



SIR FREDERICK

SAMSON PARK MANAGEMENT PLAN

FEBRUARY 2006



City of Fremantle

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Currently being updated for inclusion in final draft- these figures are in the 1995 revision of the management plan. The figures will include a locality map, land use and zoning, vegetation condition, access and track network, park use zones, habitat linkages, and recreational activities.

1. INTRODUCTION

Sir Frederick Samson Park was reserved in 1971, when Samson Estate was developed from former Army land. An 8.6 hectare area of bushland was retained for the Park, named after a former Mayor of Fremantle, Sir Frederick Samson. Now a "C" Class Reserve vested with the City of Fremantle, the Park remains largely undeveloped, with the exception of a central strip of turf with play, barbecue and toilet facilities. Samson Park is managed by the City of Fremantle.

The suburb of Samson is also important to Fremantle's wartime heritage, being the site of the Melville Military Camp during World War Two. Seven W.A. battalions (an estimated 12,000 troops), the Australian Women's Army Service and a small contingent of RAAF personnel trained here during WWII. A cairn commemorating the Army's presence has been erected in the Park.

The vegetation of the Park consists of Jarrahl Marri/ Tuart woodland, with a Banksia and Sheoak understorey. Dominant understorey species are Grass-trees and Zamia palms. The Park provides habitat for over 50 bird species, reptiles and bats. A Friends of Samson Park group was formed in 1990 with the aim of fostering greater community interest and involvement in Samson Park, particularly conserving the Park's flora and fauna. The Friends group hold regular bush bees and nature walks in the Park. The Friends of Samson Park Management Committee advise Council on matters relating to the management of the Park.

Sir Frederick Samson Park is the City of Fremantle's largest natural park. Its significance as an urban bushland reserve was originally recognised by its inclusion in the Environmental Protection Authority's System Six Reserve System (1981). It is now included as one of the Bush Forever sites as part of the State Government's Perth Bushplan policy. This Bush Forever policy is designed to:

- identify, protect and manage regionally significant vegetation within the Sawn Coastal Plain portion of the Perth metropolitan Region;
- preserve the biodiversity of the region;
- achieve a sustainable balance between the conservation of bushland and development within the Perth Metropolitan Region.

The original Samson Park Management Plan had 2 primary objectives:

- (a) encouraging the growth and regeneration of indigenous flora; and
- (b) giving priority to passive recreation activities which are compatible with the conservation of flora and fauna.

The original management plan for Samson Park was prepared by ecological consultants Ecoscape and adopted by Council in 1989. This Plan was reviewed in November 1995.

The purpose of the revision in 1995 was to:

- update resource information contained in the original Management Plan;
- update technical information on management strategies dealing with pest plants, pest animals, fire and other issues;
- provide data on park usage and public perceptions of the park;
- assess progress to date on the management recommendations of the original plan; evaluate management strategies from the original plan in light of the above; and
- review the original objectives and strategies and put forward new recommendations as necessary.

The 1995 revision was prepared with the assistance of the Friends of Samson Park, Council staff (particularly Tony Baird and Andrew Stevenson), Associate Professor Jonathan Majer (Curtin University), Dr. Harry Recher (University of New England) and Keith McDougall. Mrs. Barbara Parker provided the list of bird species for Samson Park.

The aim of the 2005 revision is:

- to assess the aims and recommendations of the 1995 revision;
- to simplify and implement the plan;
- have realistic and achievable outcomes;
- implement a monitoring program; and
- provide a way forward over the next 5 years.

2. MANAGEMENT OBJECTIVES

Management objectives for Sir Frederick Samson Park take into consideration the regional conservation significance of the Park, its reservation status, its importance as the only public open space in the suburb of Samson, and community input to the planning process.

The primary management objectives for Samson Park are to:

- conserve and protect the park's natural environment, particularly its indigenous flora and fauna;
- provide a range of recreational opportunities to all age groups in a manner consistent with the protection of the natural environment;
- provide a safe, stimulating playground area for small children;
- rehabilitate degraded sections of the bushland using indigenous species of local or regional provenance;
- ensure the effectiveness of rehabilitation measures through a reliable monitoring system;
- design an integrated interpretation program that will enable all age groups to gain a better understanding of the park's natural environment, and will promote a co-operative approach to the park's rehabilitation;
- continue to foster community involvement and a sense of custody in the park's management, particularly in promoting its natural values and bush rehabilitation activities;
- ensure that adequate precautions are taken for public safety;
- protect the park and its visitors from fire;
- control pest plants and animals which have a major impact on the park's flora and fauna

3. THE PARK ENVIRONMENT

3.1 Location

Sir Frederick Samson Park is located six kilometres east of Fremantle and occupies an area of 8.6 hectares, bounded by McKenzie Road, Sellenger and McCombe Avenues. It is one of the larger areas of public open space in the City of Fremantle and the largest natural reserve in the municipality. Sir Frederick Samson Park is the only area of public open space within the suburb of Samson.

3.2 Land Tenure & Zoning

Sir Frederick Samson Park comprises Reserve C34233 (C Class Reserve: Public Recreation and Parkland), vested with the City of Fremantle; Lots 629 and 576 (freehold), owned by the City of Fremantle; and Lot 630, a Sewer Pumping Station. Freehold title to this lot is held by the West Australian Water Authority.

Planning schemes/ documents relevant to Samson Park are the Metropolitan Region Scheme (the overriding planning scheme in the metropolitan area), the City of Fremantle's Town Planning Scheme No.3, and the Environment Protection Authority/ Department of Conservation and Environment System Six (Darling System) Report. Samson Park is zoned Urban under the Metropolitan Planning Scheme. The Park is zoned as Local Reserve: Public Open Space, and reserved for the purposes of Public Recreation and Parkland in the City of Fremantle's Town Planning Scheme.

Council has retained its freehold title to Lots 629 & 576. In the System Six Report (1981) it recommended that that these lots be included in the Public Recreation and Parkland reservation.

Samson Park lies within the suburb of Samson, a relatively recent (1971) medium-density suburban development. The Park is bounded by roads adjoined by residences and a complex consisting of a small shopping centre, the Council's Kanyana recreation centre, Samson Primary School and an aged persons centre.

Samson Park is an important recreational resource for nearby residents, providing a large, relatively undeveloped public open space area which caters for a variety of recreational uses. As mentioned, it is the only area of public open space in Samson, and one of only two parks in the area bounded by Stock Road, Winterfold Road, South Street and North Lake Road. Samson Park is one of three conservation reserves managed by the City of Fremantle (others are Cantonment Hill and North Fremantle Foreshore).

The other major land use of the Park is its use by the Water Authority as a stormwater reservoir for the surrounding area. A total catchment of 63 hectares (largely medium-density suburban development) drains into Samson Park. WAWA has a small enclosure near the southern boundary of the park. An average volume of 150,000 cubic metres is discharged into the Park each year. No major roads drain into this catchment, reducing the risk of oil and other chemical contamination within the Park (Ecoscape, 1989).

3.3 Climate

The climate of the area is typically Mediterranean, with a long, hot, dry summer (five to six dry months per year) and mild, wet winter (Beard, 1990, Seddon, 1972). Mean annual rainfall (measured at Fremantle) is 771 mm, most of which occurs between May and September.

Maximum temperatures range from 28.8°C in February to 17.5°C in August, and minima from 18.7°C (February) to 9.8°C (August) (Bureau of Meteorology, 1988).

Because of the extended period of moisture deficit and high temperatures, plant growth is minimal over summer, and many species experience some form of dormancy (Seddon, 1972).

These climatic conditions produce an extended fire season for the metropolitan area, usually from November to April. Other climatic conditions which influence fire risk/behaviour are high temperatures, low relative humidities experienced in this period, strong overnight and early morning easterlies, and west or south-west afternoon sea breezes. Vegetation is at its most flammable from December and maintains its flammability until late autumn rains (Robley, 1983).

3.4 Topography, Geology, Soils

Samson Park lies in the swale (valley) of part of the Spearwood dune system. Being of recent origin, the Spearwood Dune System is typified by its topographical variation and undulating terrain. Hills are higher (eg. Cantonment Hill, Reabold Hill, Mt. Eliza) than those of the older Bassendean Dune System, located further inland (see Geology, Geomorphology and Soils). Samson Park acts as a drainage basin for the surrounding area. The lowest point of the Park (in the central lawn area) is 24.2m AHD and the highest point (on the corner of Sellenger Avenue and McKenzie Road) is 47m AHD (Ecoscape, 1989).

Samson Park lies on the Swan Coastal Plain. This landform lies between the Indian Ocean and the Darling Fault and is bounded to the north by a subsidiary fault running north-west from Bullsbrook, and to the south by the Collier-Cape Naturaliste Scarp. The Swan Coastal Plain consists of five geomorphic elements running roughly parallel to the coast: the Ridge Hill Shelf (lateritic foothills of the Darling Scarp), Pinjarra Plain (a narrow band of alluvium at the base of the Scarp), and the Bassendean, Spearwood and Quindalup Dune Systems. These Dune Systems run from west to east, with the oldest deposits forming the Bassendean System, and the most recent forming the Quindalup System. Each of the dune systems was formed by accumulation of wind-blown sand deposits from successive shorelines during the Quaternary period (recent geologic time). Samson Park is located on the Spearwood Dune System, which lies inland from the more recent Quindalup Dunes. The chain of nearby lakes to the east of Samson Park (Bibra Lake, North Lake, South Lake and Lake Yangebup) form the boundary of the Spearwood and Bassendean Dune Systems. The Spearwood Dune System consists of wind-blown deposits (aeolianite) with a hard capping of calcite beneath varying depths of yellow or brown sand (Cottesloe Soil Association). Prevailing southwesterly winds have shaped the aeolianite parent material of the dune system at least during recent geologic times (Quaternary), producing distinct windward and lee slopes trending south-west (McArthur & Bettaney, 1960). This topography can still be seen in the area.

Soils of the area are podzolized (leached) sands, low in fertility, and mildly alkaline (pH 7-8). Originally these soils would have been calcareous to the surface, but continued leaching has precipitated calcium carbonate to the lower capping rock. Loss of iron from the soil also occurs with leaching. The soil in Samson Park is fairly shallow: in some parts of the park the cap rock is visible at the surface. Soil loss from erosion resulting from rabbit activity and excessive recreational pressure is thus a problem in areas to be revegetated.

The most important climatic factor affecting the area's soils is precipitation. Soils are heavily leached in winter and may even experience some waterlogging, then rapidly fall below field capacity after November. There is virtually no available soil moisture within several feet of the surface throughout summer (McArthur & Bettaney, 1960).

The combination of low soil fertility and severe moisture deficit for approximately six months of the year has several management implications. Indigenous vegetation of the area is adapted to these conditions and may be adversely affected by increasing soil moisture or fertility levels, for example in the vicinity of the central grass sward and stormwater discharge areas. Some of these effects are direct, as in the case of Proteaceae species (Banksias, Persoonias, Petrophiles), which are acutely sensitive to increased phosphate levels, or anecdotal evidence of Banksia species suffering from excessive watering over summer in Perth gardens (Beard, 1990). The most obvious indirect consequence of increased soil moisture and fertility levels is invasion of indigenous vegetation by weed species, which will produce vigorous growth under these conditions.

3.5 Vegetation

The vegetation at Samson Park is classified as Tuart-Jarrah-Marri Woodland. In the complex mosaic of dune soils of the Spearwood System the Tuart Forest Formation, with its component of extremely lime-tolerant species, intergrades with species found in the JarrahBanksia Woodland further east (Smith, 1973). Dominant overstorey species at Samson Park are Jarrah (*Eucalyptus marginata*), Marri (*E. calophylla*) and Tuart (*E. gomphocephala*). Samson Park retains a reasonable eucalypt cover despite the many fires of the last decade. Other metropolitan reserves, such as King's Park, have largely lost their eucalypt overstorey as a result of excessive fire frequency (Seddon, 1972). However, Tuart trees in the park have poor seedling recruitment, and mature Jarrah show signs of crown dieback, indicating some form of stress or disease. The combination of poor regeneration, disease and excessive fire frequency threaten the long-term survival of these eucalypts. The tall shrub layer is dominated by Candle Banksia (*Banksia attenuata*). Other major shrub species are Firewood Banksia (*Banksia menziesii*), Hakea prostrata and Sheoak (*Allocasuarina fraseriana*). There is one surviving Bull Banksia (*Banksia grandis*) in Samson Park. This species would once have been fairly widespread in the area, but appears to be sensitive to fire. There is no natural regeneration of this species, possibly because of self-incompatibility. This species has also not survived in revegetation plantings.

The lower scrub layer is dominated by Blackboys (*Xanthorrhoea preissii*), Dwarf Sheoak (*Allocasuarina humilis*) and Zamias (*Macrozamia riedlei*) in more intact vegetation, and Jacksonia stembergiana and Acacia pulchella in severely burnt areas. Jacksonia stembergiana appears to be a particularly vigorous post fire coloniser. The herb layer is dominated by sedge species, particularly *Mesomelaena pseudostygia*, *Hibbertia hypericoides*, *Daviesia nudiflora*, *Petrophile* spp. *Conostephium pendulum* and *Leucopogon* spp. There is a large component of geophytes which emerge every spring. These include Milkmaids (*Burchardia umbellata*), Bloodroot (*Haemodorum* ? *spicatum*), Kangaroo Paw (*Anigozanthos manglesii*), Fringe Lilies (*Thysanotus* spp.), and several orchid species (*Pterostylis sanguinea*, *Diuris magnifica*, *Caladenia* spp., *Microtis* sp., *Lyperanthus nigricans*). Introduced grasses form a major component of the ground layer. The most prolific of these are Veldt Grass (*Ehrharta calycina*), African Love Grass (*Eragrostis curvula*), Quaking Grass (*Briza* spp.), Rabbit-tail Grass (*Lagurus ovatus*) and Wild Oats (*Avena fatua*). Other major non-indigenous ground storey species are Pelargoniums (*Pelargonium capitatum*) and Lupins (*Lupinus consentii*) - see following section (3.6.1 Weeds) for further details.

