Proposed St John Brook and Jarrahwood Conservation Parks

Draft Management Plan 2004

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DEPARTMENT OF PARKS AND WILDLIFE

PROPOSED ST JOHN BROOK AND JARRAHWOOD CONSERVATION PARKS

Draft Management Plan 2004

PART A INTRODUCTION

The proposed St John Brook and Jarrahwood Conservation Parks (the parks) are particularly important to the community of Nannup. This draft management plan proposes strategies for public comment as part of finding an agreed balance in managing the parks (see the management summary table at the end of this document).

PLANNING AREA

The proposed St John Brook and Jarrahwood Conservation Parks encompass an area of 3,440 ha and 160 ha respectively, and are located approximately 7 and 18 km north-west of Nannup and 50 km south-east of Busselton, the nearest large town (Map 1).

The parks are separated by a distance of approximately 2 km and surrounded by large areas of multiple-use State forest that covers the majority of the Blackwood Plateau. For the most part they adjoin St John Brook, which is a northern tributary of the Blackwood River, and connect to a wider network of proposed reserves including Butler and Blackwood River national parks. The parks comprise high quality riverine ecosystems although the linear shape (16 km long but only 1–3.6 km wide) of the St John Brook Conservation Park and the small size of both parks make them susceptible to edge effects associated with adjoining land uses. Approximately 82% of the park's boundary abuts State forest and 18% private property, giving them a high boundary to area ratio of 1:78. Since most of the parks abut State forest the associated edge effects are considered minor. Nevertheless, ensuring that compatible management is continued will be an important factor in maintaining the park's values. In particular, this involves the protection of adjoining tributaries to the parks through informal reserves.

The park boundaries shown in Map 1 are indicative and subject to fine-scale modification. This is consistent with the *Forest Management Plan 2004-2013* (FMP), published by the Conservation Commission of Western Australia in 2004. The Conservation Commission of Western Australia (Conservation Commission) is seeking public comment on the boundaries through this draft management plan.

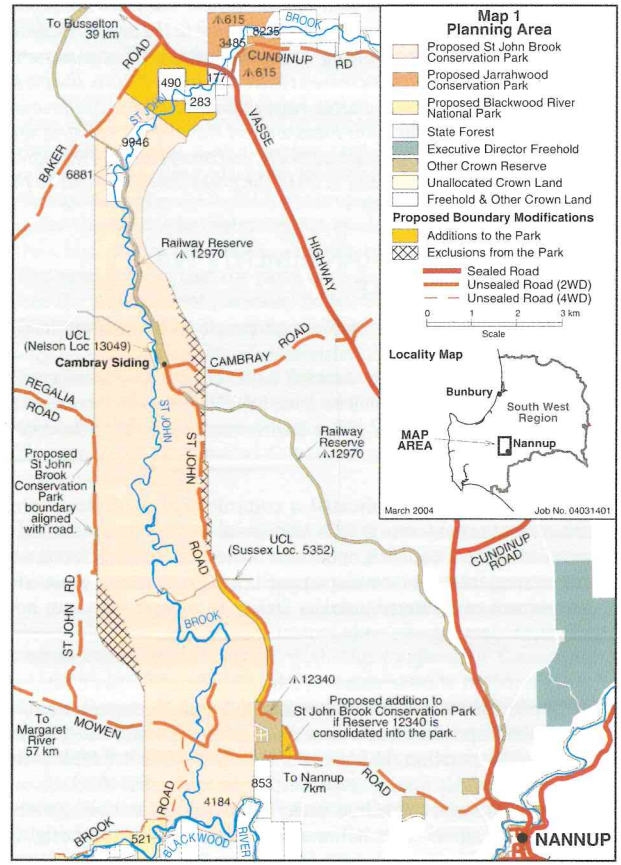
It has been proposed to add a portion of State forest abutting the northern boundary of the proposed St John Brook Conservation Park, thereby providing frontage to the Vasse Highway and aligning the park boundary to an easily identifiable and manageable boundary. The views of the public are being sought as to whether this addition should be supported, noting that the FMP requires that the sustainable forest yield be maintained. A number of other minor proposals to modify park boundaries are also indicated on Map 1, primarily to assist in boundary identification and to offset the area of proposed addition that fronts the Vasse Highway. It is also proposed that a portion of Reserve 12340 (see section on Proposed and Existing Tenure) be added to the parks (see Map 1). The remainder of the reserve would be added to State forest. If this reserve were not consolidated into the parks then the proposed addition to the park bounded by the reserve, St John Road and Mowen Road would remain as State forest.

KEY VALUES

Maintaining or enhancing the key values of the parks will be the major focus of this management plan. How these values relate to the auditing of the management plan is detailed in *Performance Assessment*.

Conservation Values

- Important riparian habitats that create a wildlife corridor along St John Brook;
- The presence of several seasonally or permanently inundated wetlands, potentially containing endemic flora species and important populations of fauna; and
- The importance of the reserves for the protection of threatened and priority flora and fauna species.



Cultural Values

- Aboriginal sites of significance including modified trees; and
- Historic features and cultural sites of the early settlement and timber cutting days and the enriched learning experiences they provide.

Recreation Values

- An array of sustainable recreational opportunities within close proximity to urban centres; and
- Areas of high scenic quality.

PART B: MANAGEMENT DIRECTIONS AND PURPOSE

VISION

The vision for the proposed St John Brook and Jarrahwood Conservation Parks is:

The St John Brook and Jarrahwood Conservation Parks capture the essence of the Jarrah Forest, with their picturesque pools, gently flowing brook systems and peaceful ambience. They attract people from the local and wider community, who come to the area to recreate around the Brook and enjoy the tranquillity of the natural environment. To manage increased visitor use in the future, the parks will offer a range of sustainable recreational pursuits and provide interpretation and education focussing on the vibrant cultural and natural heritage. Management will focus on conservation of the park's habitats, flora and fauna, and in 2014 the parks' condition will be the same or better than in 2004.

MANAGEMENT ARRANGEMENTS WITH ABORIGINAL PEOPLE

There is a strong interest by Noongar people to be involved in the management of conservation estate in the south-west and to strengthen cultural ties to the land. By working together with Aboriginal people to care for the land, there will be great benefits for the preservation of heritage and conservation of the environment, as well as for cross-cultural awareness.

The Government has indicated a commitment to explore joint management arrangements with traditional owners by developing a consultation paper outlining options for ownership, administration and joint management of conservation lands in Western Australia (Government of Western Australia 2003). This paper discusses how these joint management arrangements may work.

A memorandum of understanding (MOU) is already in place between the Department of Conservation and Land Management (the Department) and the South West Aboriginal Land and Sea Council Aboriginal Corporation, which, under the *Native Title Act 1993*, is the representative body for the south-west of the State. This MOU sets out both principles and guidelines under which access and co-operative management agreements between the Department and Aboriginal

people may be established within the existing provisions of the *Conservation and Land Management Act 1984* (CALM Act).

LEGISLATIVE FRAMEWORK

Legislation and Policy

Conservation parks are created under the *Land Administration Act 1997*. The Department manages conservation parks according to the legislative specifications of the CALM Act, the *Wildlife Conservation Act 1950*, the *Fish Resources Management Act 1994*, and the policies of the Department and the Conservation Commission.

The primary objective in the management of conservation parks, as defined in section 56 of the CALM Act is to:

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

The CALM Act does not negate any of the powers of the *Petroleum Act 1967*.

Proposed and Existing Tenure

The proposed St John Brook Conservation Park is currently part of State Forest No. 6, 28 and 33. The proposed Jarrahwood Conservation Park (Reserve 615) is an unvested class C reserve of 160 ha for the purpose of a resting place for teams and stock. Under the *Forest Management Plan 2004-2013*, it is proposed that the parks be reserved under the Land Administration Act as class A reserves and vested in the Conservation Commission for management by the Department. This would ensure that the parks have security of tenure and purpose (see the management summary table). The proposed St John Brook Conservation Park was previously identified for reservation in the *Central Forest Region Management Plan 1987* and the *Forest Management Plan 1994-2003*. The conservation reserve proposal was then removed under the *Regional Forest Agreement 1999* (RFA) but reinstated under the *Protecting Our Old Growth Forest Policy (2001)*. The proposed Jarrahwood Conservation Park was identified for reservation in the RFA.

The parks are surrounded by State forest and adjoin privately owned freehold locations Nelson 3, 521, 4184, 853, 3485, 8235 and Reserve 12340 to the south (Map 1). Reserve 12340 is a class C reserve of 72.3 ha that adjoins the proposed St John Brook Conservation Park. Previously this area had the purpose of a townsite, but was not developed and is currently unvested, with the purpose of Government requirements. The addition of this reserve to the proposed St John Brook Conservation Park would enable an easily identifiable management boundary to be defined along St John Road. Privately owned freehold locations 6881 and 9946, three surveyed but unmade roads (including location 5352), a railway easement known as Cambray Siding (Nelson Location 13049) and the Cambray Siding Railway Line (also known as Talereendiner Pool or Reserve 12970), are also located within the park. Cambray Siding Nelson Location 13049 is currently

unallocated Crown land with no vesting whilst Cambray Siding Railway Reserve 12970 is currently vested in the Minister for Railways as a class C reserve for the purpose of railway. These areas have potential for recreation development, although current recreation use is impacting on the surrounding park. Consolidation of these areas into the parks would facilitate better visitor management as well as enhancing reserve design by eliminating enclaves (see the management summary table and the section on Visitor Use and Opportunities). Surveyed roads that are also enclaves within the park should be included into this park.

