors with the opportunity and programs to appreciate the Park's natural features.

3.Although no vehicle-based sightseeing routes are developed within the Park encourage visitors to utilise pleasure driving and sightseeing opportunities presented by the "Jarrahdale Scenic Drive".

5. Consider the visual impacts of all Park operations, particularly those visible from facilities, walk trails and lookouts (see *Landscape*).

6. Progressively develop an extensive and varied system of walks within the Park, distinct from vehicles or horses tracks, to provide visitor access to the major features of the Park (see *Bushwalking and Pedestrian Access*)

25. Recreational Fishing and Marroning

1. Support Fisheries Department initiatives that help conserve marron populations.

26. Bushwalking and Pedestrian Access

1. Implement the strategies from Section 21: Access.
2 . Progressively develop an extensive and varied system of walk tracks within the Park, distinct from vehicle or horse tracks, to provide visitors access to the Park's major features.
3. Liaise with Water Corporation and private land holders to develop walk tracks to link Gooralong Camping area with the Falls and Pipehead Dam recreation sites. Carefully assess the impacts of the track on the stream banks, the steep terrain and access through Water Corporation lands.
7. Where practicable, link the Park's walk track network with trails outside the Park.
8. Signpost the walk track network.

28. Cycling

1. Competitive cycling events are not permitted in the Park.
2. Non-competitive cycling will only be permitted on the main access roads into the Serpentine Falls and Gooralong, and on tracks within the Gooralong Site, and on designated mountain bike paths which are compatible with the Park's conservation values and Water and Rivers Commission Requirements.
3. Cycling trails will be closed if weather conditions, erosion, disease, degradation, of vegetation or water resources, conflict with other users or lack of compliance to conditions of use warrant such closure.
4. Direct all other cyclists to use facilities outside the Park boundary.

30. Off-road Vehicles

1.Use appropriate measures to prohibit vehicles being driven off roads in the Park, except in emergencies.

2."Off road vehicle only" tracks or areas will not be provided within the Park.

31. Horse Riding

1. Exclude all forms of commercial horse-riding activities from the Park.
2. Exclude all group horse-riding events from the Park, except a single annual horse-riding event that has been historically run in the Park. The event must follow an environmentally acceptable route and conditions.
3. Horse riding by individuals will not be permitted in the Park except on designated horse trails within the "horse access area" (Figure 11). CALM will establish a working group to recommend to CALM management where horse trails within the "horse access area", should be located.

HIGH PRIORITY cont.

32 Special Events

1. Special events will be allowed subject to the approval and conditions stipulated by the NPNCA.
2. Approved "one-off" special events must be of national significance.
3. Strict hygiene requirements to eliminate the risk of spreading dieback infection be followed.
4. Where appropriate, approved "one-off" special events must be compatible with Class 1 Water Catchment requirements, approved by the Water Corporation and Water and Rivers Commission.
5. Event organiser to be responsible for the removal of any allowed temporary fixtures, facilities, in support of such event from the Park at event completion to the satisfaction of the NPNCA.
6. Event organiser to be responsible for the rehabilitation of any site disturbance at event completion to the satisfaction of the NPNCA.

33. Information, Interpretation and Education

1. Develop and implement a comprehensive communications plan for the Park that promotes its use by family groups.
3. Develop a calender of special interpretive activities and events that encourages family groups to participate.
4. Train staff in interpretation and education techniques.
5. Prepare and implement a sign plan in accordance with CALM's Sign Manual.
6. Develop the existing trails - Stacey's and Kitty's Tracks - as interpretive trails with different and specific themes (For example, Stacey's "the jarrah ecosystem" and Kitty's "landforms and water management").

35. Leases and Commercial Concessions

1. Consider concessions that:
   are consistent with the Park's management objectives;
   facilitate Park management or;
   provide a service or facility that CALM would otherwise be unable to provide.
2. Include a lease or licence agreement as part of all approved commercial operations and review all operations regularly.
3. If feasible implement private involvement in the management of the Serpentine and Gooralong Recreation Areas by a Commercial operator.