A total of 122 species have been found in Samson Park, of which 82 (67 %) are indigenous and 40 (33 %) are exotic. A list of these species is given in Appendix 1. No declared rare or threatened species have been found in Samson Park. Determination of significance of species at a lower level (i.e. regional, local, disjunct or unusual occurrences) will be possible when CALM's Vegetation of the Swan Coastal Plain Report is published (D. Coates, W.A. Herbarium, pers. comm.). However, as this is the last remnant of Jarrah/Marri/Tuart woodland in the municipality, the vegetation has a great deal of local significance, and every effort must be made to conserve indigenous species. Priorities are species such as Tuart, Bull Banksia, Sheoak, Tangle Daisy, and many of the indigenous geophytes. These plants have small populations and poor recruitment in Samson Park, and are threatened by a number of factors. These species should be reinforced in revegetation planting and natural regeneration.

All vegetation in the park has been degraded to some extent by factors such as fire, trampling, vandalism, past use of off road vehicles in the park, rabbits and weed invasion. The condition of vegetation in the park was assessed and rated from severely degraded to good condition. Severely degraded vegetation is that where a significant component of all structural classes (trees, shrubs and ground cover) have been lost; degraded, where the over or understorey has been severely depleted; moderately degraded vegetation retains remnants of all structural classes, but is relatively species-poor and weedy; and good, where there is a reasonable diversity of species in all strata, and weed cover is not severe. This was only assessed visually; when a flora survey of the park is done, it would be possible to assess the vegetation more accurately. Figure 3 shows the condition of the park's vegetation.

Many of the Jarrah have dead "stag heads" and leaf discolouration. While this is common after heavy flowering and consistent with the effects of fire (K. McDougall, pers. comm.), the possible presence of Jarrah dieback (*Phytophthora cinnamomi*) in the park is of concern. Testing for *Phytophthora* was done a few years ago, with negative results. However, this organism is notoriously difficult to isolate, so these results do not necessarily mean that there is no disease in the park. Tree health should be monitored, and care taken to avoid possible contamination from infected plant material or mulch. Sudden death of susceptible species (Jarrah, Blackboys, Banksias) should be noted and roots of these plants tested for the presence of this pathogen.

4. EVALUATION OF RECOMMENDATIONS FROM 1989 & 1995 MANAGEMENT PLANS

Outstanding recommendations from the original Management Plan requiring further action include the following:

- monitoring program including: flora, fauna, weed infestations, effects of fire, vandalism, park interpretation, user impacts/requirements, stormwater quality;
- interpretation (some signage has been erected, but recommendations for brochures, resource centre and school involvement have not been fully developed).
- council should make funds available to implement an integrated weed control strategy (i.e. one which utilises a range of control techniques), targeting species which pose significant ecological risk and large unsightly woody species which destroy landscape character.
- a reference herbarium has not as yet been completed. This should be completed and include indigenous species as well as weeds to avoid repeats of this unfortunate occurrence. A good photographic reference collection would be a useful adjunct or alternative to the herbarium.

Problems include an over-reliance on often poorly-trained volunteers; lack of mulch or protection from rabbits or trampling; and lack of appropriate species selection (several of the species used are apparently not good colonisers, requiring greater shade to establish, and some are actually environmental weed species).

Some important elements of the vegetation (notably sedges) are entirely missing from revegetation plantings. Even in areas where revegetated cover is good, there are rarely more than five species established. The rationale of the revegetation program needs to be re-examined (see Section 4) and commitment of staff and other resources for the rehabilitation program increased.

A Friends Group was established in 1990 and has been very active in rehabilitation activities in Samson Park, as well as advising Council on this and other issues of concern for park users. The group has received excellent support from the Public Liaison Officers and other staff. However, the Friends have expressed concern at the inadequacy of funds to carry out restoration activities, and the lack of council staff on the ground.

A monitoring programme has not been implemented by the City of Fremantle as recommended. Specific areas which require monitoring include:

- a) flora and fauna found in the park
- b) weed infestation
- c) effects of fire
- d) vandalism
- e) permanent quadrats
- f) effectiveness of park interpretation programs
- g) user impacts and user requirements
- h) effectiveness of management strategies
- i) stormwater quality

None of the above have been addressed in any systematic way, although there is a good idea of the extent of most major weed infestations and their treatment! cover is informally monitored. Comprehensive flora and fauna surveys are recommended for the park. Refer to the Recommendations at Appendix 5.

These issues have been noted by the Fremantle city council and have been addressed in the recommendations section of this report.

5. MANAGEMENT ISSUES & PROPOSED STRATEGIES

5.1 Flora

Aims:

- enhance remnant natural vegetation in Samson Park and surrounding areas to conserve its indigenous fauna in the long-term
- improve the natural heritage, conservation and landscape values of the suburb of Samson, and the City of Fremantle

Small bush reserves such as Samson Park are typified by a large edge: internal area ratio. Edges of bush reserves are invariably the most degraded areas, due to the combined effects of weed invasion, stormwater quantity and quality, predation by domestic pets, trampling, and dumping of garden rubbish. Although the indigenous vegetation of the area is remarkably resilient to events such as fire and drought, increasing disturbance of the groundstorey, frequent fire and altered hydrological conditions predispose the indigenous vegetation to a greater risk of disease and favour the spread of invasive weed species. Whilst indigenous species are finely adapted to conditions of regular summer drought, poor nutrient status and occasional fire, most weed species are aggressive colonisers which survive a wide range of ecological tolerance and compete successfully for water, nutrients and space. Without persistent efforts at weed control, further degradation of native vegetation is inevitable. Loss of indigenous vegetation also means loss of habitat for indigenous fauna. While some species adapt to changes in vegetation, others with more specialised habitat requirements may decline in numbers or become locally extinct.

A rehabilitation program has been conducted in Samson Park since 1986, with the aim of conserving the area's indigenous flora and fauna. Revegetation has been carried out in severely degraded edge and disturbed internal areas with a poor cover of indigenous species. Where possible, local seed/ propagation material has been used. These efforts have been recognised by two major environmental awards: the John Tonkin Greening Award (Samson Primary School, 1991), and the state final of the National Landcare Award (City of Fremantle, 1993). Despite the significant progress achieved, it is important that the impetus of the rehabilitation program is maintained, as there are still areas of serious degradation within the park.

Rehabilitation of bushland areas with a history of continuing disturbance is a long and complex process. Previous revegetation at Samson Park has had mixed success (survival rates fluctuate between zero and roughly 50%) and there is nothing like a complete complement of original plant species in even the most successful revegetation plantings. Many of the revegetated areas now have good cover, but only a small selection of species have survived. Problems associated with revegetation are (1) some plantings are done largely by inexperienced volunteers; (2) insufficient resources allocated to cover mulch, plant guards and follow-up maintenance; (3) quality and availability of suitable planting stock (some plants in revegetated areas are not even indigenous to the area - eg. *Acacia podalyriifolia*, *A. celastriifolia*); and (4) insufficient resources given to maintenance and monitoring. Potentially useful trials of labour-saving techniques such as direct-seeding and mulching were abandoned for this reason.

The revegetation strategy of the original plan (Ecoscape, 1989) requires revision in the light of subsequent revegetation plantings and changed conditions, particularly the extent of rabbit damage in the western section of the park. The original revegetation plan consisted of two strategies: (1) in internal areas, replanting bare areas only, and allowing natural regeneration by removing stresses such as weeds and trampling; and (2) replanting highly disturbed, weed infested areas. A suggested "theme planting" of low shrubs was suggested for the park perimeter. Strategy one remains essentially sound, although the species list requires some revision; strategy two plantings have been less than successful. Edge areas receive a great deal of disturbance and trampling, and small, poorly marked small shrub seedlings have little chance of survival. A quick reconnaissance of the park boundary shows that people will enter the park wherever there is a large enough gap between bollards. However, in parts of the perimeter with dense, prickly vegetation (*Jacksonia sternbergiana*, *Acacia pulchella* and *Hakea prostrata*), there is virtually no unwanted traffic. These plants should form a component of edge plantings. (The intended effect is to channel people appropriately, not create a prickly, species poor hedge around the perimeter). More emphasis should be given in planting lists to strongly colonising groundcover species, particularly sedges, and to important overstorey species which show poor natural regeneration (eg. *Allocasuarina fraseriana*, *Banksia grandis*, *Banksia menziesii*, *Eucalyptus gomphocephala*). Reinforcing verge plantings with attractive, native low-growing shrubs would improve the aspect of the park from the street, and provide further habitat for small bird species. Where possible the verge should remain unplanted (with trees and shrubs) to facilitate clear vision and monitoring of the area for the protection of the park.

The previous flora survey of the park was not adequate to meet the objectives. A complete list of all species in the park, their relative abundance, recruitment/ regeneration, and patterns of distribution are required. This will indicate different vegetation types in the park (eg. areas on shallower soils with a greater component of Tuart), species characteristic of each, and should provide a good indicator of vegetation condition (eg. species-poor edges and frequently burnt areas, areas of significant weed invasion, relatively "intact" areas etc.). In areas where indigenous vegetation is not homogeneous, it is important to have such information to ensure that appropriate species are selected for revegetating a given area. It is also important to have accurate information

on the extent and location of weed infestations and the presence of any particularly vulnerable native species in weedy areas which may require special protection.

A thorough flora survey of the park should be conducted in midspring, when most species are flowering and geophytes have emerged. Series of 10m x 10m quadrats should be placed throughout the bushland and all plants within each quadrat recorded. Some estimate of cover (eg. 5 % of the quadrat area) would be useful, or for large species, actual numbers of each species recorded. For major woody species or species of particular significance, an indication of the amount of regeneration and the approximate age classes of each species would be useful to determine whether natural regeneration is adequate, or whether populations are likely to diminish in the long term without intervention. Once quadrat data is gathered, the data should be classified to show the different vegetation types present. This is done by sorting data into groupings of quadrats with similar species. Once the data has been sorted, an accurate vegetation map can be produced showing distribution of vegetation communities and areas of significant degradation.

Areas requiring rehabilitation works are indicated in Figure X. Degraded edge areas and very degraded/degraded internal areas are those requiring more urgent rehabilitation work. Different strategies will be required for different areas of the park, depending on the nature of the existing vegetation, the degree of weed invasion and the extent of traffic in these areas.

Priorities for revegetation are the severely degraded areas in the south-west portion of the park and north-eastern corner, the park boundary, and unwanted tracks within the bush areas (see Fig. 3). Efforts should concentrate on re-establishing groundstorey and shrub species. The tree cover overall in Samson Park is good, and Marri and to a lesser extent Jarrah are regenerating. However, there are several areas where the groundstorey is virtually non-existent, or is dominated by weed species. This component of the vegetation is particularly important for small bird species, invertebrates and reptiles, and modifies the microclimate near the ground to protect the root zone of larger species and provide more suitable conditions for seedling establishment. Shading by canopy species seems to provide relatively little insurance against weed invasion; a healthy, dense groundstorey component may be of more use in impeding further weed infestation.

Boundary areas are important as they are the points of entry into the park, and influence people's perceptions about the park. Greater respect for a park is given if people feel that management cares about appearances (Buchanan, 1989). At present, the verge is fairly unattractive, with struggling or dead street trees and poorly maintained turf. This either requires reticulation and more intensive management, or a different approach using clump plantings of existing indigenous trees and additional shrubs, without reticulation. Chip mulch would replace much of the turf. In a park such as this, where there are a great many users who use the most direct point of entry, whether a made track or not, a combination of planting, unwanted track closure, and signage to clearly mark entrances from the verge are required to prevent further trampling damage. Fast-growing, prickly species have proved particularly effective in restricting access along the park's eastern boundary. Suitable species are *Hakea prostrata*, *Acacia pulchella*, *Dryandra sessilis*, *Jacksonia* spp. and *Acacia lasiocarpa*. These species should be used in association with other suitable edge species, not planted as a species-poor "hedge" around the perimeter.

The area of severe degradation (see Fig. 3) has virtually no ground cover and is thus highly erodable. It is also extremely unattractive. As stated, rabbit control is the first priority for this area. Subsequent revegetation should concentrate on ground cover species which can cope with maximum exposure and drought tolerance. The few surviving sedge species (*Mesomelaena pseudostygia*, *Lepidosperma angustatum*, *Tetraria octandra*, *Loxocarya flexuosa*) should form the basic component of revegetation planting. Other species should include overstorey trees/shrubs (Jarrah, Tuart, Marri, Candle Banksia and Sheoak) and "coloniser" groundstorey species capable of coping with open and fairly hostile conditions. These include *Conostylis aculeata*, *C. candicans*, *Haemodorum spicatum*, *Hibbertia hypericoides* (although difficult to propagate), *Daviesia nudiflora*, *Dryandra nivea*, *Hardenbergia comptoniana*, *Hovea trisperma*, *Gompholobium tomentosum*, *Pimelea rosea*, *Petrophile linearis*, *Scaevola canescens*, *Helichrysum cordatum* (D. Brookes, no date). As sedge species are not regularly available from nurseries, it would be worthwhile to dig up some of these plants from nearby condemned bushland in Coolbellup and divide clumps. Stock for future plantings could be supplied on a contract basis by nurseries specialising in revegetation from local stock.