Private property adjoining the parks may add to its ease of management or conservation value if consolidated into the parks. Subject to an assessment of the values of these areas and their availability, consideration should be given to their acquisition and addition to the parks.

MANAGEMENT PLANNING PROCESS

This document (the plan) acts as a Draft Management Plan for the proposed St John Brook and Jarrahwood Conservation Parks. It identifies the parks key values and outlines strategies to protect those values. Once public comments have been received on the plan, it will be revised and submitted to the Minister for the Environment for approval. The approved management plan will be for a period of 10 years or until otherwise replaced by another management plan.

PERFORMANCE ASSESSMENT

The Conservation Commission will measure the success of this plan by using performance indicators and other mechanisms as appropriate. It is not efficient to measure all aspects of management given resource and technical impediments – consequently, indicators will target 'key' components of the plan. Kanowski *et al.* (2001) defined 'key' performance indicators (KPIs, listed in the management summary table), when considering the conservation of biodiversity, as: "*the minimum set, which if properly monitored, provides rigorous data describing the major trends in, and impacts on, Australian biodiversity*". In the case of this plan, it includes evaluation of a measure and target, reporting requirements and a management response to any target shortfall. These components provide a basis for adaptive management, whereby management is altered if necessary to meet a desired outcome.

The Department is responsible for providing information to the Conservation Commission to allow it to assess the success of the Department's management and meeting targets specified in the KPIs. The frequency of these reports will depend upon the requirements of each KPI. Where a report identifies a target shortfall, a response to the Conservation Commission is required. The response may identify factors that have led to the target shortfall, and propose alternative management actions where appropriate. The Conservation Commission will consider the Department's response on the target shortfall and evaluate the need for action in the context of its assessment and audit function under section 19(1)(g)(iii) of the CALM Act. The Conservation Commission will make the results of audits available to the public.

PART C: MANAGING THE NATURAL ENVIRONMENT

BIOGEOGRAPHY

The National Reserve System Program (NRS) was adopted to preserve Australia's native biodiversity on a regional scale, and initiate a protected reserve system that meets the world's best standards in terms of comprehensiveness, adequacy and representativeness (Thackway and Cresswell 1995). As a framework for developing this reserve system, the NRS initiated the Interim Biogeographic Regionalisation for Australia (IBRA), which divided Australia into 85 bioregions based on dominant landscape characteristics of climate, lithology, geology, landforms and vegetation. Three bioregions, the Jarrah Forest, Warren and Swan Coastal Plain lie within the extreme south-west. The parks lie entirely within the Jarrah Forest IBRA region and southern Jarrah Forest subregion.

At the time of publication, just under 5% (214,490 ha) of the Jarrah Forest bioregion and 3% (69,365 ha) of the southern Jarrah Forest subregion is within a conservation reserve[1]. Proposed reservations of the Jarrah Forest bioregion will result in 16% of the bioregion being reserved, making the Jarrah Forest IBRA one of the most highly reserved IBRA regions within the State, comparable to reservation in the Mallee and Geraldton Sandplains IBRA regions.

Comprehensive Adequate Representative Conservation Reserve System

In the south-west of the State, the Jarrah Forest and Warren IBRA bioregions encompass the boundaries of the RFA for most of its extent. The RFA was initiated to provide a specific framework for managing forests in the south-west, recognising the need for a more in-depth analysis of environmental, social, economic and indigenous heritage values in this area. As such, 26 forest ecosystems were defined and used to assist in the establishment of a comprehensive, adequate and representative (CAR) conservation reserve system to protect the biodiversity of the south-west forest area. The forest ecosystem definition process is consistent with the criteria used for determining IBRA boundaries but is at a finer scale.

The reservation target for forest ecosystems was set at 15% of their pre-1750 distribution, except for some rare ecosystems where 100 per cent of the extant distribution was the target. This ensures that viable examples of each ecosystem are included in the protected reserve system.

The FMP added to the conservation reserve system proposed in the RFA by incorporating the policy commitments in the Government's *Protecting Our Old Growth Forests Policy* (2001). The addition of the reserve proposals in the *Protecting Our Old Growth Forests Policy* significantly increased the representation levels of many forest ecosystems.

[1] conservation reserves include nature reserves, national parks, conservation parks and 5(1)(g) and (h) reserves which have a purpose of conservation.

Three forest ecosystems occur in the parks (jarrah blackwood, jarrah wandoo and shrub, herb, and sedgelands), all of which meet the agreed target for the CAR conservation reserve system (Conservation Commission of Western Australia 2004).

Biogeography of the parks

The parks capture riverine ecosystems of fresh flowing streams, valuable riverine fauna habitat and terraced landscapes that comprise one of the few-forested tributaries of the Blackwood River proposed for reservation. Similarities exist with other tributaries such as Rosa Brook, although this system is smaller in size than St John Brook and little is proposed for reservation. Forest surrounding the Blackwood River itself is proposed for reservation downstream of the parks. However, this area represents a major river system with broad valleys, different to the more incised landscape and ephemeral streams and wetlands of the parks. Reservation of the proposed St John Brook and Jarrahwood Conservation Parks, when combined with large areas of adjoining State forest, provides a sizeable, relatively unfragmented area of forest and wetland systems that extends south of Nannup along the Blackwood River to Augusta.

GEOLOGY, GEOMORPHOLOGY AND LANDSCAPE

The parks contain geology of the Bunbury Trough, which is located in southern Perth Basin, west of the Darling Fault. The Bunbury Trough is a deep graben, bounded by north-south running faults, known as the Darling and Busselton Faults.

Geology of the parks forms part of the Blackwood Plateau landform. Much of this landform is relatively flat, due to the deposition of sediments and the absence of major mountain-building activities. However, watercourses such as St John Brook have incised through the lateritic cap that dominates the parks to create major and minor valley systems. Major valleys contain the St John Brook river system, floodplain and raised alluvial terraces, which broaden towards the south of the proposed St John Brook Conservation Park, sometimes to a distance of 200 m. Deep, brown-coloured sands occur on the raised alluvial terraces, while deep sand and sandy gravels are found on the flanking slopes.

Minor valleys associated with St John Brook are shallow with gentle to low sandy side slopes and narrow sandy terraces that may be 20 m wide. These valleys contain soils that are mainly sandy gravels, with some loamy gravels and deep sands. Upstream of the minor valleys, broad shallow depressions containing sandy yellow duplex soils can be found.

The geology, landforms, and soils of the parks, when combined with hydrology, vegetation, land use and cultural heritage, define the visual character of the area and most people's appreciation of the environment. For many visitors, visual appearance is the most direct way to experience an area and therefore, the management of landscape is fundamental.

Although part of the Blackwood Plateau, the parks lie within broad definition of the Darling Plateau Landscape Character Type (CALM 1994). They contain areas of high visual landscape quality that includes permanent waterbodies such as Barrabup and Workmans Pool, riparian

vegetation and incised valleys along St John Brook, isolated hilltops, distinctive areas of quality vegetation and steep hills that overlook sections of the Blackwood River. Guidance for landscape management is provided for by *Policy Statement No. 34 - Visual Resource Management of Lands and Waters Managed by CALM* (CALM 1989). This Policy should be considered prior to any developments within the parks.

SOIL AND CATCHMENT PROTECTION

The parks are located within the Blackwood River catchment, the largest river catchment in south-west Western Australia. This catchment has an area of about 22,530 km^2 and extends 300 km inland where the landscape is flat and characterised by higher stream salinities in broad, ancient watercourses.

St John Brook forms a series of long pools between shorter lengths of faster flowing rapids, and drains a surface catchment of 583 km^2 into the Blackwood River near Nannup. Approximately 84% of the catchment is forested, of which 6.2% of this is protected within the parks. Cleared land comprises 16% of the catchment and predominantly occurs to the east where it is used primarily for grazing beef cattle. Land clearing in these areas is especially noticeable on the private property adjacent to the Brook.

The quality of water flowing into St John Brook is fresh, with low levels of salinity (300 mg/L according to Muirden 1995) and only occasional high levels of turbidity. Sediment loads may be affected by run-off from nearby roadworks and existing roads, especially where these cross watercourses (Borg *et al.*1988). Appropriate management of drainage and visitor access to watercourses of the parks is necessary to minimise the potential for erosion of streambanks, walk trails, picnic sites and campsites. Agricultural and horticultural practices in the upper catchment of St John Brook, including the presence of feedlots and the use of fertilisers, herbicides and pesticides may degrade the water quality of the Brook. As such, the Department should liaise with developers, the Nannup Shire, the planning commission, other agencies and local landholders to implement better catchment management where required.

The most significant stream flow into St John Brook occurs during winter and spring (June to November) when it is fed by St Paul Brook, Mill Brook, Harrington Brook, Padbury Brook, Rocky Gully and a number of smaller tributaries. The mean annual flow averages 49 800 ML (Muirden 1995). During dry summers, the Brook is significantly reduced at times to a series of pools along the watercourse. Several wetlands also lie within the parks, some which impede drainage and others, which are ephemeral. Predictions of increased drought frequency and reduced river flows have serious implications for inland wetlands (Hughes 2003) and riparian systems. Over the past 30 years, winter rainfall in the south-west has declined by 10–20% (Indian Ocean Climate Initiative 2002), most of this occurring between 1960 and 1972. This has the potential to dry out some wetlands and moist riparian zones that are ephemeral in nature, reducing this vegetation type and predisposing these areas to fire. Key recreation attributes of St John Brook, such as Barrabup and Workmans Pools may also be affected if water flow were to be reduced. The Commonwealth Scientific and

Industrial Research Organisation predicts that climate change in the south-west could see rainfall decline by as much as 60% and temperatures increase by up to 5°C by 2070 (CSIRO 2001, Hughes 2003).