36. Mining and Mineral Exploration

1. Follow Government policy on mining in national parks.
2. Ensure that, as far as possible, any mining operations adjacent to the Park have minimum impact on the Park, particularly with regard to landscape values, spread of dieback disease and decrease in water quality.

37. Raw Material Extraction

1. Follow CALM Policy Statement No. 2 (Basic Raw Materials) and NPNCA Policy Statement No. A5 (Government and Local Government Access to Conservation Estate, Basic Raw Materials) when assessing proposals to extract raw materials from the Park.

38. Utilities and Services

1. Wherever practical, negotiate to place new utility and service corridors outside the Park.
2. If a utility or service corridor must go through the Park, ensure that its placement and maintenance have minimal adverse impact on the environment.
3. Encourage the use of a single easement for more than one utility.

40. Management and Staff Resources

1. Provide sufficient staff or staffing arrangements at Serpentine National Park to implement strategies in this Plan and to maintain facilities.
2. Investigate and implement revenue raising mechanisms. Use funds collected to increase, improve and maintain Park facilities and services.
4. Seek revenue from external sources that could be used to implement this plan.

41. Priorities

1. Prepare a 10-year implementation plan taking into account the priorities outlined in Table 6.
2. Prepare an annual progress report and review the implementation plan annually or as circumstances change.

42. Evaluation and Review

1. Review the implementation of the Plan periodically to assess its progress and revise the priority status of strategies.
2. Review strategies in the light of new information, particularly from research and monitoring programs. If a major change in the direction of the Plan is required, any proposed revision is subject to NPNCA approval and if approved will be released for public comment. (There is provision for this under Section 61 of the CALM Act, 1984.)

MEDIUM PRIORITY

5. Land Tenure and Park Boundaries

4. By purchase or exchange, acquire private property enclaves, when available, that have:
   high conservation or recreation value;
   management benefits;
   that protect areas with these values within the Park; and
   agreement from the land owner to sell.
6. No further private property emergency access should be approved for subdivisions adjoining the Park boundary.
7. The eastern and southern boundaries of reserve A39825 of the Park that adjoins State forest (number 22) should, if possible, be located to follow existing tracks or other features, so that they can be easily located in the field.

7. Climate

2. Locate and design recreational facilities to minimise unpleasant climatic effects.

8. Geology, Landform, Soils and Erosion Risk

1. Identify and protect geological sites and landform features that have scientific and educational values.
3. Monitor the effectiveness of erosion control techniques, and incorporate new practices where appropriate.

9. Hydrology

3. Provide input into the EPA assessment processes on the impacts the proposed Water Corporation and Western Power dams and infrastructure will have on the Park's values.

10. Landscape

4.Design and construct walk tracks and viewpoints that maximise the park visitors access to scenic locations without detracting from the Park's natural landscape.
5. Seek the cooperation of other agencies, neighbours and community groups that impact on the Park's landscape to protect and rehabilitate the Park's landscapes and that of surrounding lands.

11. Vegetation and Flora

2. Systematically, over a period of five years, record the distribution, abundance and other details of the Park's flora including threatened species.
5. Use the established monitoring plots as long term reference areas.

12. Fauna

1. Survey the Park's vertebrate fauna to determine presence or absence of species within the major landform and vegetation types.
2. Monitor the Park's threatened fauna populations every three years using permanent monitoring sites. Maintain a register of sightings and road kills for the Park.
3. Implement management strategies to protect and enhance fauna populations and their habitat, and to minimise the impact of threatening processes, including dieback disease, fire and predation.

13. Feral Animals and Domestic Pets

1. Monitor feral animals and implement a control program, with priority given to feral pigs, foxes and cats.

14. Disease

5. Monitor the presence of other plant diseases, such as Armillaria, and take appropriate actions to limit their spread.

15. Fire Management

6. Carry out all fire management and suppression operations according to visual resource management principles.
7. Promote public education and awareness of fire risk, safety and survival.
8. Close parts or all of the Park to visitors if necessary during periods of very high and extreme fire dangers. Prepare a contingency plan for total closure in the event of a wildfire within or threatening the Park, or in periods of fire emergency as declared by the Minister for Emergency Services.

