

Savage River National Park

Savage River Regional Reserve

Management Plan 2001

SAVAGE RIVER NATIONAL PARK and SAVAGE RIVER REGIONAL RESERVE DRAFT MANAGEMENT PLAN 2001

This draft Management Plan for Savage River National Park and Savage River Regional Reserve has been prepared in accordance with the requirements of Part IV of the *National Parks and Wildlife Act 1970*.

Unless otherwise specified, this plan adopts the interpretation of terms given in Section 3 of the *National Parks and Wildlife Act 1970*. The term "Minister" when used in the plan means the Minister administering the *Act*. The term "park" refers to Savage River National Park; the term "regional reserve" refers to Savage River Regional Reserve.

In accordance with S.23 of the *National Parks and Wildlife Act 1970*, the managing authority for the park and the regional reserve, in this case the Director of National Parks and Wildlife, shall carry out his or her duties in relation to the park and the reserve for the purpose of giving effect to, and in accordance with, the provisions of this Management Plan.

Appendices do not form part of the statutory management plan. The plan may only be varied in accordance with procedures set out in Sections 19 and 20 of the *National Parks and Wildlife Act 1970* and, in any case, will be reviewed ten years after approval of the plan by the Governor.

Management Plan Structure

The management plan sets out the long term objectives, the zoning and management prescriptions necessary to meet those objectives. It consists of three main parts:

Part A describes the physical features, values, uses and management of Savage River National Park.

Part B describes the physical features, values, uses and management of Savage River Regional Reserve.

Part C describes issues and management prescriptions applicable to both Savage River National Park and Savage River Regional Reserve.

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ISBN

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Making a Representation - What do you think?

Copies of this draft plan are available for inspection or purchase at Service Tasmania centres in Launceston, Burnie and Devonport and Hobart. Copies will also be made available at the Launceston, Ulverstone and Smithton offices of the Parks and Wildlife Service, Department of Primary Industries, Water and Environment.

When writing a representation:

What do you think of the proposals in this draft management plan? This is your chance to have your say on how we are proposing to manage Savage River National Park and Savage River Regional Reserve for the next 10 years. Please make your representation concise and clear. It will help if you refer to the section numbers in the plan. Say whether you agree or disagree with the action proposed. Where possible, give reasons and provide sources of information. Suggest alternatives if you disagree. Giving reasons, offering information and alternative suggestions will help improve the plan.

All representations received are public documents and will be made available to relevant officers of the Department of Primary, Industries, Water and Environment and any member of the public who wishes to view them. If you do not wish your representation to be viewed by other members of the public, please mark the representation as 'Confidential'. Please note that all representations are potentially accessible under the Freedom of Information Act.

How is your representation assessed?

The Minister will consider all representations made with respect to the draft plan and may make alterations to the draft plan having regard to the representations. As a general guide, and depending on all the circumstances, the draft plan may be amended if a representation:

- provides new information relevant to planning and management;
- indicates misunderstanding about proposed policies and actions;
- clarifies or proposes actions that would better achieve management objectives;
- identifies a lack of policies or actions for particular issues; or
- corrects errors, omissions or lack of clarity.

Similarly, the draft plan may not be amended if a representation:

- contradicts proposals for which there is widespread support;
- conflicts with government policy;
- is contrary to the intention of relevant legislation or national or international conventions or agreements;
- is among widely divergent viewpoints better handled or balanced by the proposed policies or actions;
- addresses issues beyond the scope of the plan (e.g., outside park boundaries); or
- ignores or contradicts relevant established facts.

How much time do you have?

This draft management plan was released for public comment on the 10 March 2001 and representations on the draft plan to the Minister will be accepted until **4 May 2001**. Your representation should be sent to:

The Minister for Primary Industries, Water and Environment
First Floor
Franklin Square Offices
Hobart, Tasmania 7000

Summary

The reservation of the Savage River National Park and Savage River Regional Reserve forms part of the Tasmanian Government's commitment under the Commonwealth and Tasmanian Regional Forest Agreement (RFA) to increase the protected status of under-reserved forest types in Tasmania. The areas were reserved on the basis of their ability to contribute to a world class CAR (Comprehensive, Adequate and Representative) reserve system in Tasmania.

Under the Regional Forest Agreement, a number of National Estate Values were assigned to the park and regional reserve. These values reflect the area's rich primitive flora, undisturbed river catchments, high quality wilderness, old growth forests, geodiversity and natural landscape values. The region is also a centre for endemic flora. The park and regional reserve form part of the National Estate listing for the Savage River Region and part of the interim listing for the Tarkine Wilderness Area.

The two reserves, with a combined area of 35 660 hectares, are located in north-west Tasmania. The rainforest located on the Savage River Plateau is the largest contiguous area of cool temperate rainforest surviving in Australia. The area is an outstanding biological resource and a major refuge in Australia for myrtle (*Nothofagus cunninghamii*) dominated rainforest, a type of forest with strong affinities to Gondwanic land flora. A high diversity of rainforest communities occur within the park including representative callidendrous, thamnnic, implicate and intermediate callidendrous/thamnnic rainforest communities. Botanically, the area is considered to be of international significance.