The parks lie within a proclaimed groundwater catchment under the *Rights in Water and Irrigation Act 1914* (RIWI Act). A license from the Department of Environment (DoE) is required to take water in proclaimed areas or non-artesian groundwater areas proclaimed or prescribed under section 26B of the RIWI Act. Several groundwater aquifers have been identified by the DoE through research on the South West Yarragadee project: the Superficial, Leederville and Yarragadee aquifers. The Yarragadee aquifer is the most significant aquifer for water supply, containing an estimated sustainable supply of approximately 70 GL/y. However, until further studies are complete, it cannot be determined whether these aquifers are interconnected or if they influence surface water flows associated with St John Brook.

Proponents seeking to extract groundwater from the parks require a license from the DoE. In order to be licensed, the proponent would need approval from the land manager (in this case the Department) to access the land for the purpose of extracting water. Approval would also be needed to extract surface water. The Department may, after consultation with the Conservation Commission and with approval from the Minister for the Environment, issue a permit for this to occur (see management summary table). Where infrastructure is required, a lease may also be issued. An assessment by the Environmental Protection Authority (EPA) may be required for projects with potentially significant environmental impacts.

As part of the Western Australia Water Assessment 2000 (DoE 2000), St John Brook has also been identified as a surface water resource and a potential site for a small pipehead dam, located approximately 0.5 km upstream of the confluence with the Blackwood River and yielding 14.6 GL/y. A dam site does exist approximately 10 km upstream (outside the parks) but no provision was made in the Assessment to divert water to a large dam. To extract large quantities of surface water, the affect of altering surface water flow regimes on the ecology of the watercourse and the social values of its many pools would need to be considered. Damming of watercourses in the catchment upstream of the parks may have already changed the ecology of the watercourse, and could adversely affect riparian vegetation and make the Brook more ephemeral in nature. Under the RIWI Act, water may be taken from unproclaimed surface water catchments, such as St John Brook, for any purpose as long as the flow of water in the watercourse is not sensibly diminished, or the flow downstream is similar to that upstream. At the time of writing there is also no provision to licence the extraction of surface water or approve interference with the streamflow, though landholders are encouraged to consider the impact that their use will have on their neighbours downstream. The Department of Environment defines the amount, purpose and way that surface water may be taken from watercourses.

Monitoring of water quality and quantity within the parks is necessary to ascertain trends and detect any detrimental changes that may affect values of the parks. A baseline assessment of land use in the upper catchment is also required to determine if these potential changes are

a result of land use practices. The Department will continue to liaise with the DoE and Water Corporation to review information relevant to the water quality and quantity within the parks. Strategies should be developed to continue their protection and monitoring over time (see the management summary table).

Rehabilitation

Several areas within the parks require rehabilitation, principally due to disturbance from the removal of vegetation and soil for gravel but also because of the presence of unnecessary tracks. Most gravel pits are 0.5 ha in size with larger pits being 1–2 ha. Priorities for rehabilitation works will be based on the type and extent of disturbance, impact on environmental and landscape values, availability of resources, level of participation of stakeholders and the capacity for long-term monitoring.

NATIVE PLANTS AND PLANT COMMUNITIES

Vegetation of the parks is located within the Menzies Botanical Subdistrict of the Darling Botanical District. Plant communities make up the Jarrah Forest – Unicup forest ecosystem type (Bradshaw and Mattiske 1997), the reservation of which will help in meeting the nationally agreed criteria for a CAR conservation reserve system for forests.

The parks comprise of seven vegetation complexes, identified by Mattiske and Havel (1998) as Blackwood, Darradup, Kingia, Telerah, Bidella, Jalbaragup and Bentley. They are dominated by open forests with an overstorey of marri (*Corymbia calophylla*) and jarrah (*Eucalyptus marginata* subsp. *marginata*) in the valleys and jarrah on the lateritic slopes. Vegetation of the lateritic uplands can be differentiated from that on the slopes by a variation in understorey composition, which is characterised by species such as sheoak (*Allocasuarina fraseriana*), bull banksia (*Banksia grandis*) and forest woody pear (*Xylomelum occidentale*). Valley floors and broad terraces associated with St John Brook consist of open forest woodlands of marri and some jarrah, as well as fringing woodlands of flooded gum (*E. rudis*), river banksia (*B. seminuda*), moonah (*Melaleuca preissiana*) and peppermint (*Agonis flexuosa*). Along the edge of watercourses are tall shrublands of swamp peppermint (*Agonis linearifolia*) and wonnich (*Callistachys lanceolata*). Minor tributaries leading into St John Brook comprise low woodlands of holly-leaved banksia (*B. ilicifolia*) and *Hakea lasianthoides* on the valley floors and open forest and woodlands of jarrah, marri and blackbutt (*E. patens*) on the slopes.

A feature of the parks is the presence of several seasonally or permanently inundated areas, characterised by wetland vegetation. These areas may contain endemic species or support important populations of fauna and should be protected from potentially threatening processes.

Significant species may also exist within the parks as rare or priority flora. Protection of rare flora is provided for by the Wildlife Conservation Act whereas management direction for priority flora is provided by advice from the Department's Wildlife Branch. Within the parks, one priority 4 species, stalked water ribbon (*Aponogeton hexatepalus*), has been recorded. Priority 4 species are considered to be adequately

surveyed and are not currently threatened by an identifiable process. Although priority species are not gazetted under the Wildlife Conservation Act and do not have the same level of legislative protection as rare flora, the priority flora list is maintained as a mechanism to highlight flora of special conservation interest. Stalked water ribbon can be found in the Darradup vegetation complex along riparian habitats within St John Brook and is susceptible to significant alterations to drainage, such as works associated with earth moving.

Other threatening processes have the potential to affect plant species and communities of the parks. Pressures from increased recreation, inappropriate fire regimes and wildfires, subdivision of adjacent private land, degradation of water quality and quantity, weed invasion and problem animals are the primary threats. Surveying for the disease *Phytophthora cinnamomi* has been limited within the parks although it has been recorded in areas of adjacent State forest (see section on Disease). This disease can have a severe impact on nature conservation values and may result in permanent changes to native plant communities. Compatible management of these threatening processes on adjacent tenures is essential for the protection of the park's values.

NATIVE ANIMALS AND HABITATS

The proposed St John Brook Conservation Park functions as a riparian wildlife corridor, facilitating the movement of native animals from the upper catchment of St John Brook, and proposed Jarrahwood Conservation Park, to proposed reserves along the Blackwood River. This movement typically utilises the riverine vegetation, thickets and wetland habitats along the valley system, which provides shelter for many species. Protection of these areas is a focus of this management plan. Other habitats within the parks include the upland jarrah forest.

Alkema *et al.* (1989) recorded 38 bird species, six reptiles, four amphibians (all endemic to Western Australia and three to the south-west) and four indigenous fish species within the proposed St John Brook Conservation Park. Eight native mammal species were also recorded by Alkema *et al.* (1989) and 11 species through the Western Shield program, a remarkably high proportion when compared to the 19 (probably pre-European) species listed for jarrah forests (Alkema *et al.* 1989).

Native animals of particular significance are mammals in the 0.35 gm–5 kg weight range, including specially protected[2] mammal species such as the chuditch (*Dasyurus geoffroii*) and priority fauna[3] such as the western brush wallaby (*Macropus irma*), quenda (*Isoodon obesulus fusciventer*), brush tailed phascogale (*Phascogale tapoatafa*) and the water rat (*Hydromys chrysogaster*). Quokka (*Setonix brachyurus*) populations are also found nearby. Given their close proximity, the fact that they are recorded on a connecting watercourse and in similar vegetation complexes, it is also possible that they exist in the parks.

[2] Specially protected fauna are species declared under the Wildlife Conservatio Act as likely to become extinct or rare, or otherwise in need of special protection.

[3] A Departmental term for fauna that may be rare or threatened but for which there is insufficient suvey data available to accurately determine their true status. Priority species may also include rare species that are currently not threatened.

Further surveys are required to ascertain their presence or absence. Many of the mammals in this weight range have declined in range and abundance, and persist in refugial habitats that may not be the most favourable to them, but least favourable to their agent or means of decline (Caughley 1994). The decline of many of these species has been attributed to predation and competition from foxes *(Vulpes vulpes)*. Other contributing factors may include impacts associated with European settlement such as land clearing (particularly riparian vegetation), habitat alteration, grazing, changes in burning patterns and the introduction of other feral species.

The Department's *Western Shield* program undertakes the control of foxes through a 1080 baiting program administered four times per year (see section on Introduced Problem Animals). This has seen an increase in abundance of species such as the chuditch and quenda, and consequently will continue within the parks. Attempts to re-establish the woylie (*Bettongia penicillata*) in the area in the early 1980s and again in 1998 appear to have been unsuccessful.

Other significant species found in the parks include specially protected fauna such as Baudin's Black-cockatoo (*Calyptorhynchus baudinii*), Carnaby's Black-cockatoo (*C. latirostris*) and Peregrine Falcon (*Falco peregrinus*) and priority species including the Forest Red-tailed Black-cockatoo (*C. banksii naso*) and western false pipistrelle (*Falsistrellus mackenziei*). These species have declined in numbers, primarily due to land clearing for agriculture. In particular, a reduction in suitable tree hollows may affect these species, particularly the cockatoos. The latter require large tree hollows for roosting, nesting and breeding, the occurrence of which is uncommon in the south-west of Western Australia. The protection of tree hollows is enhanced through the increase in reservation of mature forest and compatible forest management practices outside the parks, such as the retention of habitat trees and the protection of fauna habitat zones.