MEDIUM PRIORITY cont.

16. Weeds

2. Conduct control programs in areas of:
   - greatest conservation value
   - greatest perceived environmental threat
   - small and new infections
   - with species which are easily controlled.
3. Revegetate areas denuded by weed control measures with appropriate local species from that habitat.
4. Liaise with neighbours, local government, the Agricultural Protection Board and Water Corporation regarding weed control on Park boundaries and adjacent properties.
5. Avoid unnecessary disturbance associated with management actions, such as road maintenance and frequent burning.

17. Rehabilitation

2. Rehabilitate very high dieback impact sites within the Park, particularly those in the south-eastern section of the Park. This may involve intensive site disturbance.
3. Monitor, evaluate and record progress of rehabilitation techniques used. Investigate more effective rehabilitation techniques.
4. Revegetate degraded sites by using local species grown from seeds or cuttings collected in the Park.
7. Ensure the long-term dieback disease research plots within the Park are not destroyed during the rehabilitation program.

18. Aboriginal Cultural Heritage

3. Contact the local Aboriginal communities to seek input and advice as to the existence of significant ethnographic sites and ongoing interests in the Park.

19. European History and Cultural Resources

5. Seek external funds to evaluate the local, regional and national cultural significance of each historic site.

20. Regional Recreation Opportunities

3. Advise visitors of alternative areas prior to busy days.

21. Access

3. Remove forest produce where appropriate, that is associated with essential works such as road construction under the approval conditions of the CALM Act.
4. Design all roads so that they are safe for visitors and CALM staff.
6. Oppose further private property emergency access for subdivisions adjoining the Park boundary (see *External Boundaries and Surrounding Landuse).*

23. Recreation Areas and Existing Use

6. Manage sites to minimise the incidence and effects of vandalism.

23.1 Serpentine Falls Recreation Area

2. Reduce the environmental damage caused by gathering wood within the Park. Replace the existing wood barbecues with electric and/or gas barbecues.
4. Assist Shire of Serpentine-Jarrahdale and local community initiatives to develop Falls Road as an entry statement to the Park.
7. If feasible implement private involvement in the management of the Serpentine Recreational Area by a Commercial operator.

23.2 Gooralong Camping and Day Use Area

5. Replace the existing wood barbecues with gas or electric barbecues at the day-use area. Provide fire rings for open wood fires only at camping areas.

24. Nature Observation and Sightseeing

2. Provide information on the Park's physical and biological attributes.
4. Provide Park visitors with interpretive information, including nearby attractions, vegetation, landforms, fauna and cultural history.

25. Recreational Fishing and Marroning

2. Prohibit fishing and marroning below the Serpentine Falls because of intense recreation use of this very limited body of water.
4. Prohibit the restocking of non-native fish species in the Park.
5. Monitor and manage access to fishing sites to prevent river banks from being degraded and open fireplaces from being used

MEDIUM PRIORITY cont.

26. Bushwalking and Pedestrian Access

4. Encourage and provide information on "low impact" bushwalking to Park visitors.
6. Monitor the environmental effects of bushwalking and how bushwalking opportunities meet visitor needs. Close walk tracks temporarily or permanently and carry out remedial work where the results of monitoring indicates significant environmental damage is occurring.
9. Produce a brochure for walk tracks within the Park from which visitors can choose the walk that is best suited to their needs and ability.

27. Orienteering, Rogaining and Cross-country Running

1. Permit a maximum of one orienteering event per year within the Park, at a time that does not impact on other visitors and minimises the risk of spreading dieback disease.

29. Hang Gliding

1. Require hang gliders to obtain a permit from CALM's District Manager to fly in the Park. The permit may place restrictions on such factors as the number of gliders using the Park at any one time and the level of impact on other Park users. Permission may be denied to craft or support activities that detrimentally affect Park values.