The park is riddled with unwanted paths and tracks which have destroyed native vegetation and are a source of potential soil erosion. Once established, these paths become more heavily used and increase in width, fragmenting the bush still further. As has occurred in the past, unwanted tracks should be closed, using a small barrier with appropriate signage (eg "Track closed for rehabilitation"). This could be as simple as a couple of uprights with the sign attached. This should be followed up with revegetation planting. Again, rapidly colonising indigenous species are required to revegetate paths quickly and discourage future access. For narrow, linear revegetation plantings such as these, there should be a greater emphasis on smaller shrubs and groundstorey species, as surrounding areas are generally adequate in terms of overstorey tree and shrub cover. Suitable species are *Acacia stenoptera*, *A. lasiocarpa*, *A. wildenowiana*, *Petrophile macrostachya*, *Dasypogon bromeliifolius*, *Alloeauarina humilis*, *Leucopogon* spp., *Persoonia saccata*, *Daviesia* spp.

Areas where intensive weed control is required (Fig. 3) should be revegetated as soon as possible after weed treatment to prevent re-invasion, vandalism and possible soil erosion. These areas should be revegetated with species from surrounding, less weedy areas.

Other areas for revegetation are the areas (Fig. 3) near the McCombe Ave/ McKenzie Avenue corner and the McCombe/ Sellenger Avenue corner, where there are thickets of senescent *Jacksonia stembergiana* and *Acacia pulchella*. Although the cover of vegetation is good in these areas, these plants are short-lived and already in decline. When these species die, they are likely to be replaced by more of the same, or by weed species, as there is little species diversity in these areas. The strategy for these areas is to work from within these thickets, pruning away growth from the inside and leaving a prickly edge to protect revegetation plantings of other species within. Prunings of this prickly growth can be used to lay across unwanted paths, of which there are many in the McCombe/ McKenzie Avenue corner.

The central turf sward effectively divides Samson Park into two smaller bush reserves, and substantially increases the edge areas, which are prone to greater disturbance and weed invasion. To minimise these problems, the boundaries of the turf sward should be clearly defined with a mulch border. Invading grass weeds from the sward should be treated with glyphosate (wick wiping would be most appropriate to avoid damage to both grass sward and native plants) and edges revegetated as necessary. Further clump planting at the McCombe Avenue entrance opposite Kanyana would reduce edge area and importantly, provide a more attractive entry statement for this very busy park entrance. Suitable species include Jarrah, Blackboys, Bull Banksia, Tuart, Sheoak, *Acacia stenoptera*, *Pimelea rosea*, *Hypocalymma robustum*, *Helichrysum cordatum*.

In all revegetation plantings stock should be of local provenance wherever possible. This ensures that planting stock will be well adapted to the soil and climatic conditions at Samson Park and should eliminate past problems with non-indigenous species (eg. *Acacia celastrifolia*, *A. podalyriifolia*) naturalising within the park. Where chip mulch is used, care should be taken that it is free from serious plant pathogens (i.e. sterilised if possible, or hot composted).

A zoning system for Samson Park may be helpful to protect areas of particular conservation significance, define rehabilitation areas, identify bushland areas capable of sustaining greater recreational use (hopefully minimising use conflict in bush areas), define the active recreational area, and provide a safe, dog-free play area for young children. These zones are shown in Figure 5. Different types and levels of use are appropriate in each zone. In areas of high conservation significance, tracks should be kept to a minimum, and dogs leashed. Fencing these areas may be appropriate if trampling or vandalism increases. As fence construction itself disturbs the vegetation, this should only be considered a last resort. However, consideration should be given to extending the bollards along the limestone path opposite Sowden Way, and along other major paths. The level of trampling in adjacent vegetation is significantly greater in the area without the protection of bollards. This treatment provides a sort of permeable barrier, still allowing some access. Rehabilitation areas require some protection while new plantings are becoming established. In these areas, some form of temporary fencing would be desirable, together with signage (eg. "Area under rehabilitation. Please do not walk on revegetation plantings"). Zoning must be clearly identified (eg. on a map at each main entrance and on the noticeboard) to inform park users of their responsibilities.

The terms "wildlife corridor" or "habitat linkage" are used to describe linear habitat which links more substantial areas of remnant habitat in a fragmented landscape. These corridors enable wildlife to move between larger habitat nodes and provide feeding and resting sites for nomadic or migratory species, alleviating some of the pressures on wildlife in isolated remnant vegetation. Examples of wildlife corridors are strips of remnant vegetation fringing waterways, strips of parkland, golf courses, or even well-planted gardens and verges.

While the issue of wildlife corridors may appear to be peripheral to the management of Samson Park, continued fauna loss from this and other isolated bushland parks in the region will be inevitable if habitat linkages between urban greenspaces are not reserved or created. The loss of indigenous species resulting from habitat fragmentation disrupts ecological processes, altering food chains, prey-predator relationships, nutrient cycling and pollination. Loss of understorey plants has been associated with decline in small insectivorous bird species such as thornbills and pardalotes, which in turn leads to severe insect irruptions, one of the causal factors of tree decline or dieback (Loyn, 1987). There is increasing interest from local government in developing such corridors to protect the conservation values of major bushland reserves (Majer & Recher, 1994; Appleby, Beardsell & McDougall, 1993). The State Government's Urban Bushland Strategy recommends establishment of Landscape Protection Zones in Town Planning Schemes to encourage conservation of remnant bush on private land, and the establishment of "Greening Plans" by local authorities (DPUD, 1993).

The suburb of Samson is bounded on three sides by major roads (South Street, Stock Road and Winterfold Road), which form an effective barrier to wildlife movement from adjacent areas. To the east is Alan Edwards Park (City of Melville), a linear strip of Public Open Space. Areas identified for habitat linkages to Samson Park are: Alan Edwards Park; verges in the immediate area of Samson Park; grounds of Samson Primary School and North Lake Senior High School; the verges of Stock Road (which already contains a wide strip of remnant vegetation) and other main roads; and residential gardens (Figure 6).

In the immediate vicinity of Samson Park, the verge planting should be supplemented where sightlines/powerlines and other services permit with indigenous trees and shrubs. Suitable species are those which conform to usual street tree requirements (i.e. do not unnecessarily obstruct paths, sightlines etc., are relatively maintenance-free, and are aesthetically suitable). Examples are *Banksia menziesii*, *Banksia attenuata*, *Banksia grandis*, and some of the smaller shrubs (eg. *Hypocalymma robustum*, *Acacia lasiocarpa*, *Acacia wildenowiana*, *Conostephium pendulum*, *Hovea trisperma*, *Daviesia* spp.)

5.2 Fauna

Aims:

- to maintain and, where possible, increase the faunal diversity of Samson Park
- to provide a diversity of habitat for indigenous fauna species

As yet, no comprehensive fauna survey of Samson Park has been undertaken. However, a zoologists' report (Majer & Recher, 1995) was commissioned for the purposes of the first revision (1995) of this Management Plan to provide information on the types of fauna which could be expected to use Samson Park, their habitat requirements, the effects of frequent fire, and strategies which could be employed to maintain and if possible enhance the faunal diversity of the area. This section of the Management Plan is basically a synopsis of Majer & Recher's report, and includes information from the original Management Plan (Ecoscape, 1989).

Bird species have been recorded for the original Management Plan (Ecoscape, 1989). Mrs. Barbara Parker of the Friends of Samson Park has been counting bird species and numbers in Samson Park for several years for RAOU records. As a consequence, there is a good deal known about the park's avifauna. 51 bird species have been recorded from Samson Park (Appendix 2). Of these, 10 are regarded as uncommon in the Perth area (Majer & Recher, 1995). A number of other species listed as rare/uncommon are possibly aviary escapes or have been misidentified (P. Anson, RAOU, pers. comm.; Majer & Recher, 1995). The diversity of bird species is slightly higher than that recorded over a period of 60 years in a longitudinal study of the birds of King's Park (Recher & Serventy, 1991). This indicates that despite its relatively small size, Samson Park is an important bushland remnant for birds in the Perth region (Majer & Recher, 1995). From the King's Park study, it is likely that species such as the White-browed Scrubwren (*Sericornis frontalis*), Broad-tailed Thornhill (*Acanthiza apicalis*), Splendid Wren (*Malurus splendens*), Black-capped Sitella (*Daphoenositta pileata*), Golden Whistler (*Pachycephala pectoralis*), Western Yellow Robin (*Eopsaltria griseogularis*), and Scarlet Robin (*Petroica multicolor*), all of which occur in the type of habitat provided by Samson Park, are likely to have become locally extinct. These species, which were all recorded at King's Park in the late 1920s, have either disappeared or declined in abundance at this site (Recher & Serventy, 1991).

To maintain the present diversity of bird species in Samson Park and to maximise the chances of survival of the less common small, ground-foraging birds, their habitat requirements must be taken into consideration when designing the rehabilitation strategy.

Specific habitat requirements and other notes regarding the bird species found in Samson Park are given in Appendix 2.

The original Management Plan (Ecoscape, 1989) lists only two species of reptile found in Samson Park, bobtails and dugites. The actual figure is likely to be considerably higher, as many species are cryptic, or active at night. Samson Park should provide adequate reptile habitat in the form of logs, woody debris and a mosaic of dense tree/shrub cover and more open vegetation. The recommendation for improving bird habitats will generally improve reptile habitat also. Road kills are a significant cause of reptile and other wildlife decline in urban areas. Installation of additional wildlife warning signs, prompt replacement of damaged/stolen signs, and traffic calming measures in the immediate vicinity of the park are recommended (Majer & Recher, 1995).

The only remaining native mammals in Samson Park are Brush-tailed Possums and possibly bat species. It is likely that the possum population has declined over recent years. Regular park users and nearby residents had not seen possums for a considerable time (D. Parker, pers. comm.) until a recent spotlighting visit, when two possums were found in the south of the park. Generally, possums are only found in the larger metropolitan parks, such as King's Park or Bold Park. It may not be possible to sustain possums in Samson Park in the long term (Majer & Recher, 1995).

Large birds and mammals need large habitat areas for their feeding and other requirements. Many mammal species have disappeared from urban areas as bushland has become increasingly fragmented, leaving small remnant patches. The size of many of these remnants is insufficient to sustain the larger species and higher order predators, which depend on large populations of smaller species for their food requirements. At the lower end of the food chain, invertebrates generally can persist in much smaller areas than vertebrate species. Samson Park would sustain in the order of 700 invertebrate species and up to 80 ant species are likely to occur in the park. As Samson Park is the only sizeable woodland remnant in the Fremantle area, it is highly likely that the park contains the only surviving representatives of some invertebrate species. Again, the habitat recommendations

given above should also benefit invertebrate species (Majer & Recher, 1995).

The effective habitat area of Samson Park could be considerably increased by sympathetic planting in adjoining gardens, reinforcement of verge plantings, and the instigation of habitat linkages within and beyond the municipality (Majer & Recher, 1995). This is discussed in detail in Section 3.10 (Habitat Linkages).

5.3 Fire Management

Aims:

- to protect life, property, environmental and community values in the park and surrounding areas
- to minimise the incidence and impact of uncontrolled fires

Like many other small bush remnants, the vegetation at Samson Park is frequently burnt as a result of accident and arson. Since 1983, when W.A. Fire Brigades records for the area commence, there have been 17 fires in Samson Park. (This figure does not include some of the smaller "spot" fires). Most fires occur in summer, when weather conditions favour the spread of fires and litter levels are high. A series of overlays compiled from only some of the fire reports over a decade, indicate that the entire area of the park has been burnt at least twice in this period, and that certain sections of the Park (particularly the western portion) have been burnt with alarming frequency. The number of large fires has decreased since 1993, probably as a result of residents' prompt response and access to reticulation controls. Fire records for the park are given below:

2002 - major fire, 1 adjoining house burnt

1995- Feb: small fire; March: two spot fires

1994- March: cool burn; Dec: spot fire

1993 - no fires

1992 - no records available 1991 - 2 fires, Jan. & Feb.

1990 - Jan. - two fires; Feb. - 5ha. burnt

1989 - no records available

1988 - 4/9 rubbish fire; 8/9 grass fire, 14/12 grass fire

1987 - no fires

1986 - no fires

1985 - 3/2 grass fire; 9/8 grass fire

1984 - 10/11 grass fire; 28/10 major fire (covered entire park); 2/12 grass fire; 10/12 grass fire

1983 - 6/12 grass fire

Until 1987, Samson Park experienced regular control burns to reduce the risk of wildfire. Firebreaks (i.e. strategic clearing by rotary hoeing) were also maintained through the park until this time. Concern about the frequency of fires other than control burns and the ecological effects of these fires prompted the decision to suspend these activities. A total fire ban was imposed on the Park in the original Management Plan for a period of 10 years (i.e. until 1999).

The primary concern in fire management in built up areas is the risk to life and property. This was the reason for regular control burns in the park. The risk of large, hot fires threatening surrounding homes has abated due to the frequency of fires in the last decade (this has reduced fuel levels) and the construction of a network of crushed limestone and compacted chip paths, which are effective fire breaks. While fire frequency remains at recent levels (an average of two fires per year), control burning is clearly unnecessary and would cause unacceptable damage to native flora and fauna, as well as landscape values. Obviously, some risk remains, and the total fire ban should be periodically reviewed in light of fire incidence and major changes in fuel levels. The expertise of the local fire brigade and an ecologist with experience in fire ecology should be sought.