Although the parks provide suitable habitat, several species known from the region have not yet been recorded. Such species include the western ringtail possum (*Pseudocheirus occidentalis)*, fat tailed dunnart (*Smithopsis crassicaudata*), short beaked echidna (*Tachyglossus aculeatus*), dibbler (*Parantechinus apicalis*) and tammar wallaby (*Macropus eugenii*). Some species, such as the tammar wallaby, have specific habitat requirements and are largely confined to densely-vegetated riverine habitats along river systems. By translocating these species into the proposed St John Brook Conservation Park, it is anticipated that they can use north-south running wildlife corridors along the Brook to establish themselves within tributary systems of the wider Blackwood River. Where the parks prove to be the most suitable location for translocating native fauna species this action will be supported.

ENVIRONMENTAL WEEDS

The *Environmental Weed Strategy for Western Australia* (CALM 1999) (EWS) describes environmental weeds as "... plants that establish themselves in natural ecosystems and proceed to modify natural processes, usually adversely, resulting in decline of the communities they invade". The Strategy rated environmental weeds as high, moderate, mild or low based on their potential invasiveness, distribution

and environmental impacts. This rating provides the basis for identifying control priorities, with the highest rated species and species that pose a specific threat to conservation values within the parks, being the focus for weed management (see the management summary table). Further guidance for management is provided by *Policy Statement No. 14 – Weeds on CALM Lands* (CALM 1986a) and the draft Environmental Weed Management policy statement.

The history of human disturbance within the parks has resulted in the presence of a number of environmental and declared weed species. Most of these exotic species are confined to areas of previous settlement with relatively few species spreading away from their original area of occupation (Alkema *et al.* 1989). However, weeds can be introduced to an area, and their spread enhanced, through any type of disturbance activity. This may include access to recreation or apiary sites, recreational site development or fire events. This problem is exacerbated in areas close to weed sources, such as farms, transport corridors (roads and railways), rubbish disposal sites and urban development. Consequently, liaison with neighbouring landholders and other agencies, as well as effective visitor management, is necessary to negate the introduction of weeds and to initiate control measures.

The main weed problem in the parks is the spread of silver wattle (*Acacia dealbata*), which is particularly prevalent around Barrabup Pool and along St John Brook. The species was introduced to the area as an ornamental by mill workers and is forming dense monospecific stands to the exclusion of other species (Alkema *et al.* 1989). Other potentially threatening environmental weeds likely to occur in the parks are bridal creeper (*Asparagus asparagoides*), arum lily (*Zantedeschia aethiopica*) and double gees (*Emex australis*).

At Cambray Siding there are a number of weed species present including fig (*Ficus arica*) and Monterey pine (*Pinus radiata*), which are ranked as moderate by the EWS. Other garden plants such as *Pelargonium* and *Robinia* species were ranked as low, whereas several stone fruit species (*Prunus spp.*), loquat (*Eriobotrya japonica*), apple (*Malus domestica*), grape (*Vitis vinifera*) and *Agave* received no ranking.

Landholders, including the Department of Conservation and Land Management, are legally responsible for controlling plants declared under section 37 of the *Agriculture and Related Resources Protection Act 1976*.

Watsonia *(Watsonia marginata)*, a declared plant within the parks, can be found at the remnants of the Barrabup Mill Manager's house, where it was introduced as an ornamental feature of the garden. Once established, watsonia has the potential to impact heavily on conservation values by creating a monoculture in riparian zones. The weed also poses a fire hazard when it dries off in summer. Currently, watsonia is confined to this site but its spread needs to be managed, as there is potential for the weed to invade Barrabup Pool and use the watercourse as a means to infest the well-preserved St John Brook.

Other declared plants that are recorded in the parks include blackberry (*Rubus fruticosus*) and narrow leaf cotton bush (*Gomphocarpus fruticosus*). In areas adjoining private property, declared plants such as apple of sodom (*Solanum hermannii*) are also likely to be present.

INTRODUCED PROBLEM ANIMALS

Problem animals occur within the parks, most significantly foxes, feral pigs (*Sus scrofa*), feral cats (*Felis catus*), rainbow trout (*Oncorhynchus mykiss*) and rabbits (*Oryctolagus cuniculus*). Foxes in particular pose a major threat to critical weight range mammals. In 1996, the Department implemented the Western Shield program to strategically reduce fox populations and its success warrants further baiting within the parks (see the management summary table). The program involves aerial baiting of land managed by the Department using 1080 poison (sodium fluoroacetate), derived from native *Gastrolobium* plants, as well as reintroducing native animals once foxes have been controlled. Initially, baiting within the proposed St John Brook Conservation Park was very successful, resulting in significant increases in translocated woylie populations. However, the population increase of woylies has ceased and even declined, and it is unknown why this has happened. One theory is that recent dry years have had a large impact on the survival rate of woylie populations, a trend that has been observed in many areas across its current range. Cats have not been demonstrated to be a significant threatening process on woylie populations in the south-west.

Feral pigs are a particular concern, as they have been observed in the area and are also prevalent in sections of the Blackwood River that connect to St John Brook. If not managed, pigs have the potential to be very destructive to vegetation, particularly in riparian zones where they reach high population densities. Their habit of wallowing and rooting around the margins of watercourses and swamps can destroy vegetation, degrade water quality, cause erosion and remove food and nesting sites of native animals. Pigs are also a vector of disease. Although their impacts within the parks are not yet obvious, regular monitoring is required to detect possible impacts (see management summary table).

The Blackwood River and its tributaries, including St John Brook, are also stocked occasionally with rainbow trout in a program administered by the Department of Fisheries, who also protect and manage native fish species (unless they are listed as threatened, whereby they fall under the Department's management responsibility). Trout do not breed in the Brook and restocking is necessary to maintain the population and support the freshwater angling fishery. However, introducing exotic fish species can impact on the natural environment as trout predate on, and compete with, marron, native fish species and insects (Department of Fisheries 2002). The Conservation Commission is considering the option of no longer permitting the release of trout into St John Brook, thereby enhancing the protection of native species. To aid in making this decision, public comment is sought through this draft management plan as to whether this option is supported.

At times, dogs have also been observed in the parks at primary recreation sites such as Barrabup Pool. Dogs can disturb wildlife and visitors, and can act as vectors for the spread of disease. Furthermore, conservation parks are often baited with 1080 poison to control foxes, which is fatal to dogs if eaten. For these reasons dogs are generally not permitted in conservation parks. However, in accordance with the *Conservation and Land Management Regulations 2002*, dogs may be permitted in designated areas of land managed by the Department. It is the Department's preference to prohibit dogs from the parks and designate

an area to take dogs in adjoining State forest near Nannup. This would provide an additional option to several reserves vested within the Shire of Nannup that also permit dogs, two of which adjoin the Blackwood River. Public comment is sought through this draft management plan as to whether this option is supported.

DISEASE

At present, the most significant disease threat to plants within the parks is the disease known as 'dieback', caused by the introduced microscopic pathogen *Phytophthora*. There are now known to be eight species of *Phytophthora* occurring within the native plant communities of Western Australia, although it is recognised that *P. cinnamomi* is the most damaging. Susceptible plants, once infested, are killed and in many cases are eliminated from the site leading to dramatic and permanent changes to native plant communities and their dependent fauna. As a result of this fungus-like pathogen, increases in salinity and water production have been detected at other sites as well as the degradation of aesthetic values.

Dispersal of *P. cinnamomi* occurs through its ability to move autonomously, producing small motile spores that are distributed over long distances through surface and sub-surface water or small distances to infect new roots, or by the growth between roots of mycelial threads. The most significant spread of the pathogen results from the movement of soil and plant material, by vectors such as humans, vehicles and animals. The pattern of *P. cinnamomi* distribution is strongly related to site factors such as the presence of watercourses, tracks and roads, with infestation being most common where human activities and use have taken place in the absence of a strict hygiene regime.

Within the parks, broadscale surveying for *P. cinnamomi* was undertaken prior to 1976 indicating expression of disease in native plants along the portion of St John Brook from Vasse Highway to Cambray Siding and in numerous tributaries. Post 1976 surveying for *P. cinnamomi* occurred largely in neighbouring State forest and revealed disease expression along all major tributaries to St John Brook and across large sections of State forest adjoining the south-west portion of the proposed St John Brook Conservation Park.

Management within the parks will remain based on constraining, as far as possible, the human-assisted establishment of new centres of infestations within disease-free areas (see management summary table). Where surveys for the occurrence of the pathogen reveal the presence of significant uninfested areas, disease management plans will be completed for new developments such as recreational facilities and planned upgrades, or realignments of public and Departmental management access roads and tracks that take account of the disease. Management actions will be developed in accordance with *Policy Statement 3 – Management of Phytophthora and disease caused by it* (CALM 1998).

FIRE

A Mediterranean-type climate consisting of hot dry summers, together with flammable vegetation, ensures that fire has and will continue to occur in the parks. Fire is a natural environmental factor, and it is likely to have operated in the area for thousands of years, shaping the biodiversity of forest ecosystems. These ecosystems and the organisms that live in them, have evolved in this fire prone-environment, and depend upon a diversity of fire regimes. In pre-European times, it is likely that Aboriginal people used fire regimes to their advantage, enhancing food supplies and enabling easy movement through the forest (Abbott 2003).