31. Horse Riding

4. Horse-riding zones and trails will be closed if weather conditions, erosion, disease, degradation of vegetation or water resources, conflict with other users or lack of compliance to conditions of use warrant such closure.
5. Encourage horse riders to maintain and sign-post approved horse trails and to help establish a code of ethics for horse riding within the Park.

33. Information, Interpretation and Education

2. Encourage the use of Gooralong and Serpentine Falls by primary and secondary school groups by developing activities and programs on specific interpretive themes for each site.
7. Enrol volunteers as interpretive guides at both Serpentine Falls and Gooralong. Guides to have the role of leading formal guided tours and activities, and talking informally with visitors.
8. Provide interpretation in the form of panels at Serpentine Falls and at Gooralong.
9. Assess and revise all programs and activities regularly.

34. Liaison and Community Involvement

1. Provide opportunities for Park staff to continue to develop liaison skills.
2. Establish an active volunteer group with interested members of the local community.

37. Raw Material Extraction

2. Rehabilitate gravel pits in the Park's north-east corner by using local native species for revegetation and completing earthworks.

38. Utilities and Services

4. Rehabilitate redundant utility works at the expense of the appropriate agency.
5. Monitor the effects of utility corridors and their maintenance upon the Park's conservation, landscape and recreation values.

39. Beekeeping

1. New permanent or temporary apiary sites will not be permitted in the Park.
2. Where appropriate, cancel the existing sites with out the possibility of a reissue of these sites, particularly the sites close to Gooralong and Serpentine recreation areas.
3. Evaluate all access associated with apiary sites for potential introduction and spread of dieback disease.
4. Follow guidelines in Policy Statement No. 41 "Beekeeping on Public Land" with existing sites, and assess changes proposed to the Policy as they may effect the Park.

MEDIUM PRIORITY cont.

40. Management and Staff Resources

3. Review resources when the camping fees are initiated at Gooralong.
5. Investigate volunteer programs for the Park.

LOW PRIORITY

5. Land Tenure and Park Boundaries

1. The whole of the Park, including Reserve A39825 (forming the "second stage" of the Park), to be formally named "Serpentine National Park".

7. Climate

1. Consider available weather data, when developing management strategies for the Park, particularly: high rainfall and the implication for erosion from earthworks, wind speed and direction at times of high fire risk.

9. Hydrology

6. Liaise with other Government departments, local government authorities and landowners to ensure the land-use practices upstream of the Park do not adversely affect the Park's water quality and quantity.
7. If other agencies and land holders prepare a catchment management plan for waters flowing into the Park, CALM would assist where required.

11. Vegetation and Flora

7. Expand and maintain the Park's herbarium.

13. Feral Animals and Domestic Pets

2. Implement an education program to inform local residents and visitors of the impacts pets and feral animals have on the Park's values.

16. Weeds

7. Liaise with townspeople and neighbours to discourage cultivation of any species that may be a threat to the Park.
8. Remove non-local trees where considered necessary.

17. Rehabilitation

6. Encourage and provide opportunities for volunteers to help in rehabilitation projects.

19. European History and Cultural Resources

3. Prepare and maintain a Sites and Building Record (archaeological index) for the Park. Collate written material on the Park's cultural history and maintain copies in the CALM District library and Shire of Serpentine-Jarrahdale library. Seek support for resources for this project from the Shire of Serpentine-Jarrahdale.
4. Recommend any cultural sites, buildings and structures considered worthy of statutory protection to the Heritage Council of WA to be included on the list of places of historical interest.
7. Consider ways to interpret sites in conjunction with the Heritage Council of WA, the National Trust and other agencies as part of wider management schemes.

23. Recreation Areas and Existing Use

7. Encourage Park visitors to provide their own gas barbecue cooking facilities.

23.1 Serpentine Falls Recreation Area

6. Provide a safe access way and viewing point at the top of Serpentine Falls on the southern side of the Serpentine River.

23.2 Gooralong Camping and Day Use Area

7. Seal the road into the Gooralong site as funds are available.

25. Recreational Fishing and Marroning

3. Inform Park visitors of guidelines for fishing and marroning.

26. Bushwalking and Pedestrian Access

5. Promote the code of ethics for walking in the Park.

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