Fire is considered a normal and recurrent event in Eucalypt/ Banksia woodlands and much of the flora of this vegetation type is adapted to survive fire. Periodic fire has many beneficial effects, stimulating seed production, opening the canopy for germination of herbaceous species, rejuvenation of resprouting species and removal of diseased or dying growth. However, if the interval between fires is insufficient for adequate regeneration, native flora and fauna become severely depleted, soil organic matter is destroyed, and nutrient cycling and other ecological processes are disrupted. Fire also has devastating effects on the aesthetic and amenity values of the landscape.

Frequent fire interrupts the reproductive cycle of many woody species, which may take several years to grow from seed to a reproductive stage, or to regenerate vegetatively to a stage where fertile seed is set. Ideally, fire

should be excluded from a vegetation community until the slowest-growing obligate seed regenerating species has produced at least one viable seedlot (Moore & Graham, 1985). If the interval between fires is less than this period, localised extinction of slowly regenerating species is likely. This is the likely fate of Bull Banksias (*Banksia grandis*) in Samson Park. In a study of post-fire regeneration in King's Park, Baird (1977) noted local extinction of weak resprouters (*Hovea*, *Pimelea* and *Phyllanthus*) and elimination of fire-sensitive species (*Acacia pulchella*, *Gompholobium tomentosum*) with annual fire.

Destruction of habitat by frequent fire also results in a decrease in faunal diversity (Bamford, 1985, Bamford & Dunlop, 1983; Majer, 1985). Although some species of reptiles and birds rapidly recolonise dense low regrowth, there is initial species loss, with variable recovery times. Small mammal populations are particularly vulnerable to this form of habitat degradation (Bamford, 1985). Since publication of the original Management Plan in 1989, numbers of Brushtail Possums (*Trichosurus vulpecula*) have declined to the point where they were thought to be locally extinct. However, two were discovered during a recent spotlighting. Even birds, which are comparatively mobile in the event of a fire, lose canopy cover required for nesting, feeding and shelter. Populations may take three or more years to recover after each fire (Bamford, 1985). Recently burnt habitats favour opportunistic pest species such as the House Mouse (*Mus musculus*), which appears to be a particularly successful post-fire coloniser (Bamford & Dunlop, 1983, Bamford, 1985).

Frequent or very hot fires cause significant damage to the tree canopy and remove understorey cover. This enables more light to penetrate and opens niches for seedling colonisation. In degraded habitats weed species rapidly recolonise bare ground in the absence of competition from slower-growing indigenous species. Post-fire weed growth depresses regeneration of indigenous species, as weeds are better able to compete for available water and nutrients.

5.4 Weed management

Aims:

- to conserve the indigenous vegetation of Samson Park
- to control and where possible eradicate environmental weeds from Samson Park, giving priority to species which constitute a major environmental problem
- to ensure prompt rehabilitation of areas disturbed by rabbit control, weed control or other park activities
- to promote the issue of environmental weeds in interpretation material

Weed invasion is a major problem in small bush reserves such as Samson Park, which typically have large edge areas, a high level of disturbance, altered fire and hydrological regimes, and predominantly exotic plantings around the perimeter of native vegetation. Weeds successfully compete against indigenous species for space, water and nutrients. Weed species typically have a wide ecological tolerance (i.e. can survive in a wide variety of habitats), successful breeding and dispersal mechanisms and rapid growth rates which enable them to out compete many indigenous species. The latter are finely adapted to their environment, but may be adversely affected by various forms of disturbance, alteration to water or nutrient status, or changes to fire regime.

These ecosystem changes further alter conditions in favour of weed species. A good example of this is the problem of Veldt Grass (*Ehrharta calycina*). This species is highly flammable and germinates profusely after fire, increasing fuel levels further (Wycherley, 1983). Control of this species is therefore a priority of the weed control program for the park.

Environmental weeds are plants affecting the conservation values of environmental reserves. Western Australia has no less than 458 species which are considered environmental weeds (Keighery, 1991), including the well-known noxious weeds of agricultural situations, widespread species such as Wild Oats or Fleabane, and a growing number of ornamental species such as Gazanias and Freesias. It is important to note that not all weed species are what most people would refer to as 'exotic'. Native species outside their usual environmental range have in some cases become serious weeds of bushland reserves. Examples include several Acacias (*A. baileyana*, *A. dealbata*, *A. podalyriifolia*) Geraldton Wax, Coastal teatree and even eucalypt species outside their normal geographic range (Keighery, 1991). Many garden species have become significant weeds of bush reserves. This may be caused by dumping garden rubbish (this is the likely source of Gazanias in Samson Park), or by wind or bird dispersal of propagules (eg. figs, Cape Lilac). The issue of appropriate plantings in close proximity to Samson Park should be a focus of the interpretation program. Council should also ensure that verge plantings are of indigenous species, or species which will not escape into bushland.

Weed control strategies in bushland areas should cause as little disturbance as possible, and be as selective as possible to minimise damage to indigenous species. Selectivity can be controlled by the physical method of removal (hand-pulling, slashing/whipper-snipping flowering heads, ring-barking), type of herbicide used, the application method (cut-stump painting, drilling/filling with herbicide, wick-wiping), and the time of year (related to flowering/ seed set) control is carried out. Obviously, physical means of removal are regarded as more environmentally acceptable than the use of herbicides. However, for many weed species, herbicide

treatment is the most effective means of control. Where possible, herbicides should be applied by wicking rather than sprays, and where the latter are used appropriate safeguards (nozzle cones, avoiding spraying on windy or hot, still days) are necessary. Only post-emergent ("knockdown") herbicides should be used, as residual herbicides (eg. atrazine) persist for long periods in the soil and affect germination of both weeds and native species. Vegetable dye should be mixed with the herbicide to easily identify areas treated, and avoid non-target species. Areas where weed control activities leave large areas of disturbed ground must be revegetated as soon as possible to avoid soil erosion and re-invasion.

Weeds such as Black Flag and Geraldton Carnation Weed (*Euphorbia Terracina*) are becoming a larger issues than they have been in the past and will require inclusion in the future management plans.

It is imperative that Council staff and volunteers have some training in safe herbicide use, plant identification and bush regeneration techniques.

Monitoring of weed infestations is essential to ensure that the control methods used are effective, that non-target species are not adversely affected, and that new infestations are identified and eradicated before large infestations occur. This can be a simple visual assessment. To determine the effectiveness of weed treatments, a small quadrat (eg. a square metre), permanently marked, should be placed in the area of infestation and the number of target weeds counted. A quick visual check of possible effects on native species can be done at the same time. This needs to be done once a year, preferably early the following spring, when all annual species are present, and prior to the next season's weed control efforts. It is particularly important when using herbicides which have not been tested in non-crop situations (eg. Fusilade) to carefully assess the health of indigenous species. Fusilade, for example, is prescribed for control of a wide range of grasses and monocot weeds, and has some effect on Weeping Grass (*Microlaena stipoides*) and Spear Grasses (*Stipa* spp.; Bob Dixon, pers. comm.), both of which are likely to occur in Samson Park. Regular weed inspections during the growing season are useful to determine optimum times for control, as there may be significant seasonal variation in flowering times and seed set.

Exotic species constitute approximately 33% of Samson Park's flora. Clearly, total weed eradication would be an enormous and probably unfeasible task. A weed control strategy is needed which targets particular problem species and focuses on eradication of smaller outbreaks before a major infestation occurs. This is outlined below.

1. Large, woody species (Fig, Lantana, Japant:st: Ptpper Tree, Getaldton Wax, Mt. Morgan Wattle, White Cedar).

These species have a major visual impact on the bush landscape, and have the capacity to invade large areas of the Park if left unchecked. Fruit of the fig, lantana and Japanese Pepper Tree are dispersed by birds, so infestations are likely to be recurrent. An effective treatment of most woody species is to cut the stems and paint immediately with undiluted glyphosate, triclopyr or other suitable herbicide. This treatment usually prevents further suckering, which has occurred with figs near the southern entrance to the park. For particularly persistent species, it is more effective to drill several large, downward-angled holes around the trunk circumference and fill immediately with undiluted glyphosate ("drill and fill"), or "frill" the circumference of the trunk with a tomahawk and apply neat glyphosate to the exposed cambium.

2. Species which constitute a fire risk (Veldt Grass)

The current spraying program with fluazifop-butyl (Fusilade) should be continued. Two sprays per year are recommended: the first in late July, the second in August (Bob Dixon, King's Park, pers. comm.)

3. Highly invasive species (Pelargonium, Lupin, Oxalis, Gladiolus, Watsonia, Freesia, Fleabane)

Pelargoniums are a vigourous, deep-rooted resprouting species. Hand-pulling is effective so long as the entire plant is uprooted: root fragments left in the ground are capable of resprouting. Spraying with glyphosate, even with a wetting agent has not been particularly effective, probably due to the hairy leaf surface of this plant.

Lupins are a hard-seeded leguminous species which set prolific seed. Seed remains viable for long periods in the soil, so infestations of this species are particularly persistent. Germination is stimulated by fire and other disturbance. Past "Lupin Days" have restricted the spread of this weed, but significant infestations remain. Further hand-pulling in winter, before seed is set, will be necessary, as will regular monitoring to ensure that there are no new outbreaks.

Species with bulbs, corms or other underground storage organs (eg. Oxalis, Gladiolus, Watsonia, Freesia) are often difficult to eradicate by hand-pulling, as bulbs and corms frequently break off when plants are uprooted and will resprout the following season. Selective herbicide treatment with a translocatable herbicide (eg. glyphosate) is a suitable treatment. (Although there are other translocated herbicides registered for Watsonia control, which are effective (eg. 2,2-DPA), the potential for damage to native lilies, grasses and other monocots is significant, and this particular herbicide is considerably more toxic to humans and other animals). Spraying should take place just before the plant flowers. This ensures that the herbicide is effectively absorbed and that

the bulb is poisoned at a time when most of its carbohydrate reserves have been used, so that it will be unable to regenerate. A little-used, but promising treatment is to bum plants using a blow-torch. Burning should take place after flowering and before seed ripening. Again, this stresses the plant at a time when carbohydrate reserves in the bulb are depleted.

Fleabane is probably one of the "lesser" weeds of the park, but seeds prolifically, and can form quite large clumps. This weed can easily be uprooted. This should be done before seedset. As seeds can "after-ripen", plants should be bagged and removed from the site.

4. Small, localised infestations of potentially invasive species

Treatment of localised infestations is the most effective weed control strategy. Infestations are eliminated before they become extensive, and disturbance of indigenous vegetation is minimal. Examples of this type of control strategy would be the removal of the Geraldton Wax on the southern boundary (Sellenger Avenue) before seed is produced, and the removal of small clumps of Gazanias and Valerian, particularly in areas adjacent to the turf sward, where growth is most vigorous.

5. Grass species (other than Veldt Grass)

The major problem weeds in this category are Couch, Kikuyu and Buffalo Grass, all of which are components of the turf sward in the centre of the park. These are rhizomatous species, which are characterised by extremely vigorous vegetative propagation. Their spread is encouraged by watering, fertiliser application, and disturbance. The extent of the turf boundaries results in a persistent problem with these species. The width of sprinkler coverage was adjusted some time ago to minimise this problem, but no monitoring has taken place to determine its effectiveness in controlling the spread of Couch and Kikuyu into surrounding bushland. Wick-wiping of these species with glyphosate is required in these boundary areas. A longer-term strategy is necessary to prevent further serious edge invasion. Mulching to define edges for maintenance crews and restrict weed growth, and rehabilitation of edge areas with dense plantings of indigenous species are recommended. Other "spot" infestations in the park resulting from garden dumping should be treated by wick application of glyphosate as required.

Other grass weeds requiring control are Wild Oats, Quaking Grass (*Briza maxima*), Shivery Grass (*Briza minor*) and African Love Grass (*Eragrostis cun'ula*). With a tall-growing species such as Wild Oats, it is possible to adequately control small infestations by simply cutting / whipper-snipping flowering heads before seed set. Fusilade, Sertin (sethoxydim) or other post-emergent grass selective herbicides and glyphosate should be suitable for chemical control should labour be unavailable for hand removal. *Briza* species are lowgrowing and are capable of rapid colonisation of the ground storey (Carr, 1993), so these species should be monitored carefully. Herbicides registered for *Briza* species are not suitable for use in bush reserves (Inkata, 1987). Hand-pulling or trials with suitable post-emergent grass herbicides (eg. Fusilade, Sertin) are recommended.

The importance of follow-up weed control and subsequent revegetation must be stressed. Many grass weeds exhibit some form of seed dormancy. This means that each season, a proportion of the seed is stored in the soil. Over time, a large amount of seed builds up in the soil, which can lead to significant weed infestations. This is another instance where a good monitoring program will avoid major weed infestation. In areas cleared of weeds, re-vegetation and mulching will restrict weed invasion.

5.6 Feral Animals

Aims:

- to control and where possible eradicate feral animals in Samson Park
- to minimise potential impacts of feral animal control on the park environment, staff, visitors, neighbours and domestic pets
- to minimise the problems caused by domestic pets in Samson Park

The rabbit problem in Samson Park has been a fairly recent occurrence (D. Parker, pers.comm.). No mention of a significant rabbit problem was made in the original Management Plan, although rabbits were included in the species list (Ecoscape, 1989). Within the last few years the rabbit population has increased and is causing considerable damage to the Park. Indigenous seedlings and revegetation plantings are being destroyed by rabbits and significant areas of bare ground are being created as a result of vegetation removal and warren construction. Rabbits also compete for resources (food, shelter) with remaining indigenous wildlife, causing further populations declines.