Fire management needs to consider both biodiversity conservation and the need for protection of the park's assets from the occurrence of large, damaging wildfires. This is achieved in a hierarchical manner, whereby the Department first considers the requirements to achieve biodiversity conservation objectives, then undertakes a systematic wildfire threat analysis to determine the level of threat posed by the regimes to assets of the plan area. These may include life, property, community values, built assets, cultural heritage sites or recreation sites, such as Barrabup Pool.

Fire management for biodiversity conservation can then be modified, if necessary, where the risk or threat of wildfire is unacceptable. To optimise the conservation of biodiversity, an interlocking mosaic of patches of vegetation representing a range of fire frequencies, intervals, seasons, intensities and scales is needed at both a landscape scale (thousands of hectares) and at a local scale (hundreds of hectares). Mattiske and Havel (2002) have divided the south-west into 26 Landscape Conservation Units (LCU) for the purposes of fire management. The Blackwood Plateau LCU, of which the parks are a part, comprises 283 690 ha. Approximately 45% of this unit has been burnt since 1998. Similarly, at a local scale, 1610 ha or 46% of the parks, have been burnt over the same period. No wildfires occurred within the parks during this period.

The Department considers that biodiversity can be promoted by use of fire, as the majority of plants and animals possess adaptive traits that enable them to persist in this fire-prone environment. However, some species and plant communities are impacted upon by fire, particularly very frequent and infrequent fires and large, intense summer wildfires.

Vertebrate fauna species that are most vulnerable to fire are those with specialised habitats, that require mature vegetation, as well as those that exist as discrete populations, have low dispersal capacity, low fecundity and are prone to predation. The extent or patchiness of fire in riparian zones of the parks is important to fauna that persist in relatively small, linear habitats along these drainage lines. Large-scale fires that burn entire habitats could be detrimental to some species that utilise these corridors, particularly along St John Brook. Although not recorded, the quokka may exist within the parks and is a species identified as requiring vegetation that has a mosaic of different ages since fire.

Fire sensitive plant species are those that are killed by fire, have short or long life spans, long juvenile periods and regenerate only from seed (obligate seeders). The rate at which these species are able to regenerate and produce adequate seed to replace themselves after fire will determine the minimum frequency of burning. This has implications for prescribed burning – on the basis of current knowledge, a

conservative minimum interval between fires is double the juvenile period[4] of the slowest maturing fire sensitive species. This would allow for adequate replenishment of seed banks (N. Burrows pers comm.).

To achieve a combination of biodiversity conservation and protection against wildfires, fire management within the parks will be considered as part of the burning program for the Blackwood Plateau LCU. The fire management objectives for this unit are to maintain a spectrum of age classes of the different vegetation complexes.

Fire management within the parks should utilise all available knowledge including fire history, the life histories and vital attributes of the flora and fauna, and other potential environmental impacts (e.g. the need to control *P. cinnamomi*, rare or priority species, and visual impacts). It should adapt to changing community expectations, Aboriginal knowledge and to new knowledge gained through research, monitoring and experience, such as that gained from the results of the Department's Fire and Biodiversity Project, currently underway. In light of any new information, the findings can be used to review the fire regimes proposed for the various cells within the Blackwood Plateau LCU, and subsequently the parks. Fire regimes may also need to be reviewed to incorporate changes that may arise due to unforseen events, such as wildfires. Based on all available information, the Department will prepare a fire plan as part of the Master Burn Plan (MBP) planning process, which will encompass the parks. The MBP is a rolling three-year prescribed fire program, which is available for public comment each year. Alterations to the program may be made to accommodate concerns of stakeholders and the community. Following this, an annual prescribed burning works program is prepared.

PART D: MANAGING CULTURAL HERITAGE

INDIGENOUS HERITAGE

The parks are significant for members of the Bibbulmun Tribal Group as St John Brook was almost certainly used as a travel route along the Blackwood River, linking traditional camping areas of the coastal lowlands to those in the open woodlands upstream. People of this group employed a mobile lifestyle, dispersing into smaller groups and moving along river systems in search of alternative food sources. River pools were particularly significant as sources to procure food (fish, marron, ducks, sedges and other plants) as well as camping and producing wooden utensils. Three pools – Barrabup, Workmans and Cambray were identified by Goode (2003) as sites of mythological significance, in association with Waugal beliefs.

The traditional practices, oral history and culture of Aboriginal people should be recorded and where possible, reflected in interpretive information. Management arrangements with Aboriginal people are discussed in the section on Management Directions and Purpose.

[4] The juvenile period is defined as the time when at least 50% of the population has reached flowering age.

The parks are currently covered by one registered native title claim (ie. WAG6279_98 South West Boojarah). According to section 24jb(7) of the Native Title Act, native title claimants and their controlling body must be notified of proposed public works to be undertaken. Within the proposed Jarrahwood Conservation Park is the Nannup Scarred Trees site, registered under the *Aboriginal Heritage Act 1972*. This act protects all Aboriginal sites, including those sites not yet registered with the Department of Indigenous Affairs. The area around Barrabup Pool is currently being considered for registration under the Aboriginal Heritage Act.

NON-INDIGENOUS HERITAGE

The *Heritage of Western Australia Act 1990* provides for the registering and protection of sites of historic interest as 'heritage places'. The management of these sites is set out in the Department's draft policy statement 'Management of non-indigenous cultural heritage on CALM estate'. This policy is in accordance with the Burra Charter, which was adopted by Australia in 1979 for 'the conservation and management of places of cultural significance'. The Charter applies to all types of places of cultural significance and has a series of guidelines for managing cultural heritage.

The proposed St John Brook Conservation Park contains cultural sites of the early settlement and timber cutting days. The area was first explored by European settlers in 1834, and first settled in 1857. In 1908, the WA Jarrah Saw Mills Company established the Barrabup town and timber mill. The timber mill thrived initially but by 1924 the mill had closed and the town was abandoned. The Barrabup timber mill was then transferred to the present Nannup mill site in 1925.

Historic features such as foundation remnants, restored mill structures, remains of the oval and cricket pitch, and a concrete storeroom ruin mark the former townsite of Barrabup and the Barrabup mill. The townsite and mill are nearby to Barrabup and Workmans Pools, which are deep, natural pools in St John Brook, and supplied the town and mill with water for many years. Barrabup Pool was the site of the mill manager's house which was reputably used exclusively by him, while Workmans Pool played host to all mill workers. The remnants of the Barrabup mill manager's house are barely evident, the only remains being the foundations of a wall surrounding the house and an old tennis court.

Barrabup Pool and its nearby surrounds contribute to the community's sense of place as a venue for social and recreational activities, and is particularly well patronised in the summer months. It has been recognised as a gathering place and swimming hole for communities since the mill was established in 1908 and is representative of the values of the community who choose to live in the region (Pearson *et al.* 1997).

Cambray Siding, a railway easement on the edge of St John Brook, is also recognised by the community for its sense of place as a cultural gathering place in the natural forest. The town at Cambray was established in the early 1900s and, in 1909, the South West Railway was extended from Busselton to Nannup, passing through the siding. A depot was established and the trains took on water pumped from St John Brook's large pools. Remnants of the old overhead water tanks

and a well dug in rock, can still be seen today. Clearings of the old Cambray Siding, townsite and school are also clearly evident. After the mill ceased operation, use of the area for active and passive recreation activities continued.

Extending along the present rail easement and old rail formations that cross St John Brook are a number of single-track trestle railway bridges, which vary in condition from poor to good. One bridge, north from Cambray Siding along the present rail easement, is 78 m in length and reaches a height of 3.4 m. The old formation bridges can be restored for use or developed as features, depending on the location and state. These structures are threatened by fire, termites and weathering.

Other sites of significance may also exist within the parks, but have not yet been identified. Although many sites may have some historic interest, they may not be worthy of listing under the relevant legislation. However, these sites are entered on the Department's recreation and tourism information system (RATIS) database, which helps to build up knowledge of cultural sites and historic events, including their location, condition and significance to the community. Information located on RATIS should be considered in management operations.

PART E: MANAGING RECREATION AND TOURISM

The proposed Jarrahwood Conservation Park has limited visitor use and opportunities, primarily due to its small size. Consequently this area will not be developed for recreation and development will focus on the proposed St John Brook Conservation Park.

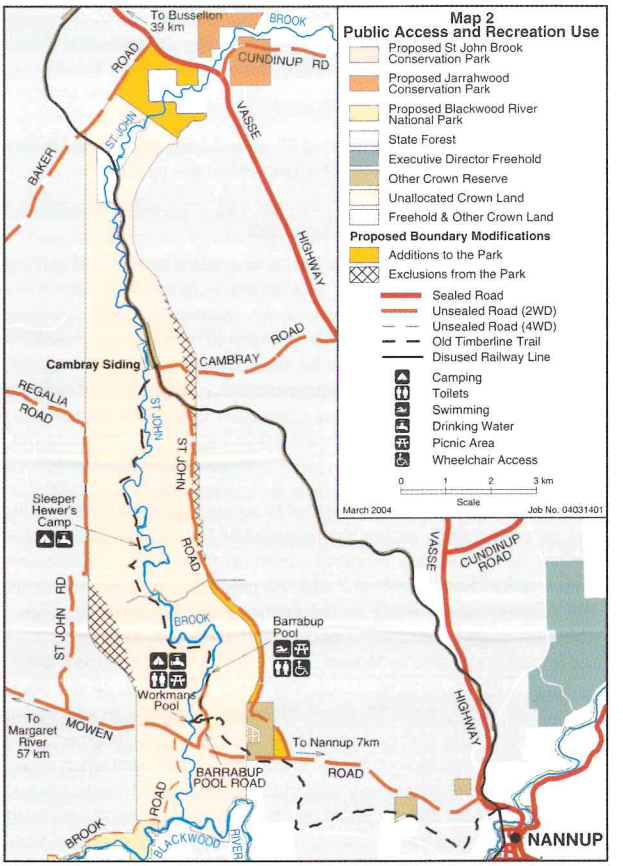
VISITOR USE AND OPPORTUNITIES

The close proximity of the proposed St John Brook Conservation Park to Nannup and Busselton make it particularly popular with visitors for picnicking, sightseeing, swimming, fishing, camping, motorbike riding, four-wheel driving and bushwalking. The area attracted approximately 21,000 visits per annum between July 2001 and June 2002, double that of the 1999–2000 financial year. Most of these visitors are travelling to the popular day-use area at Barrabup Pool, the day-use and camping area at Workmans Pool and to Cambray Siding (Map 2). The main activities within this park are swimming and camping.