Samson Park provides a particularly favourable environment for rabbits due to the large central irrigated turf sward. While the usual breeding season for rabbits in rangeland situations occurs in winter/ spring when there is ample food and soil moisture for burrowing, a site such as this could possibly sustain breeding for a more

extended period (Filsell, 1995). A control program is now underway at the Park. Briefly, this involves fumigating warrens with phosphine gas and subsequent warren destruction. This will take place after the first rain, coinciding with the main breeding season. Phosphine fumigation was seen to be the safest and most effective of available control treatments and cause least damage to wildlife or domestic pets. While this method should be effective in controlling the existing population, rabbit populations from surrounding areas are liable to re-invade the Park. Follow-up monitoring of warrens/ rabbit numbers will therefore be essential to longer term control of the problem and further control measures may be necessary (Filsell, 1995).

Domestic cats are a major threat to wildlife in Samson Park. It is important that residents be informed of the extent of the problem and be encouraged to attach bells to their cats' collars and keep their animals inside or penned overnight. The only alternative to voluntary cat curfews is to erect cat-proof fencing around the perimeter of Samson Park. This has been used to good effect in small suburban reserves in Victoria, but is extremely expensive and aesthetically undesirable.

Although dogs do not pose as great a risk to wildlife, they are capable of killing native species, and leave scent trails which deter native animals. Dogs may also be a minor cause of disturbance to ground-layer vegetation. As Samson Park is the only dog exercise area available in the suburb, excessive regulation of dogs in the Park is undesirable. However, owners should be encouraged to leash dogs in bush areas. In areas of particularly high conservation value, dogs should be excluded.

Another pest animal in Samson Park is the honey bee. Bees have invaded all the nest boxes in the park and hives are found in many tree hollows. Although honey bees are important pollinators, their occupation of many of the available tree hollows in Samson Park restricts habitat for possums and hollow-nesting bird species. A potential control for bees in nest boxes is the use of acephate, an organophosphate compound, administered as a sugar bait. This can be placed directly in the hives, requires only 30 minutes' exposure and breaks down rapidly (within one week). This minimises exposure of non-target species (Williams et al., 1989). The Department of Agriculture is interested in conducting trials of acephate and Samson Park would be a suitable site (Rob Manning, Department of Agriculture, pers. comm.). Adequate safeguards would need to be taken (eg. screening hive entrances) to further minimise risk to non-target species. Trials should preferably take place just before birds would occupy hollows for breeding. Involvement with CALM Wildlife Branch, Dr. Jonathan Majer, an entomologist at Curtin University and author of the fauna report for Samson Park (Majer & Recher, 1995) is recommended.

5.7 Environmental Education & Community Involvement

Aims:

- to promote Samson Park as an educational resource;
- to educate visitors and the local community of the values of the park;
- to encourage community involvement in the rehabilitation of Samson Park.

Bush reserves such as Samson Park are an invaluable educational resource for local children, students and the wider public. They allow a glimpse of what the landscape was like before European settlement, and are refuges for indigenous flora and fauna. Children (and adults) can learn at first hand about native plants, animals, and ecological processes. Bush remnants can also provide an insight into the life of the Nyoongah people before European colonisation, and are a reminder of how drastically the landscape has changed since European settlement. Interpretation programs, which inform park users about the park's environment and appropriate park usage, are a vital facet of park management.

In 2004, the City of Fremantle commissioned Karen Hethey and Francis Italiano to write an environmental booklet on Samson Park. This booklet is titled "Samson Trek – Site 59" and is aimed at informing children about Samson Park. It also encourages the children to walk through the park and find the flora and fauna included in the booklet. This booklet has been revised recently and it will be used as part of the Fremantle Children's Fiesta 2005 as well as an ongoing environmental program with the local schools.

Community concern with environmental issues has also had a major impact on the management of bush reserves. Over the past few years, numerous 'Friends' groups have sprung up to assist in the management of these areas, among them the Friends of Samson Park. This and other groups provide invaluable volunteer labour, local knowledge and expertise to deal with bush rehabilitation. Such groups have an important custodial role to ensure the long-term conservation of bush reserves.

Samson Park is fortunate in having an energetic and committed Friends Group. This group holds regular meetings to advise Council on matters relating to Samson Park and has regular busy bees to assist with revegetation, weeding, rabbit control, rubbish collection and other practicalities. However, membership of the group is small, and the tasks facing the group are enormous. With such groups, there must be good support in terms of money and staff assistance from the managing body, or the line between community involvement in park management and exploiting the community resource becomes blurred. Staff support for the Friends Group

has been extremely good, but budgets for restoration activities, basic maintenance and upgrading play equipment have been lower compared to other large reserves in the municipality. It is disheartening for volunteers (particularly schoolchildren) to see their restoration efforts degraded through lack of basic maintenance or vandalism.

This aside, the park user survey in 1995 indicated that a number of residents who would be interested in participating in the Friends Group. Some residents who do not belong to the Friends Group act as park custodians, picking up rubbish and replacing plant guards etc. within the park. Reasons for not joining the Friends Group (other than lack of time or interest) were that people were unavailable on Sundays (when busy bees are scheduled) or are unfit for physical activities such as weeding, planting or rubbish removal. To encourage membership of the group, the activities of this group could be expanded to include putting together interpretation material (history, flora, fauna, photography), completing the park's herbarium, monitoring flora and fauna, and holding occasional community days in the park. Keen local photographers/ artists could be encouraged to provide material for posters, photographs to assist with weed/ native plant identification, and other interpretation material. Planting and weeding days are a good opportunity to inform people about different aspects of the park environment. It is important to keep an educational focus for Friends activities to raise these efforts above the level of just "hard slog", and keep members enthused.

5.8 Access and Tracks

Aims:

- to minimise further degradation from unwanted tracks through bush areas
- to provide a track network which caters to the needs of both active and passive recreational park users

The number of tracks through Samson Park's bushland has proliferated to such an extent that quite large areas of vegetation are being seriously degraded. This is readily apparent from aerial photographs of the park, taken in 1991 and early 1995. This destroys habitat and seriously disturbs nesting of several bird species (Majer & Recher, 1995). Much of the damage is caused by "off-track" traffic: short-cuts from the verge, between defined paths, or to facilities such as the toilets and basketball pad. No new tracks have been formed recently, and some of the tracks on the eastern side of the park do not seem to be as well used as in the past. A few tracks have been closed for revegetation. Despite these encouraging signs, most of these dirt tracks are still frequently used and trampling and erosion are increasing. Many of the paths which have been formed on the western side of the park are from easy access areas along Sellenger Avenue, McKenzie Road and part of McCombe Avenue. These access tracks occur in areas where there are wide gaps between bollards and sparse vegetation.

Signage is needed on the verge to indicate where track entrances are located (this is difficult to see in some instances) and to emphasise the importance of keeping to defined paths wherever possible. The most obvious reason for the relative lack of tracks on the eastern side is the dense, prickly thicket of post-fire regeneration (most of it *Jacksonia sternbergiana*). Revegetation of edge areas should include a component of prickly indigenous species to deter unwanted traffic. Smaller tracks could be closed using prunings of some of these dense thickets required in the rehabilitation program. Branching tracks from the main paths may be minimised by using bollards along the edges of main tracks. This has been used to good effect on the limestone path near Sowden Way. Where the bollards disappear, there is a marked increase in trampling damage. Bollards channel traffic along the path, allowing access beyond, but providing some deterrent to those who would otherwise cut across the vegetation. In all but the most sensitive areas of the park, this is preferable to fencing off areas.

Some of the larger tracks are duplicated on a very close scale by firebreaks or well-worn access routes. Other made tracks avoid obvious "desire lines", with the result that there are numerous branches off these paths. The number of intersecting paths in the western section of the park and a small area to the east near the WAWA compound have produced a series of extremely degraded, eroded areas at each intersection. Vegetation is fragmented and trampled as a consequence. These tracks could be further rationalised, taking into account "desire lines", obvious lines of sight, and existing firebreaks and defined as described above by bollard edging.

There is some weed growth on the newly-surfaced mulch tracks. This will eventually need control by additional mulch or possibly spraying. A less labour intensive solution in the long term may be replacement with crushed limestone, although it is less "natural" looking.

The central grassed strip effectively divides the bush reserve into two separate areas, which has increased the proportion of disturbed edge areas. To small animals and heavier plant propagules this central strip forms an uncrossable barrier. With such small populations of species, this limitation to gene flow is significant (Majer & Recher, 1995; B. Keighery, EPA, pers. comm.). As this area is very important to recreational use of the park, it would be inappropriate to substantially revegetate this area. However, an increase in clump plantings of indigenous species in this section, particularly near the north and south entrances to the park, would improve both habitat and landscape quality.

5.9 Interpretation

Aims:

- to provide information and recreational experiences which allow visitors to discover, understand and enjoy the natural environment of Samson Park
- to encourage responsible park usage and minimise further degradation caused by inappropriate activities within Samson Park
- to integrate interpretation of Samson Park through the use of the track network, community noticeboard and Kanyana Centre

Interpretation is a broad term covering a variety of means used to convey information about a park or reserve to the public. This includes signage, brochures, other educational material and guided walks. The objective of an interpretation program is to assist park visitors to develop a greater awareness, appreciation and understanding of the reserve, and encourage appropriate park usage.

As yet, no integrated interpretation program has been developed for Samson Park. There are a number of excellent signs informing visitors about several of the plants of Samson Park, and other more utilitarian signage. To develop the program further, additional signs are needed along tracks with information about all aspects of the park environment: fauna, flora, ecosystem processes, habitat protection and management issues (eg. weed control, fire, tracks). As well as being informative, each sign should encourage park users to "do their bit" toward protecting the park environment: 'keeping to tracks, putting rubbish in bins, keeping control over dogs etc.. It is important that signage conveys a positive message, rather than being unduly regulatory or officious. From some of the comments on the questionnaires distributed to residents, some people have little understanding of appropriate park usage. There were several comments about not being able to walk directly from their favoured approach into the park, without any consideration of the number of tracks this would entail. Signage on the verge clearly indicating track entrances and including a message regarding the damage caused by uncontrolled trampling is needed. There were also several comments about "messy" undergrowth and unpruned trees and shrubs. Signs along major paths should emphasise the importance of Samson Park as a refuge for native fauna, and explain about habitat requirements such as tree hollows and dense groundcover for ground foraging animals. Prickly shrubs (another source of complaint) offer protection for these small animals from wandering cats or dogs.

More use should be made of the main noticeboard in the Park. This could be developed as a general community bulletin board, with general information about the park (history, flora and fauna, conservation values, role of Friends' Group, and appropriate park usage). One survey respondent suggested a map of the reserve with walking trails, indicating points of interest along the way.

The interpretation program could better utilise Council's Kanyana Recreation Centre, located opposite Samson Park. This venue would be suitable for a permanent poster display promoting Samson Park's natural and recreational values, and would be a convenient place to distribute brochures and information on Friends' Group activities. Regular walking groups, occasional nature walks and "environmental" holiday activities could be included in Kanyana's program. Suitable after school/ holiday activities could include: spotlighting for possums, bats, owls and rabbits; dawn/dusk bird walks, washed down by damper and billy tea; animal tracking (looking for tracks, scats, pellets, skins and listening for calls); and walks showing how the Nyoongah people used and looked after bush plants. It is important that local children develop an appreciation of this very special bush reserve and treat it with respect. It is a resource which appears to be under-utilised by local schools. Council should encourage involvement of schools in park activities and use of the park as an environmental studies resource.

Other avenues for promotion of Samson Park and specific activities (eg. Wildflower Walks, Busy Bees etc.) are through Port City News and press releases.

5.10 Recreation

Aims:

- to provide a variety of pleasant recreational experiences for park users, consistent with the environmental objectives for the park
- to provide safe and stimulating play areas for children of all ages
- to minimise conflict between dog exercise and other recreational use of the park
- to encourage appropriate recreational use of bush areas
- to minimise degradation of the park through vandalism and other inappropriate activities

Samson Park is the only public open space in the suburb of Samson, and apart from Kanyana, is the only recreation facility in this suburb. It is intensively used: from survey figures alone, over 90 people use the park each day.

Samson Park has been managed to provide a range of recreational experiences. Its unique quality is its bushland setting. This allows a wide range of recreational opportunities which are often lacking in urban areas. Many of the respondents to the Samson Park questionnaire commented that they love the park because they feel that it is a place where they can temporarily escape from suburbia and experience the tranquility, sights, sounds and smells of the bush. It is a place where city dwellers can conveniently go bushwalking and birdwatching, enjoy the beauty of wildflowers and generally appreciate what nature has to offer. For youngsters, the bushland at Samson Park offers an exciting place for unstructured, imaginative adventure play. This opportunity is too often lacking in urban environments, typified by small pockets of public open space; standard, safe but dull play equipment, and busy roads nearby. Urban bush areas are also important for the recreational experiences of adolescents, a group considered particularly "at risk" of depression and poorly catered for in terms of recreational needs (Owens, 1994). In a study of the recreational patterns of teenagers, this author identifies their primary needs as private places to "hang out" with friends; quiet, secluded places for contemplation ("look-outs"); and areas for active recreation (skateboard ramps, basketball pads, areas for roller blading etc.).

The central turf area is used for a variety of purposes, including children's play, general exercise, dog exercise, ball games, picnics and as an access path from the shopping/recreation/school complex on McCombe Avenue. Park equipment in this area includes play equipment, a noticeboard, electric barbecue, picnic table, limited bench seating, a toilet block, rubbish bins and stormwater outlets. This section of the park is the most intensively used. It is particularly popular with families using the play equipment and the open area for ball games, and for walkers and dog exercise. It is apparent that there is some conflict in the use of this area. Many park users are unhappy with the attitude of some dog owners who do not clean up after their dog has defecated in play areas, or let dogs "run wild" in areas where they upset small children or cause fights with other dogs. The level of dog usage in the park is clearly an issue of great concern to residents.

5.11 Vandalism & Security

Aims:

- to reduce damage caused by vandalism to the park environment
- to foster a greater sense of community custody of Samson Park

Samson park receives a large number of visitors. Because it is the only recreation reserve in the area, people with very different recreational preferences visit the park and use it accordingly. The 1995 visitor survey identified a significant proportion of park users who have no great interest in the bush areas of the park and are frustrated by the lack of active recreational space allocated. There are problems with the proliferation of tracks through the bushland, and with the extent of vandalism occurring in Samson Park.

It would be impossible to outline a strategy to eliminate vandalism from Samson Park. The problem is a symptom of wider social dysfunction and cannot realistically be tackled on the scale required. However, some attempts could be made to control some of the more "opportunistic" vandalism which occurs in the park. A regular staff presence at Samson Park would be an excellent deterrent, particularly during summer, when arson is a major risk to life, property and the park environment. A good ranger can encourage a more positive, involved attitude among park users. Studies elsewhere have shown that the worst vandalism occurs in areas perceived as poorly maintained (Buchanan, 1989). The reasoning appears to go along the lines of "well, nobody else cares, why should I?" Regular maintenance, particularly rubbish removal and verge maintenance are important. Interpretation material emphasising the importance of rehabilitation efforts, conveyed in a positive, not regulatory manner would help.

Installation of lighting through the central strip of the park would be another helpful initiative. Several residents suggested this in response to the park user survey, both as an anti-vandalism measure and because the park is used extensively around dusk and until late evening in summer.

5.12 Funding

Aim:

- to provide sufficient resources to manage both bushland and active recreational areas of Samson Park in a manner which fulfils environmental objectives for the park and caters for the needs of park users

This section briefly outlines the resources required to manage Samson Park. Funds to manage Samson Park are obtained through the Parks and Recreation budget of the City of Fremantle. Funding for some of the

revegetation planting has come from Greening Australia. While there are several sources of external funding for conservation activities which are relevant to Samson Park, it is important that basic maintenance of the park and the rehabilitation program already approved by Council in the 1989 plan be funded internally, as there is no guarantee of obtaining funds through these external sources.

City of Fremantle staff and Friends of Samson Park have faced problems with reliable and adequate funding sources for bush area of Samson Park in the municipality. In the past, bushland restoration activities at Samson Park have relied on general parks maintenance budgets, supplemented by a Greening Australia grant and volunteer labour. Maintenance activities such as mowing, rubbish collection and playground maintenance consume most of Samson Park's budget, leaving a fairly meagre amount for rehabilitation and interpretation. These funds are further reduced by expenditure on vandalism. This is inadequate to prevent further degradation of the Park, much less to rehabilitate already degraded areas.

It is also important that the Friends Group receive adequate support from Council in terms of staffing of the Park and sufficient resources to continue their planting, weed control, monitoring and interpretation activities. Without this support, Council risks exploiting the goodwill of this and other Friends Groups, who are already suffering dwindling numbers and enthusiasm.

The Friends Group should be encouraged to apply for external grants for non-routine activities (eg. establishing a photographic record of flora for rehabilitation training/ interpretation; publishing pamphlets on habitat planting/ responsible pet ownership/ weed identification and control etc.). These type of activities may be more stimulating than regular busy bee tasks and may encourage a greater participation in the group.

Community satisfaction with Samson Park's management has been reasonable, although there were many complaints regarding the amount of rubbish, lack of bins, and maintenance of the grassed area. It is clear that basic maintenance of the park, particularly rubbish collection, need to keep improving. Upgrading and maintenance of play areas is another priority.

6. IMPLEMENTATION & MONITORING

Aims:

- to restore degraded areas of Samson Park's natural vegetation by reducing disturbance and controlling pest plants and animals, and replanting with indigenous seed and tubestock of local provenance
- to encourage natural regeneration in less disturbed areas
- to use rehabilitation methods which minimise disturbance to indigenous vegetation
- to maximise the success of rehabilitation by following a well-structured monitoring program to provide feedback on the progress of revegetation, weed control and rabbit numbers, and alter techniques as necessary
- to minimise conflict between recreational use and conservation objectives by fencing sensitive areas,

This is a crucial but often neglected area of managing bush reserves. A reliable monitoring program for the park should be regarded as an essential management component, and part of the auditing system for Parks and Recreation expenditure. The outcomes of such inputs as a major redesign of the park's reticulation system, several years' worth of revegetation plantings, permanent quadrat monitoring, and trials of direct seeding, mulches etc. are not known. Such an auditing process provides feedback on management inputs and has the potential to save significant money for minimal outlay, and allow optimal allocation of resources.

Monitoring is also essential when using herbicides for use on non-registered species in bushland. This is important to assess any non-target effects. It is necessary to evaluate the success or otherwise of operations such as weed control, rabbit eradication, revegetation plantings and trials of such things as mulches, plant guards, soil conditioners, and direct seeding. Monitoring is also essential to assess the health of bush areas which are not subject to the above procedures, particularly areas which contain significant species. Adequate documentation is required. Monitoring must be done on a systematic basis to provide sufficient feedback on management inputs and the resources required to meet, management objectives. A review of the Management Plan every five years is not a substitute for regular monitoring.

Monitoring should be seen as a crucial part of park management. Without feedback on the success or otherwise of weed control and revegetation programs, money could be wasted by persisting with ineffective methods, or weed invasions allowed to proliferate to the point where control becomes more expensive. An increasing number of environmental managers now use monitoring as an integral part of their auditing process. Feedback provided by efficient monitoring provides optimal allocation of resources for a minimal outlay. A park ranger with expertise in managing bushland reserves and monitoring techniques could easily undertake a modest monitoring program and report on matters requiring attention (eg. summer watering, rabbit numbers, weed infestations) before substantial damage occurs and money and other resources wasted. This would only require occasional checks (perhaps once per week), with flexibility to allow greater time over peak periods (fire season and for weed control, revegetation and flora monitoring in late winter/ spring).

7. RECOMMENDATIONS

SUMMARY OF MAIN RECOMMENDATIONS FROM REPORT

1. Maintain a separate budget line for rehabilitation activities.
2. Upgrade recreational facilities to provide a safe and stimulating play area for children of all ages.
3. Establish a clear use zoning system for Samson Park to minimise the present extent of use conflict.
4. Improve routine maintenance of the park and verge areas.
5. Implement feral animal (rabbit, bees) and weed control strategies.
6. Extend the interpretation program for Samson Park.
7. Develop and refine the rehabilitation strategy.
8. Reassess current fire ban using current research and advice from fire ecologists and fire protection and suppression experts.
9. Implement a reliable monitoring program for the Park as a means of auditing performance and expenditure on rehabilitation.

These recommendations are provided in greater detail below.

RECOMMENDATIONS - 2006

ISSUES	AIMS	RECOMMENDATIONS	COMMUNITY COMMENTS	FCC RESPONSE
Flora	Enhance remnant natural vegetation in Samson Park and surrounding areas to conserve its indigenous fauna in the long-term	1. Complete a comprehensive flora survey	What will be the time frame for the conduction of the survey?	
	Improve the natural heritage, conservation and landscape value of the suburb of Samson, and the City of Fremantle	2. Develop and implement a rehabilitation strategy	Very pleased to see a new management plan and the acknowledgement that there has not been any improvement since the first recommendations in 1989.	
		3. Encourage plantings of indigenous or other suitable habitat species on verges adjacent to the park	Where will funding come from?	
Fauna		1. Conduct a thorough fauna survey of Samson Park to determine populations of non-bird species	<i>No community comments provided on this recommendation</i>	
		2. Continue to monitor bird species in Samson Park and expand monitoring to include other species (possums, bats, reptiles)	<i>No community comments provided on this recommendation</i>	
		3. Develop and implement a rehabilitation strategy to provide a diversity of habitat for fauna.	<i>No community comments provided on this recommendation</i>	
		4. Work with the local schools in building and erecting more bird nesting boxes and bat boxes.	<i>No community comments provided on this recommendation</i>	

ISSUES	AIMS	RECOMMENDATIONS	COMMUNITY COMMENTS	FCCRESPONSE
Fire Management	To protect life, property , environmental and community values in the park and surrounding areas	1. Maintain a regular presence at the Park by Council staff to discourage arson and other vandalism and to ensure that fire hazards are dealt with promptly	Suggestion: Western side access track has not been developed very well, this needs to be aesthetically improved.	
	To minimise the incidence and impact of uncontrolled fires	2. Reduce fuel loads by continued control of weeds such as Veldt Grass	Suggestion: There are currently too many access points, these need to be reduced.	
	To minimise the incidence and impact of uncontrolled fires	3. Encourage existing community co-operation in alerting authorities about fires within the park	Suggestion: Spraying of veldt grass means that other weeds grow in it's place. As a consequence of this, there are currently large areas of the park that are weed infested. Therefore the recommendation to spray veldt grass may be outdated and the solution to the veldt grass needs to be revisited.	
		4. Reassess the total fire ban recommendation after consultation with experts in the field of fire ecology and fire prevention and suppression.	<i>No community comments provided on this recommendation</i>	
		5. Provide a fire access track in through the eastern side of the park in consultation with FESA officers.	<i>No community comments provided on this recommendation</i>	
		6. Develop maintenance prescriptions before September 2005 and implement annual maintenance of the perimeter fire break and all internal tracks.	<i>No community comments provided on this recommendation</i>	

ISSUES	AIMS	RECOMMENDATIONS	COMMUNITY COMMENTS	FCC RESPONSE
Fire Management (cont'd)		7. maintain a record of fires which occur in the Park and the approximate area of each and monitor regeneration after fires.	<i>No community comments provided on this recommendation</i>	
Weed Management	To conserve the indigenous vegetation of Samson Park	1. Implement the restoration strategy	Suggestion: Dogs spread weed seeds therefore keeping them on a leash in the bush areas could be a solution to controlling weeds.	
	To control and where possible eradicate environmental weeds from Samson Park, giving priority to species which constitute a major environmental problem	2. Provide adequate protection for areas of high conservation value and rehabilitation areas	Suggestion: Need for more public education for dog owners to encourage them to put a leash on dogs in the bush areas.	
		3. Develop and implement the weed control strategy	<i>No community comments provided on this recommendation</i>	
		4. Continue to provide Council staff and volunteers involved in weed control in Samson Park with training in herbicide usage, plant identification and bush regeneration techniques	<i>No community comments provided on this recommendation</i>	
		5. Conduct a systematic flora survey of the park which will provide information on major differences in vegetation structure, weed infestation and vegetation condition	<i>No community comments provided on this recommendation</i>	

ISSUES	AIMS	RECOENDATIONS	COMMUNITY COMMENTS	FCC RESPONSE
Weed Management (cont'd)		6. Design interpretation material to inform residents of the problems of weed invasion in Samson Park and encourage appropriate planting	<i>No community comments provided on this recommendation</i>	
		7. provide adequate protection for areas	<i>No community comments provided on this recommendation</i>	
		8. continue regular green waste collection to discourage garden dumping	<i>No community comments provided on this recommendation</i>	
Feral Animals	To control and where possible eradicate feral animals in Samson Park	Continue to implement the rabbit control program when necessary	Suggestion: Need for fencing to prevent dogs from harming small children in the play area.	
	To minimise potential impacts of feral animal control on the park environment, staff, visitors, neighbours and domestic pets	Continue to monitor rabbit numbers at regular intervals and repeat control measures as necessary	Suggestion: Feral bees are a major problem and should be a priority. Instead of "eradication" of the bees, there needs to be "continuous control" of the bees to prevent reinfestation.	
	To minimise the problems caused by domestic pets in Samson Park	Publicise the issue of cats in wildlife reserves and encourage a local cat curfew and belling cats	Suggestion: Rabbits are not just confined to Samson Park. To prevent reinfestation there's a need to eradicate/ control rabbits all over the City of Fremantle and not just Samson Park.	
		Encourage voluntary restriction of unleashed dogs in conservation areas by appropriate signage	Comment: Cat curfew sounds impossible to police and funding would be better spent on public education through signage and publicising the issue.	