Barrabup Pool allows for only 24 vehicles to be parked at the site. During peak periods, this causes problems as many people park along the roadside which encroaches upon roadside vegetation. Many visitors to Barrabup Pool are also seeking vehicle based camping opportunities, which can only be found at Workmans Pool. Currently Workmans Pool has toilet facilities and a five-bay campsite. To cater for visitor needs at Barrabup Pool additional vehicle parking is required. A basic, minimal facility campsite may also be developed upslope of Barrabup Pool (see management summary table). Both camping and additional vehicle parking at this site is subject to Aboriginal clearance.

Bushwalking within the proposed St John Brook Conservation Park can be undertaken along the 20 km Old Timberline Trail, which runs along old rail formations between the Nannup townsite and Cambray Siding, connecting Barrabup and Workmans Pools along the way. The trail network traverses a variety of environments and incorporates major water crossings, which add to its attraction. The trail will be dual use for walking and cycling as it provides more opportunities to access the park from Nannup and has been designed to cater for both uses, including a suitable width of trail and lines of sight to minimise visitor conflict. The trail could be enhanced through the development of basic walk/cycle-in camping, picnic areas and scenic viewpoints.

In addition to this trail is the proposed Munda Biddi Mountain Bike Trail, which will traverse the proposed St John Brook Conservation Park as it winds its way to Nannup, before reaching its final destination in Albany. It is the first long distance mountain bike trail to be constructed in Western Australia, totalling approximately 900 km in length. It is proposed that the Munda Biddi Mountain Bike Trail will be aligned along the disused Cambray Siding Railway Line and pass through Cambray Siding. A loop trail that starts and finishes in Nannup will also be developed, utilising portions of this trail and the Old Timberline Trail (see the management summary table).



Cambray Siding is an enclave of just 8.6 ha within the proposed St John Brook Conservation Park but the intensity of human usage at the site has flow-on impacts on the rest of the park. Historically, the area was a timber cutting settlement and contained part of the Ludlow to Nannup rail line, but now it constitutes a maze of tracks and open space, providing opportunities for group camping, swimming, fishing and motorcycle riding. Cambray siding and the adjoining railway line are also the location for several events, some of which attract hundreds of participants. This high intensity recreational usage is a particular concern as the area is unmanaged, resulting in degradation of the environment.

Opportunities exist for the Department to acquire Cambray Siding and to approach the Minister for Railways to relinquish portions of the Cambray Siding Railway Line to the Conservation Commission for management by the Department (see also section on Proposed and Existing Tenure). These sites can be managed for recreation, providing a variety of vehicle and non-vehicle-based campsites, group campsites, toilet and rubbish facilities and improved access.

Campfires

Campfires are a valued part of the camping experience. However, firewood collection can cause environmental damage and loss of habitat for small animals. Fallen timber, available for use as firewood is already becoming increasingly rare around major camping areas. To overcome this three options are proposed:

1. collect firewood from gazetted 'Firewood Collection Areas' in State forest and timber reserves for use within the parks;
2. provide wood at popular day-use and overnight sites such as Barrabup and Workmans Pools; and
3. provide communal gas barbeques where this is practical and cost effective.

The Old Timberline Trail, which is not open to public access by vehicle, may be limited to fuel stoves to reduce the incidence of escaped campfires. Visitors will only be permitted to have a campfire in designated fire rings.

VISITOR ACCESS

Public access to the parks is designed to access recreation opportunities and private property within the proposed St John Brook Conservation Park as well as private property adjoining the proposed Jarrahwood Conservation Park (see Map 2 and the management summary table). The primary access route to the former is via Barrabup Pool Road, which provides all weather access to Barrabup and Workmans Pools, and is readily accessed by Mowen Road, the main, unsealed road, linking Nannup to Margaret River. Under the Roads 2020 strategy, the Shires of Nannup and Augusta-Margaret River are proposing to seal Mowen Road, potentially increasing vehicle speeds at the intersection of Barrabup Pool and Mowen Roads. Roadworks undertaken when sealing Mowen Road, and other roads within the parks, must provide adequate sighting distances and safe entry points for visitors entering and exiting the area. Signage is also necessary on Mowen and Barrabup Pool Roads to inform visitors of the potential hazard of merging traffic.

Other points of public access to the proposed St John Brook Conservation Park occur to the eastern side of the brook, via the unsealed St John and Cambray Roads (Map 2). Cambray Road is the preferred travel route to Cambray Siding and can be accessed off Vasse Highway. However, this road requires upgrading to two-wheel drive. Alternate access to Cambray Siding can be gained via St John Road, although the Rocky Gully river crossing is four-wheel drive only. South of Mowen Road, the proposed St John Brook Conservation Park is accessible from Brook Road, which provides opportunities for four-wheel drive access along the Blackwood River.

All roads not designated as public vehicle access are to be used for management purposes (such as for fire management or access for conservation), or closed and rehabilitated if they are not required and do not assist in accessing park facilities. Roads, constructed as part of logging operations in adjacent State forest, should also be closed as part of the harvesting approval process where they do not assist in the management of the parks. This will minimise external influences on the parks.

Private property within the proposed St John Brook Conservation Park is accessed informally via tracks off Baker Road. Private property adjoining this park to the south can be accessed via Mowen Road and tracks emanating from River Road. The proposed Jarrahwood Conservation Park and adjoining lands can be accessed via Vasse Highway and Cundinup Road.

VISITOR SAFETY

In addition to a genuine concern for visitor welfare, the Department has a moral and legal responsibility to consider the personal safety of visitors to the parks. The Department manages the risks presented to visitors by their activities and by the natural, cultural, and developed environments through a visitor risk management program. This is guided by *Policy Statement No. 53 - Visitor Risk Management* (CALM 1986b).

Within the parks, trained Departmental-staff routinely conduct risk audits of all designated recreation areas. Falling trees or limbs and collision with submerged obstacles while swimming pose the most serious risks to visitor safety. These risks are managed by removing hazardous trees and lopping off threatening limbs in all designated recreation areas. Also, divers periodically survey popular swimming holes within these areas and submerged obstacles presenting a risk to swimmers may be removed. More commonly, appropriate hazard and 'No Diving' signs are placed near swimming holes.

The Visitor Risk management program will be ongoing.

TOURISM AND COMMERCIAL OPERATIONS

Commercial arrangements with private sector partners can help meet the rising demand for high quality recreation and tourism opportunities, facilities and services within conservation parks. These arrangements, or commercial concessions, can be by way of a lease, licence or permit for occupation or use (respectively), under appropriate conditions, of an area of land or water managed by the Department.

At present, there are no leases or licenses issued within the parks. It is possible that future accommodation and recreation developments may be considered by way of a lease arrangement. However, due to the small size of the parks, their existing level of development and the desire to preserve the nature conservation values, it is preferred that these developments be directed outside the parks.

Proposals for commercial concessions will be carefully considered by the Department and require endorsement by the Conservation Commission and approval of the Minister for the Environment. Commercial concessions must be consistent with the purpose of the parks, the protection of their values and with the objectives of this plan.

PART F: MANAGING SUSTAINABLE RESOURCE USE

PETROLEUM EXPLORATION AND PRODUCTION

Government policy on petroleum exploration and production in Western Australia stipulates that applications made prior to 10 February 2001 are subject to the *Petroleum Act 1967, Environmental Protection Act 1986* and the Wildlife Conservation Act. The Petroleum Act requires that no petroleum exploration or production will be approved or access presumed until the Minister for State Development has obtained the recommendations of the Minister for the Environment. The Conservation Commission may provide advice to the Minister for the Environment. Proposals to produce or explore for petroleum or gas on conservation estate are also referred to the EPA to determine the level of assessment that is required. Where proposals may cause a significant environmental impact they may be assessed by the EPA under section 38 of the Environmental Protection Act. During the assessment process, the Department has the opportunity to comment on the impact of the proposal. However, it is the Department's preference that petroleum exploration and production is opposed, thereby ensuring that conservation values are preserved in perpetuity. If approved, exploration and petroleum production should ensure that the impact on all conservation values is minimised.

The exploration for, and subsequent extraction of petroleum resources is administered by the Department of Industry and Resources (DOIR) through the granting of exploration permits and production licences. DOIR has identified the parks as an area of high hydrocarbon resource potential and have indicated a desire to access the area. At the time of publication, one exploration permit for petroleum and gas held by Empire Oil Company (WA) Ltd (EP416), covers the parks.