ISSUES	AIMS	RECOMMENDATIONS	COMMUNITY COMMENTS	FCC RESPONSE
Feral Animals (cont'd)		Implement a feral bee eradication program over the next five years	Suggestion: (1) Need signage to educate dog owners. (2) Implement an annual feral bee control and monitoring program	
Signage			Need for improved signage (including a structure and hierarchy of signage as well as installation and maintenance	City of Fremantle recognises the importance of this and will continue to improve the signage as further funding becomes available.
Environmental Education & Community Involvement	To promote Samson Park as an educational resource	1. The City of Fremantle continues to encourage and support the Friends of Samson Park and other volunteer groups to assist in the implementation of this management plan	Suggestion: (1) Seton College needs to be included in recommendation 3. This College uses the park frequently. (2) Need to provide ongoing funding for the Friends of Sampson Park group to undertake regeneration training	City of Fremantle will continue to support this initiative as adequate funding becomes available.
		2. Develop and produce promotional material to provide information on practices that can be adopted to minimise environmental impact on the reserve.	<i>No community comments provided on this recommendation</i>	
		3. Continue to encourage involvement of Samson Primary School and North Lake Senior High School in the rehabilitation of Samson Park and wildlife corridor strategy	<i>No community comments provided on this recommendation</i>	

	AIMS	RECOMMENDATIONS	COMMUNITY COMMENTS	FCC RESPONSE
Access & Tracks	To minimise further degradation from unwanted tracks through bush areas	1. Erect signage on the verge at park entrance points to indicate clearly where entrances are located, and inform visitors of the importance of keeping to defined tracks	Comment: It is currently very difficult to determine the main access point to the park.	
	To provide a track network which caters to the needs of both active and passive recreational users of the park	2. Close unnecessary paths - these tracks should be revegetated as necessary	Comment: There is currently no uniformity of signage among the different access points.	
Interpretation		3. rationalise the network of larger tracks.	<i>No community comments provided on this recommendation</i>	
	To provide information and recreational experiences which allow visitors to discover, understand and enjoy the natural environment of Samson Park	1. Develop a nature trail along defined tracks. This should include existing signs, and additional signs providing information about specific flora/fauna, their habitat requirements, and park protection issues on each sign	Comment: Kenyana is now called Samson Recreation Centre. This needs to be updated in the Management Plan.	
	To encourage responsible park usage and minimise further degradation caused by inappropriate activities within Samson Park	2. Upgrade the main notice board	Suggestion: Need for two main entrance points with two notice boards.	
		3. Develop an information brochure for the community noticeboard and for distribution through the Kanyana Centre/ elsewhere	<i>No community comments provided on this recommendation</i>	
		4. Continue regular wildflower and bird walks in Samson Park	<i>No community comments provided on this recommendation</i>	

ISSUES	AIMS	RECOMMENDATIONS	COMMUNITY COMMENTS	FCC RESPONSE
Interpretation (cont'd)		5. Where areas are closed for regeneration, provide appropriate signage, preferably including information about the rehabilitation process	<i>No community comments provided on this recommendation</i>	
Recreation	To provide a variety of pleasant recreational experiences for park users, consistent with the environmental objectives for the park	1. Conduct an audit on playground equipment and implement recommendations to meet Australian Standards	Suggestion: Need to make sure any new lighting or benches are "vandal proof".	
	To provide safe and stimulating play areas for children of all ages	2. Increase the number of bins in the park and provide a separate dog bin away from the picnic and play areas	Suggestion: Change "increase the number of bins" to "review the number of bins".	
		3. Review parking provision	Suggestion: (1) Provide car parking facilities in Sellenger Ave near Kirby/Bradbury Wy (2) There needs to be an increase in the amount of parking space available. In particular there needs to be a car park built at the main entrance to the park near the toilets/ noticeboard/ playground.	City of Fremantle will progress this initiative as adequate funding becomes available.
		4. install more lighting in the park to increase user safety and deter vandalism	<i>No community comments provided on this recommendation</i>	
		5. upgrade major entrances to the park on Sellenger and McCombe Avenues to allow better access for pram and wheelchair users	<i>No community comments provided on this recommendation</i>	

ISSUES	AIMS	RECOMMENDATIONS	COMMUNITY COMMENTS	FCC RESPONSE
Recreation (cont'd)		6. instigate a community arts project for sculptures over the stormwater outlets	<i>No community comments provided on this recommendation</i>	
		7. provide more seating in the picnic/ play area and a few benches along tracks in bush areas	<i>No community comments provided on this recommendation</i>	
Vandalism & Security	To reduce damage caused by vandalism to the park environment	1. Ensure a regular staff presence in Samson Park, particularly during fire season	Suggestion: Notice board needs a contact number so that the public can notify authorities of vandalism or other security issues.	
	To foster a greater sense of community custody of Samson Park	2. Improve routine maintenance of the park, particularly rubbish collection	Suggestion: Recommendation I appears vague in terms of whom and how often.	
		3. Liaise with local schools to encourage further involvement in Samson Park and develop/support other programs to foster environmental awareness among younger residents	Suggestion :Allocate a community resident as a park warden.	
		4. ensure a regular staff presence in Samson Park,particularly during fire season	<i>No community comments provided on this recommendation</i>	
		5. liaise with local schools to encourage further involvement in Samson Park and develop/suppo'rt other programs to foster environmental awareness among younger residents	<i>No community comments provided on this recommendation</i>	

ISSUES	AIMS		COMMUNITY COMMENTS	FCC RESPONSE
Vandalism & Security (<i>cont'd</i>)			Suggestion: (1) There is a need for greater presence in the park to minimise potential vandalism (2) City of Fremantle provide a mobile phone for use by a nominated Park "Warden".	It is not feasible to provide full time presence. Adequate coverage is provided through the frequent attendance of rangers, regeneration staff, volunteers, gardeners and local residents. All will contribute to coverage and monitoring of the Park.
Funding		1. continue to have a separate budget line for Samson Park which covers regular maintenance activities (weed control, rubbish removal) and programmed rehabilitation and interpretation activities	<i>No community comments provided on this recommendation</i>	
		2. work with the Friends of Samson Park to apply for external grants for rehabilitation activities	<i>No community comments provided on this recommendation</i>	
Implement-ation & Monitoring	To restore degraded areas of Samson Park's natural vegetation by reducing disturbance and controlling pest plants and animals, and replanting with indigenous seed and tubestock of local provenance	1. Ensure that this second revision of the management plan is implemented efficiently and effectively within budget	Suggestion: Recommendation 3 needs to change "3-months" to "annually".	
	To encourage natural regeneration in less disturbed areas	2. Monitor and report on the effectiveness of the implementation of this second revision of the management plan	Suggestion: There needs to be an internal report every 3-months and a public report every 12-months.	

ISSUES	AIMS	RECOMMENDATIONS	COMMUNITY COMMENTS	FCC RESPONSE
Implement- ation & Monitoring (cont'd)		3. Establish and then monitor quadrats every 3 months to assist in bushland maanitenance and to provide a performance indicator on the implementation.	<i>No community comments provided on this recommendation</i>	
		4. Provide a written report on the progress of this management plan every 3 months.	<i>No community comments provided on this recommendation</i>	
		5. Conduct another user survey to update park user numbers, patterns of park useage, park issues and the attitudes of the local residents to Samson Park.	<i>No community comments provided on this recommendation</i>	
ISSUES	AIMS	RECOMMENDATIONS	COMMUNITY COMMENTS	FCC RESPONSE
			Suggestion: There needs to be a copy of the minutes for the monthly meetings on the notice board.	

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APPENDICES

APPENDIX 1. PLANT SPECIES FOUND AT SIR FREDERICK SAMSON PARK

This list has been compiled from the original Management Plan (Ecoscape, 1989), a brief survey conducted by the EPA (October, 1994), a list of orchid species provided by Margo O'Byrne (EPA), and observations over a three month period (February- May 1995). A complete botanical survey has not as yet been done.

Exotic species are marked with an asterisk (*). Native, non-indigenous species are marked (#). Dubious records are denoted thus (?) and should be checked as part of the botanical survey and with the W.A. Herbarium. Nomenclature follows that used in the Flora of Australia (AGPS).

CYCADS

ZAMIACEAE

Macrozamia riedlei Zamia MONOCOTYLEDONS CYPERACEAE

Lepidosperma angustatum Lepidosperma scabrum Mesomelaena pseudostygia Tetraria octandra

HAEMODORACEAE

Anigozanthos humilis Catspaw

Anigozanthos manglesii Mangles Kangaroo Paw Conostylis aculeata

Conostylis candicans

Conostylis setigera

Haemodorum ? spicatum Bloodroot

IRIDACEAE

*Freesia x leichtlinii Freesia

*Gladiolus caryophyllaceus Gladiolus

*Romulea rosea Guildford Grass

*Watsonia leipoldtii Watsonia

LILIACEAE

*Asphodelus fistulosa Onion Weed

Burchardia umbellata Milkmaids

Dianella revoluta var. divaricata Flax Lily

Thysanotus dichotomus Thysanotus thyrsoides Tricoryne elatior

ORCHIDACEAE

Caladenia flava ssp. flava Caladenia latifolia Caladenia arenicola Caladenia longicauda

Caladenia ? arenicola x longicauda Diuris magnifica

Lyperanthus? nigricans Microtis sp.

Pterostylis sanguinea

OROBANCHACEAE *Orobanche minor POACEAE

*Aira spp.

*A vena barbata *Briza maxima *Briza minor *Bromus madrilensis *Cortaderia selloana *Cynodon dactylon
Danthonia spp. *Ehrharta calycina *Eragrostis curvula *Lagurus ovatus *Lolium rigidum Microlaena
stipoides *Pennisetum clandestinum *Rhynehelytrum repens *Stenotaphrum secundatum *Sporobolus indicus
Stipa spp.

RESTIONACEAE Loxocarya flexuosa XANTHORRHEACEAE

Dasypogon bromeliifolius Lomandra caespitosa Xanthorrhoea preissii

Cowslip Orchid Pink Fairies Carousel Spider White Spider

Pansy Orchid

Dark banded Greenhood

Lesser Broomrape

Wild Oats

Shivery Grass Quaking Grass Brome Grass Pampas Grass Couch

Wallaby Grasses Veldt Grass African Love Grass Rabbit-tail Grass Perennial Rye-grass Weeping Grass
Kikuyu

Red Natal Grass Buffalo Grass Rat's-tail Grass Spear Grass

Pineapple Grass

Blackboy, Balga

DICOTYLEDONS

AMARANTHACEAE

Ptilotus drummondii Ptilotus polystachyus

ANACARDIACEAE

*Schinus terebinthifolius Brazilian Mastic (Japanese Pepper Tree)

ASTERACEAE

*Conyza bonariensis Fleabane

*Gazania splendens Gazania

Helichrysum cordatum Tangle Daisy

*Hypochoeris glabra Cat's ear Podolepis gracilis

*Sonchus asper Sow Thistle *Ursinia anthemoides

Waitzia suaveolens

CARYOPHYLLACEAE

*Petrorhagia velutina

*Silene gallica French Catchfly

CASUARINACEAE

Allocasuarina fraseriana Sheoak

Allocasuarina humilis Dwarf Sheoak

DILLENIACEAE

Hibbertia hypericoides Native Buttercup Hibbertia racemosa

DROSERACEAE

Drosera spp. Sundews EPACRIDACEAE

Astroloma pallidum

Conostephium pendulum Pearl Flower

Leucopogon propinquus Beard Heath

EUPHORBIACEAE

*Euphorbia terracina Phyllanthus calycinus

FABACEAE

Bossiaea ornata Eggs and Bacon Daviesia divaricata

Daviesia juncea

Daviesia nudiflora

Gompholobium tomentosum

Hardenbergia comptoniana Native Wisteria Jacksonia furcellata

Jacksonia stembergiana

Kennedia prostrata Running Postman

*Lupinus consentii Sandplain Lupin Oxylobium capitatum

*Trifolium angustatum

*Trifolium campestre

GERANIACEAE

*Erodium botrys Crane's Bill

*Pelargonium capitatum Pelargonium

GOODENJACEAE

Dampiera linearis Scaevola canescens Scaevola pahidosa

MIMOSACEAE

Acacia ? alata

#Acacia celastrifolia Acacia lasiocarpa

#Acacia podalyriifolia Mt. Morgan Wattle

#Acacia iteaphylla Gawler Range Wattle

Acacia pulchella Prickly Moses

Acacia saligna Orange Wattle

Acacia stenoptera Acacia wildenowiana

MORACEAE

*Ficus carica Edible Fig

*Ficus macrocarpa Moreton Bay Fig

MYRTACEAE

#Chamae laucium uncinatum Geraldton Wax
Eucalyptus calophylla Man-i, Red Gum
Eucalyptus gomphocephala Tuart
Eucalyptus marginata Jarrah Hypocalymma robustum

PROTEACEAE

Banksia attenuata Candle Banksia
Banksia grandis Bull Banksia
Banksia menziesii Firewood Banksia
Dryandra nivea Couch Honeypot
Dryandra sessilis Parrot Bush Hakea prostrata
Isopogon cuneifolia
Persoonia saccata
Petrophile linearis Pixie Mops Petrophile macrostachya
Synaphea ? spinulosa

RANUNCULACEAE

Clematis microphylla Old Man's Beard

RUBIACEAE

*Centranthus ruber Valerian

STYLIDIACEAE

Stylidium schoenoides THYMELEACEAE
Pimelea rosea Rose Banjine

VERBENACEAE

*Lantana camara Lantana

APPENDIX 2. LIST OF BIRD SPECIES FOUND IN SAMSON PARK, WITH NOTES ON OCCURRENCE AND HABITAT REQUIREMENTS

This list was compiled from records from the previous Management Plan (Ecoscape, 1989), a long term survey being conducted by Mrs. Barbara Parker of the Friends of Samson Park, and a brief survey by Dr. Harry Recher, who provided all the habitat notes and an indication of the significance of each species (Majer & Recher, 1995). Comparisons are drawn between occurrences at Samson Park and records from a longitudinal study of King's Park (Recher & Serventy, 1991). The list was vetted by Peter Anson of the Royal Australasian Ornithologists Union (RAOU). Exotic species are marked with an asterisk(*). Questionable records (possible aviary escapes or misidentifications) are indicated by a question mark(?).

Australian Hobby (*Falco longipennis*)

An uncommon but wide-ranging species in the south-west. This bird has nested in Samson Park in recent years.

Australian Kestrel (*F. cenchroides*)

A common and widely distributed species often seen along road edges and in open areas. It requires open habitat and is unlikely to nest in Samson Park. Not recorded in King's Park.

Australian Magpie (*Gymnorhina tibicen*)

Common breeding resident throughout the Perth region.

Black-faced Cuckoo Shrike (*Coracina novaehollandiae*)

Frequent visitor throughout the Perth region. It nests on large horizontal branches, usually high in trees. This bird is sensitive to disturbance and is unlikely to nest in Samson Park due to the large numbers of visitors and dogs.

Black Duck (*Anas superciliosa*)

Resident throughout the Perth region. A casual visitor to Samson Park in periods when there is standing water.

Brown Falcon (*Falco berriogra*)

A wide-ranging but uncommon bird on the Swan Coastal Plain. It is most frequent in open habitats and low shrublands.

Brown Honeyeater (*Lichmera indistincta*)

Abundant breeding resident throughout the Perth region. Brown Honeyeaters build a small cup-shaped nest in low shrubs and in King's Park often builds nests close to frequently-used paths.

Boobook Owl (*Ninox novaeseelandiae*)

This is a hole-nesting species requiring a large hollow. The habitat area required by a breeding pair will depend on the abundance of large insects and other small mammals as food, but Samson Park is probably at the lower size limit for this species. It occurs and probably breeds in King's Park.

Collared Sparrowhawk (*Accipiter cirrocephalus*)

This bird is easily confused with the Brown Goshawk, as the two species are similar in both appearance and habits. The Collared Sparrowhawk has not been recorded in King's Park, although both occur in the Perth region. The Brown Goshawk is the more common of the two species.

Elegant Parrot (*Neophema elegans*)

A tree hole nesting species that has increased in abundance and range with agricultural clearing. The Elegant Parrot is a ground-foraging species which feeds on grass and weed seeds. It is uncommon in the Perth region, and has not been recorded in King's Park.

?Fairy Martin (*Cecropis ariel*)

The Fairy Martin has never been common on the Swan Coastal Plain and it has decreased in abundance over the past 50 years. It is possible that it has been confused with the Tree Martin, which is similar in appearance.

Fan-tailed Cuckoo (*Cuculus pyrrhophanus*)

This species has decreased in abundance throughout its southwestern distribution over the last 50 years and is uncommon in the Perth region. Its preferred hosts are the Broad-tailed Thornhill and the White-browed Scrubwren, neither of which occur at Samson Park. The decline of the Fan-tailed Cuckoo parallels that of its hosts. It is an infrequent visitor to King's Park.

*Feral Pigeon (*Columba livia*)

Common throughout the Perth region, though not recorded from King's Park. #Galah (*Cacatua roseicapilla*)

The Galah has increased in abundance and distribution since the beginning of the century, colonising the Perth region after World War Two. It will nest in tree hollows in close proximity to people. Galahs have only been recorded in King's Park since 1986.

Grey Butcherbird (*Cracticus torquatus*)

A breeding resident throughout the Perth region. The Butcherbird often builds its nest within a couple of metres of the ground and in King's Park has been found nesting near quite heavily-used recreation facilities.

Grey Fantail (*Rhipidura fuliginosa*)

Common throughout the Perth region. A breeding resident in King's Park, with numbers increasing during inter with the arrival of migrants from cooler areas. The Grey Fantail is sensitive to disturbance when nesting. Nests may be found within one metre of the ground.

The Kookaburra was introduced to the Perth region in 1897 and has spread throughout the southwest. It is a hole nesting species that commonly associates with people, but generally prefers to nest in less disturbed situations.

Laughing Turtle-dove (*Streptopelia senegalensis*)

The turtle-dove is more typical of suburban habitats than bushland areas in the Perth region. It was introduced to Perth, probably from Africa, in 1898. It will nest almost anywhere in the shrub layer.

Mallee Ringneck (*Platycercus zonarius barnardi*)

This is one of four forms of the Ringnecked Parrot *Platycercus zonarius*. The form that occurs naturally on the Swan Coastal Plain is the "28" Parrot (*Platycercus zonarius semitorquatus*), while the Port Lincoln Parrot (*Platycercus zonarius zonarius*) is the form which occurs throughout the rest of southern W.A. The Mallee Ringneck occurs in S.A., Vic., N.S.W. and Qld. in mallee, mulga and native pine woodlands. "Port Lincoln" and "Mallee" have frequently been applied mistakenly to the "28" Parrot in the Perth region. As the sighting was made by an experienced birdwatcher, it is likely to have been an aviary escape.

New Holland Honeyeater (*Philydonyris novaehollandiae*)

An abundant breeding resident throughout the southwest wherever there is a good supply of nectar-rich flowers. It is unlikely to find sufficient nectar resources in Samson Park to sustain breeding. An infrequent visitor in King's Park.

Peregrine Falcon (*Falco peregrinus*)

A wide-ranging but uncommon species. It feeds on birds, including pigeons and gulls. It is unlikely to be more than a rare visitor to Samson Park. Not recorded from King's Park.

Pied Butcherbird (*Cracticus nigrogularis*)

Uncommon in the Perth region. Normally a species of drier and more open woodlands. The Pied Butcherbird can easily be confused with the Grey Butcherbird.

Port Lincoln Ringneck (*Platycercus zonarius zonarius*) See notes under Mallee Ringneck.

Purple-crowned Lorikeet (*Glossopsitta porphyrocephala*)

An uncommon visitor to the Perth region. Not recorded in King's Park. Red Wattlebird (*Anthochaera carunculata*) Abundant breeding resident throughout the Perth region. Nests abundantly in King's Park, with nests placed from one to ten metres above the ground.

Red-capped Parrot (*Purpureicephalus spurius*)

This is a forest-dependent species that feeds on eucalypt, sheoak and other tree seed. It requires hollows for nesting. Mrs. Parker has observed a breeding pair in Samson park. This species has not been recorded from King's Park.

Regent Parrot (*Polytelis anthopeplus*)

This parrot is an uncommon visitor to the higher rainfall districts of the southwest. Birds in the Perth region could be aviary escapes.

Rock Parrot (*Neophema petrophila*)

The Rock Parrot inhabits coastal islands and occurs on the southwest mainland in coastal dunes and rocky foreshores. It is easily confused with the elegant parrot.

Rufous Whistler (*Pachycephala rufiventris*)

A common breeding resident in larger bushland remnants in the Perth region. Nests may be placed from one to

30m above the ground in dense shrubs and trees.

Sacred Kingfisher (*Halycon sancta*)

A tree-hole nester, the Sacred Kingfisher has declined in abundance throughout the southwest in the last 50 years. There are no recent records from King's Park, but formerly a breeding summer visitor.

Silver Gull (*Larus novaehollandiae*)

An abundant coastal species which often visits parks to scavenge for food. Silvereye (*Zosterops lateralis*) A flocking species with a wandering, wide-ranging habit, so that numbers may vary considerably. Nests are placed in thick shrubbery between one and three metres from the ground. This species is particularly susceptible to predation by cats. It is a common breeding resident of King's Park.

Singing Honeyeater (*Meliphaga virescens*)

After the Brown Honeyeater, this is the most common native bird in suburban Perth. *Spotted Turtle-dove (*Streptopelia chinensis*)

The Spotted Turtle-dove is more typical of suburban habitats than bushland areas in the Perth area. It was introduced to Perth from southeast Asia in 1898. It will nest almost anywhere in the shrub layer.

Striated Pardalote (*Pardalotus striatus*)

A small tree-hole nesting species. Numbers are greatest in winter when individuals from cooler climatic regions disperse to warmer coastal regions. A breeding resident in King's Park.

Tawny Crowned Honeyeater (*Philydonyris melanops*)

The Tawny Crowned Honeyeater is an uncommon resident in low open heaths and shrublands in the southwest. Not recorded in King's Park.

Tree Martin (*Cecropis nigricans*)

An uncommon visitor to King's Park, although it may have nested there earlier this century. Numbers increase in the Perth region during summer with the arrival of dispersing flocks, probably from the and inland. Tree Martins tend to nest in colonies, in tree hollows.

Weebill (*Smicrornis brevirostris*)

The Weebill feeds on lerps (sap-sucking psyllid insects) and builds a small hanging dome nest between one and 15m from the ground. It appears tolerant of people and will nest in close proximity to heavily used areas.

Welcome Swallow (*Hirundo neoxena*)

The Welcome Swallow is very tolerant of people and disturbance. It builds mud nests under eaves, in caves, and outside buildings. A common resident in the suburban area.

Western Gerygone (*Gerygone fusca*)

The Western Gerygone or Western Warbler builds a dome-shaped hanging nest within four metres of the ground. It is tolerant of people: nests in King's Park have been placed close to busy paths.

Western Spinebill (*Acanthorhynchus superciliosus*)

This species nests in thick scrub within three metres of the ground. It appears tolerant of people. It is an uncommon breeding resident of King's Park.

Western Thornhill (*Acanthiza inornata*)

White-tailed Black-Cockatoo (*Calyptorhynchus latirostris*)

Occasional visitor to Samson Park. More frequently found in the remains of the pine plantations in Kardinya and beyond.

Yellow-rumped Thornhill (*Acanthiza chrysorrhoa*) Prefers open habitats, often on the ground.

APPENDIX 3. MAMMAL AND REPTILE SPECIES RECORDED AT SAMSON PARK.

This list appeared in the original Management Plan (Ecoscape, 1989). No comprehensive survey has been made of non-avian vertebrate fauna in Samson Park. There are likely to be greater numbers of reptiles and possibly bats inhabiting Samson Park than this list indicates.

MAMMALS

Brushtail Possum *Trichosurus vulpecula*

Common House Mouse *Mus musculus*

Rabbit *Oryctolagus cuniculus*

REPTILES

Bobtail *Tiliqua rugosa*

Dugite *Pseudonaja ajf nris*

APPENDIX 4. LIST OF SPECIES FOR REVEGETATION PLANTINGS

Numbers denote priority for revegetation plantings { 1 = higher priority, 2 = lower priority). This relates to the present abundance of species, the amount of natural regeneration or successful re-establishment in plantings, and the structural importance of the species.

All stock for revegetation plantings should be collected on site or from nearby sites (within a 15km radius) to ensure that plantings are of local provenance, and to minimise the risk of further establishment of alien species. This should be stipulated on any nursery contracts.

1. Overstorey species

1 *Allocasuarina fraseriana*

2 *Banksia attenuata*

1 *Banksia grandis*

1 *Banksia menziesii*

2 *Eucalyptus calophylla*

1 *Eucalyptus gomphocephala*

2 *Eucalyptus marginata*

2. Tall Shrubs

2 *Acacia saligna*

2 *Dryandra sessilis* 2 *Hakea prostrata*

2 *Jacksonia furcellata*

2 *Jacksonia stembergiana*

3. Shrubs

1 *Acacia lasiocarpa*

2 *Acacia pulchella*

1 *Acacia stenoptera*

1 *Acacia wildenowiana*

2 *Allocasuarina humilis*

2 *Conostephium pendulum* 2 *Hypocalymma robustum*

2 *Leucopogon propinquus*

1 *Macrozamia riedlei*

Persoonia saccata

2 *Petrophile linearis*

Petrophile macrostachya

Synaphea spinulosa

4. Small shrubs/ groundcovers/ vines

2 *Anigozanthos humilis*
 2 *Anigozanthos manglesii* 2 *Astroloma pallidum*
 2 *Bossiaea ornata*
 2 *Burchardia umbellata*
 Sheoak
 Candle Banksia Bull Banksia Firewood Banksia Marri
 Tuart Jarrah
 Orange Wattle Parrot Bush
 Prickly Moses
 Dwarf Sheoak Pearl Flower
 Beard Heath *Zamia*
 Pi.'<ie Mops
 Catspaw
 Mangles Kangaroo Paw
 Eggs and Bacon Milkmaids

Small shrubs/ groundcovers/ vines (cont.)

2 *Clematis microphylla* Old Man's Beard
 2 *Conostylis aculeata*
 2 *Conostylis candicans* 2 *Conostylis setigera*
 2 *Dampiera linearis*
 2 *Dasypogon bromeliifolius* Pineapple Grass
 2 *Daviesia divaricata*
 2 *Daviesia juncea*
 2 *Daviesia nudiflora*
 2 *Dianella revoluta* var *divaricata* Flax Lily
 1 *Dryandra nivea* Couch Honey Pot
 2 *Gompholobium tomentosum*
 2 *Haemodorum spicatum*
 2 *Hardenbergia comptoniana* Native Wisteria
 1 *Helichrysum cordatum* Tangle Daisy
 1 *Hibbertia hypericoides* Native Buttercup
 1 *Hibbertia racemosa*
 2 *Hovea trisperma*
 1 *Isopogon cuneifolia*
 2 *Kennedia prostrata* Running Postman
 1 *Lepidosperma angustatum*
 1 *Lepidosperma scabrum* 1 *Lomandra caespitosa*
 1 *Loxocarya flexuosa*
 1 *Mesomelaena pseudostygia*

2 *Oxylobium capitatum*
 2 *Pimelea rosea*
 2 *Podolepis gracilis*
 2 *Ptilotus drummondii*
 2 *Scaevola canescens*
 2 *Scaevola paludosa*
 1 *Tetraria octandra*
 2 *Thysanotus dichotomus*
 2 *Thysanotus thyrsoides*
 2 *Tricoryne elatior*
 2 *Waitzia suaveolens*
 1 *Xanthorrhoea preissii* Blackboy, Balga