BEEKEEPING

One commercial apiary site is located in the proposed St John Brook Conservation Park, south of Cambray Siding. Due to the requirement for a minimum distance between sites of 3 km, and noting the small, linear shape of the parks, there is limited scope for any additional sites. The Department's draft policy is to maintain (and renew) current apiary site permits on all classes (tenures) of land, but to permit no additional apiary sites on land currently or proposed to be reserved primarily for nature conservation purposes[5], until a management plan has been prepared. In this instance, the Department will consider whether access for beekeeping is retained at the current level, increased, decreased or phased out, based on ecological and management criteria defined in the draft policy. Using these criteria and taking a precautionary approach to management, the existing apiary site will be retained but no new sites permitted. A limiting factor for the location of sites is the proximity to recreation sites within the parks and apiary sites in adjoining State forest, as well as limited access to the south of Cambray Siding. There may, however, be opportunities to locate new apiary sites in nearby State forest. Feral honeybees can also increase the risk of people being stung, especially where they are present at recreation sites.

PART G: INVOLVING THE COMMUNITY

INFORMATION, EDUCATION AND INTERPRETATION

An effective information, education and interpretation program is vital to achieve the objectives for the management of the parks. It informs the public of the attractions and opportunities available, and assists the community in appreciating and understanding the natural and cultural environments. Such programs should engage the community and foster a sense ownership of the parks. In doing this, the community will encourage appropriate behaviours that minimise adverse impacts on the environment.

Education and interpretation programs will concentrate on raising awareness about the park's conservation values, potential human impacts, cultural heritage, and the positive actions visitors can take to support park management. An interpretation plan will be developed for the parks that link to interpretative information along the Blackwood River.

MONITORING AND IMPLEMENTING THE PLAN

The Department and the Conservation Commission will assess the effectiveness of the final management plan for the parks by regular audits. The strategies outlined in the Plan will be built into the works program of the District responsible for the day-to-day management of the parks. Progress against Key Performance Indicators will be assessed by the Conservation Commission in audits of the Plan, or as it otherwise deemed necessary.

[5] Lands reserved primarily for nature conservation includes national parks, conservtion parks, nature reserves and 5(1)(g) and (h) reserves.

PERSONAL COMMUNICATIONS

Dr Neil Burrows – Director, Science Division, Department of Conservation and Land Management.

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KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		PERFORMANCE MEASURE	TARGET	REPORTING REQUIREMENTS
INTRODUCTION				
PLANNING AREA AND TENURE • The proposed St John Brook Conservation Park is currently part of State forest and vested in the Conservation Commission. The proposed Jarrahwood Conservation Park is a class C reserve for the purpose of a resting place for teams and stock. It is proposed that the tenure of both parks be changed to Conservation Park. • Due to the linear shape of the parks, the compatible management of adjoining lands will continue to be critical in maintaining their values. • Cambray Siding Railway Line (Reserve 12970) and Cambray Siding (Nelson Location 13049) have potential for recreation development.	**OBJECTIVE** To protect the parks with the maximum security of tenure. **THIS WILL BE ACHIEVED BY:** 1. the Department, in consultation with the community and the Conservation Commission, determining final park boundaries and then advising the Minister for the Environment. 2. the Department and Conservation Commission initiating all actions for which they are responsible to reserve the proposed parks as class A reserves under the *Land Administration Act 1997*; 3. the addition of Reserve 12340, Nelson Location 13049 and surveyed, but unmade roads, for inclusion into the parks;	Changes in land tenure and purpose.	To formally change the land and tenure and purpose of the proposed parks to Conservation Park (Class A) within two years of commencing the plan.	After two years or when changes in land tenure and purpose occur.
• Fine-scale changes to the park boundaries should consider alignment to easily identifiable and manageable boundaries (e.g. using roads and tracks).	4. the acquisition of adjoining private property if it becomes available, and subject to an assessment of its values; and 5. approaching the Minister for Railways to relinquish Reserve 12970 (Cambray Siding Railway Line) to the Conservation Commission for management by the Department.			

MANAGING THE NATURAL ENVIRONMENT				
GEOLOGY, GEOMORPHOLOGY & LANDSCAPE • The parks are dominated by a lateritic profile, which has been dissected by St John Brook and its tributaries to form major and minor valleys. • The parks are characterised by gently undulating slopes, low relief and sandy soils that, if exposed, may be susceptible to erosion. • The parks are characteristic of the Darling Plateau Landscape Character Type. They have high visual landscape quality based on the occurrence of permanent waterbodies, riparian vegetation, incised valleys, isolated hilltops and distinctive areas of quality vegetation.	**OBJECTIVE** To protect the geomorphological features, soils and visual landscape qualities of the parks. **THIS WILL BE ACHIEVED BY:** 1. identifying geological/geomorphological features and soils types vulnerable to environmental damage and protecting these areas; and 2. applying *Policy Statement 34* prior to any development or management activity that may impact on the parks landscape values.			

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		PERFORMANCE MEASURE	TARGET	REPORTING REQUIREMENTS
MANAGING THE NATURAL ENVIRONMENT (CONTINUED)				
SOIL AND CATCHMENT PROTECTION • The quality of water flowing into St John Brook is fresh, with low levels of salinity and only occasional high levels of turbidity. Approximately 84% of the catchment is forested, of which 6.2% is protected within the parks. About 9.9% of the catchment is privately owned freehold land. • The Department may issue a permit to extract water from the parks. • Potential threats to water quality and flow within the parks arise from eutrophication, salinisation, sedimentation, groundwater abstraction and damming in the upper catchment.	**OBJECTIVE** To minimise soil erosion and protect the water quality and quantity of the parks. **THIS WILL BE ACHIEVED BY:** 1. requesting that the Environmental Protection Authority formally assess any proposals for land clearing and water extraction within the catchment where this may adversely affect the values of the parks; 2. following an appropriate level of assessment, and approval by the Conservation Commission, the Minister for the Environment and the Department of Environment, issuing permits for the extraction (taking) of water from the parks;	Changes in the area of land covered by woody perennial vegetation in the catchment. Changes in the streamflow of St John Brook.	No decrease in the area of land within the catchment covered by woody perennial vegetation. Allowing for natural variation, maintenance of the historical streamflow in St John Brook.	Every five years. Every five years subject to information provided by the Department of Environment and Water Corporation.
• The parks lie within a proclaimed groundwater catchment under the *Rights in Water and Irrigation Act 1914*.	3. preparing and implementing a rehabilitation plan for the parks and liaising with local landholders to maintain the forested area within the catchment; 4. liaising with developers, Shires, the Planning Commission, landholders and other agencies on land use planning issues; and 5. meeting annually with the Department of Environment and Water Corporation to discuss new information on water quality and quantity and to develop strategies to continue its protection and monitoring over time.	Annual flow weighted mean salinity levels in St John Brook.	Salinity trend in St John Brook to be neutral.	Every five years subject to information provided by the Department of Environment and Water Corporation.
NATIVE PLANTS AND PLANT COMMUNITIES • The parks lie within the Menzies Botanical Subdistrict and contain seven vegetation complexes. • Several wetland plant communities exist within the parks. Riparian vegetation potentially contains the greatest species diversity and is likely to contribute to the survival of ground-dwelling mammal species. • One Priority 4 species, stalked water ribbon, has been recorded within the parks. • The main threat to vegetation is alterations to water flow and quality in St John Brook.	**OBJECTIVE** To conserve indigenous plant species and communities. **THIS WILL BE ACHIEVED BY:** 1. identifying and protecting flora and habitats that are rare or in need of special consideration; 2. using fire to protect biodiversity within the parks; and 3. ensuring that any development, weed control and rehabilitation activities within the parks is undertaken with due regard to their potential impacts on conservation and visual landscape values.			

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		PERFORMANCE MEASURE	TARGET	REPORTING REQUIREMENTS
MANAGING THE NATURAL ENVIRONMENT (CONTINUED)				
NATIVE ANIMALS AND HABITATS • The parks function as a riparian wildlife corridor, comprising of riverine and upland jarrah forest habitats. They contain four specially protected fauna species and several 'Priority' taxa. • The primary threat to fauna is predation by foxes and inappropriate fire regimes.	**OBJECTIVE** To protect native fauna and their habitats. **THIS WILL BE ACHIEVED BY:** 1. protecting native fauna, particularly specially protected species, from introduced predators through appropriate control regimes if/as required; and 2. supporting the preparation and implementation of recovery and translocation plans for fauna species that are identified in, or reintroduced into, the parks.	Changes to the population size of critical weight range mammals within the parks. Evidence of second generation (F2) progeny from translocated species.	Recovery and maintenance of viable populations of critical weight range mammals within the parks. The successful establishment of translocated species.	As per recovery plans for individual species.
ENVIRONMENTAL WEEDS • Silver wattle is a high priority weed and is prevalent around recreation sites and nearby watercourses. • Watsonia, a high priority weed, is an aggressive coloniser of riparian habitats. • Cambray Siding contains numerous horticultural weed species.	**OBJECTIVE** To prevent species loss and community decline from weed invasion. **THIS WILL BE ACHIEVED BY:** 1. implementing the Department's commitments to the *EWS* and *Policy Statement No. 14* where weed invasion threatens the parks' conservation values, with an emphasis on species and communities of high conservation significance; 2. preparing and implementing a weed control plan; and 3. liaising with relevant agencies and landholders to negate the possible introduction of weed species, initiate control programs and co-ordinate ongoing assessment.	Changes in the area covered by species rated as High in the EWS or in the weed control plan.	No increase in the area covered by species rated as High in the EWS or in the weed control plan.	Every five years.

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		PERFORMANCE MEASURE	TARGET	REPORTING REQUIREMENTS
MANAGING THE NATURAL ENVIRONMENT (CONTINUED)				
INTRODUCED PROBLEM ANIMALS • The Department undertakes fox control as part of the Western Shield program. • Pigs frequent watercourses within the parks and can impact on riparian ecosystems. • Domestic dogs potentially threaten the ecological values of the park by disturbing wildlife and introducing disease. • Large numbers of feral honeybees at recreation sites can pose a visitor risk. • Exotic fish species such as trout predate on, and compete with, marron, native fish species and insects.	**OBJECTIVE** To negate the impacts of problem animals on the park's values. **THIS WILL BE ACHIEVED BY:** 1. continuing fox control as part of *Western Shield*; 2. prohibiting domestic animals, except seeing-eye dogs, dogs for the hearing impaired and dogs for search and rescue; 3. undertaking pig control and monitoring within the parks, with a focus on protection of significant species and habitats; 4. eradicating honeybees from around recreation sites; and 5. retaining the existing apiary site within the proposed St John Brook Conservation Park and prohibiting the introduction of any new sites or the transfer of sites.	Changes to the population size of critical weight range mammals within the parks.	No loss of species attributable to the impact of foxes.	Annually.
DISEASE • At present, *P. cinnamomi* is the most significant pathogen threatening native plants and fauna habitats of the parks. • *P. cinnamomi* can be spread by humans, vehicles and animals moving infested soil and plant material.	**OBJECTIVE** Protect the natural values of the parks from the impacts of *P. cinnamomi*. **THIS WILL BE ACHIEVED BY:** 1. determining the extent and influence of *P. cinnamomi* within the parks; 2. rationalising and managing access roads and/or tracks to uninfested areas, and prioritising and developing management actions in accordance with Policy Statement 3; 3. developing *P. cinnamomi* management plans prior to any operations requiring soil or plant material movement; 4. identifying and treating threatened species, threatened ecological communities and habitats where they have been given priority; and 5. providing the public with information about plant disease, emphasising the need to be clean on entry to uninfested areas and to stay on approved roads and tracks.	The number of sampled areas uninfested with *P. cinnamomi* following an operation with an approved disease management plan.	No new human-assisted infestations of disease caused by *P. cinnamomi* in uninfected protectable areas.	Every three years.

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		PERFORMANCE MEASURE	TARGET	REPORTING REQUIREMENTS
MANAGING THE NATURAL ENVIRONMENT (CONTINUED)				
FIRE • In the past 5 years, 46% of the parks and approximately 45% of the Blackwood Plateau Landscape Conservation Unit, which includes the parks, has been burnt through prescribed burning. • The linear shape of the proposed St John Brook Conservation Park increases its vulnerability to wildfire. • To optimise the conservation of biodiversity, an interlocking mosaic of vegetation representing a range of fire frequencies, intervals, seasons, intensities and scales is needed. • Fire management within the parks should be adaptive, utilising all available knowledge including life histories and vital attributes of the fauna and flora.	**OBJECTIVE** 1. Maintain fire diversity and hence biodiversity, and protect ecologically sensitive areas from inappropriate fire frequency or large and intense wildfire. 2. Protect life, property, community values and assets of the parks from wildfire. **THIS WILL BE ACHIEVED BY:** 1. maintaining a mosaic of vegetation which represents a diversity of fire regimes; 2. considering the vital attributes of flora and fauna species within the parks and, where possible, appropriately use fire to conserve biodiversity; 3. considering populations of priority flora and sensitive fauna habitats;		To be developed for the final management plan.	
• The Department will prepare a fire plan for the parks as part of the Master Burn Plan (MBP) planning process. The MBP is a rolling three-year prescribed fire program, which is available for public comment each year.	4. identifying risk mitigation strategies and consider this in planning to protect life, property and assets of the parks from large-scale wildfires; 5. undertaking fire response monitoring, including mode of regeneration of riverine forest and time-to-first flowering of plant species; and 6. adapting management to incorporate new knowledge and the impacts of wildfire.			
MANAGING CULTURAL HERITAGE				
INDIGENOUS AND NON-INDIGENOUS HERITAGE • One registered native title claim covers the parks (ie. WAG6279_98 South West Boojarah). • The Nannup Scarred Trees, located within the proposed Jarrahwood Conservation Park, is a registered site under the *Aboriginal Heritage Act 1972*. • Historic features mark the former townsite of Barrabup and the Barrabup mill. Other remnant features exist at the location of the former Barrabup Mill manager's house whereas infrastructure, such as railway bridges, exist along old rail formations.	**OBJECTIVE** To protect the parks' cultural heritage. **THIS WILL BE ACHIEVED BY:** 1. notifying relevant Native Title Claimants and authorities when proposing to undertake public works in registered heritage sites; 2. prohibiting public works that may have an adverse affect on registered heritage sites; 3. in accordance with the Burra Charter, developing management guidelines and an evaluation process for existing and potential heritage sites; and 4. progressively collate information on cultural heritage sites and maintain a register on the Departments RATIS database.			

PROPOSED ST JOHN BROOK AND JARRAHWOOD CONSERVATION PARKS: MANAGEMENT SUMMARY

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		PERFORMANCE MEASURE	TARGET	REPORTING REQUIREMENTS
MANAGING RECREATION AND TOURISM				
RECREATIONAL OR VISITOR USE AND OPPORTUNITIES • The parks are particularly popular for picnicking, sightseeing, swimming, fishing, marroning, camping, bicycling, motorbike riding, four-wheel driving and bushwalking. Visitation has increased markedly since 1999. The most popular recreation areas are Barrabup and Workmans pools and Cambray Siding. Cambray Siding is unmanaged and constitutes a maze of tracks and open space. • Bushwalking and cycling occurs along the 20 km Old Timberline Trail (see Map 2). • The Munda Biddi Mountain Bike Trail will traverse the proposed St John Brook Conservation Park and be aligned along the disused Cambray Siding Railway line. • Falling limbs and collision with submerged obstacles while swimming pose the most serious risks to visitor safety.	**OBJECTIVES** 1. Provide and enhance opportunities for recreation that are consistent with the parks' values, and which minimises conflict between visitors. 2. Ensure visitor safety through appropriate design and regular assessment of recreation areas. **THIS WILL BE ACHIEVED BY:** 1. providing an overflow carpark and, subject to Aboriginal clearance, basic campsites upslope of Barrabup Pool; 2. subject to the maintenance of visitor satisfaction levels, designating the Old Timberline Trail as dual use for walking and cycling. If visitor satisfaction levels are not maintained, the trail will be used for walking only; 3. developing sustainable recreation opportunities along the Old Timberline Trail, including a walk/cycle-in campsite; 4. developing Cambray Siding for recreation;	Change in the area of disturbance zone around campsites. The satisfaction that visitors express with their visit in relation to the use of dual use trails.	Over the life of the plan, no increase in the disturbance zone around campsites from 2004 levels. No reduction in visitor satisfaction because of cycling on designated dual use trails.	Every 5 years.
	5. developing the Munda Biddi Mountain Bike trail along the disused Cambray Siding Railway line; 6. managing campfires by: • permitting campfires in designated fire rings only. • providing fuel (wood or gas barbeques) at Barrabup and Workmans pools and along the Old Timberline Trail where it is economically feasible to do so. • gazetting 'Firewood Collection Areas' in State forest and timber reserves elsewhere within the region. 7. evaluating applications for commercial concessions according to Departmental policy and the CALM Act and permitting their establishment where appropriate. 8. implementing visitor risk management within the parks in accordance with *Policy Statement No. 53*; and 9. providing onsite information and interpretation for visitors.	Percentage of accidents/incidents per visit reported annually to the Department. Number of accidental fires in the parks.	The percentage of accidents/incidents per visit reported annually to the Department remains stable or decreases from 2004 levels. Reduction in the number of accidental fires in the parks from 2004 levels.	
VISITOR ACCESS • The proposed St John Brook Conservation Park is accessed via Mowen Road, which provides access to Barrabup and Workmans pools. • The intersection of Barrabup Pool and Mowen Road is potentially dangerous to visitors. • South of Cambray Siding, a section of the western side of St John Brook is designated as management access only and access for the proposed Old Timberline Trail.	**OBJECTIVE** To provide a range of access types that are consistent with the parks values. **THIS WILL BE ACHIEVED BY:** 1. maintaining roads required for public access (Map 2); 2. closing and, where appropriate, rehabilitating tracks deemed unnecessary or inappropriate;	The satisfaction that visitors express with their visit in relation to park access.	No reduction in visitor satisfaction levels due to altered access patterns over the life of the plan.	Every 5 years.

PROPOSED ST JOHN BROOK AND JARRAHWOOD CONSERVATION PARKS: MANAGEMENT SUMMARY

KEY POINTS	OBJECTIVES AND STRATEGIES	KEY PERFORMANCE INDICATORS*		
		PERFORMANCE MEASURE	TARGET	REPORTING REQUIREMENTS
VISITOR ACCESS (CONTINUED) • Brook Road, south of Mowen Road, provides four-wheel-drive access to the Blackwood River.	3. closing disused logging roads in adjoining State forest where they do not assist in park management and incorporating this into the harvesting approval process; and 4. ensuring that safety considerations are incorporated into all road designs, especially when sealing Mowen Road.			
MANAGING RESOURCE USE				
• One petroleum exploration title held by Empire Oil Company (WA) Ltd (EP416), covers the parks.	**OBJECTIVE** To minimise the impact of exploration and resource extraction on values of the parks whilst being consistent with Government policy. **THIS WILL BE ACHIEVED BY:** 1. making submissions in relation to petroleum proposals for the parks to reduce the effect of petroleum operations on the values of the parks.			

Note: where there is a target shortfall for any of the key performance indicators, the Department will investigate the cause and report to the Conservation Commission for action.