The western portion of the park and the regional reserve constitute part of the most extensive basalt plateaux in Tasmania that still retains a wholly intact forest ecosystem. These basalt substrates provide rich and fertile soils which support most of the tallest (over 30 metres) callidendrous rainforest in the region. Basalt soils are highly productive and are greatly sought after for agriculture and forest production. Therefore, the remaining forested areas on basalt soils at higher elevations are particularly important for forest conservation.

The park and regional reserve contain habitat for a diverse rainforest fauna and is believed to be a stronghold for a number of vertebrate species and communities which have suffered population declines elsewhere in Tasmania and mainland Australia.

The majority of the park is remote and has no visitor facilities but it does offer a remote area wilderness experience to self reliant visitors, such as experienced bushwalkers. However, opportunities for visiting the park by conventional vehicle will be provided to the more accessible points of the park. In addition, the surrounding regional reserve contains a number of existing tracks which provide recreational opportunities such as bushwalking, fishing, camping, scenic four-wheel driving, rafting, canoeing and kayaking.

The major management initiatives for the park and regional reserve are summarised below:

- to promote cooperative management arrangements with Forestry Tasmania and the mining industry sector to ensure that surrounding resource use on State forest and the regional reserve does not impact on the wilderness values and biological integrity of the park;
- to ensure that resource utilisation within the regional reserve is conducted in a sustainable manner;
- to provide for tourism and recreational opportunities within the regional reserve while maintaining the national park as a core wilderness area;

- to implement fire management strategies to reduce the risk of wildfire impacting on the values of the reserves, and
- to minimise the impact of myrtle wilt disease on mature myrtle forest within the reserve areas.

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1 Overview**1.1 Location, Regional Context and Reservation History**

The Savage River National Park is located in north-west Tasmania (see Map 1), approximately 45 kilometres south-west of Burnie, via the Murchison Highway. The park has a total area of 17 980 hectares.

The exact boundaries of the park are set out on registered Plan Number 4351 and located in the Central Plan Office, Department of Primary Industries, Water and Environment in Hobart.

Regional Context

The north-west part of Tasmania is a densely forested region that was assessed for natural, cultural and economic values during the comprehensive regional assessment, undertaken as part of the Tasmanian-Commonwealth Regional Forest Agreement. This assessment identified broad-scale CAR (Comprehensive, Adequate and Representative) values for forested areas of the state that cover wilderness, old growth forest and biodiversity (defined as the diversity of different forest communities and the presence of threatened species). This process identified high quality wilderness values, old-growth forest communities and key fauna habitat for threatened species within the boundaries of the park.

The national park and adjacent regional reserve were created as additions to this CAR reserve system in Tasmania in order to improve the representation of rainforest on particular soil types and elevations. The forest communities of the park and regional reserve were mapped as part of the comprehensive regional assessment.

Reservation History

The park constitutes the eastern half of what was a much larger Recommended Area for

Protection (RAP) of 35 320 hectares. In 1988, the Working Group for Rainforest Conservation recommended that the Savage River RAP should be reserved as a conservation area to protect rainforest on associated geology/altitude groups. However the future of the Savage River RAP remained unresolved due to forestry and mining interests until 1997.

The Savage River RAP was referred to the Public Land Use Commission, now known as the Resource Planning and Development Commission (RPDC), as part of the inquiry into the determination of appropriate land use classifications during the Regional Forest Agreement process. The RPDC recommended that the eastern portion of the Savage River RAP become a national park and regional reserve. Both reserves were subsequently gazetted on 30 April 1999.

1.2 Importance of the Park

The value of the park resides in it being the single largest area of unburnt and unfragmented rainforest remaining in Tasmania. The park is also biologically and geologically important as it forms a large area of virtually undisturbed habitat. All forest community types present in the park and the regional reserve have been identified as priority forest communities during the comprehensive regional assessment for the RFA.

The Savage River Region has been listed on the Register of the National Estate, in recognition of its natural values. In light of the RFA, Tasmania has agreed to protect National Estate values. These values include high quality wilderness, old growth forest and the presence of rare and vulnerable species (an indicator of biodiversity). The park forms approximately a third of the area covered by the Savage River Region National Estate listing. The area also forms

part of the National Estate Register interim listing for the Tarkine Wilderness Area. A wide diversity of flora, fauna, landforms and scenic features characterise the park. In addition, the park has outstanding wilderness, habitat and undisturbed catchment values. Much of the park is generally inaccessible by vehicle, with the exception of forestry tracks to the east of the park. There are several mineral prospecting tracks to the south of the park that are largely overgrown and inaccessible by vehicle. The park contains no infrastructure. It is remote and contains difficult terrain, therefore only those people with good navigational and survival skills should attempt to bushwalk in the area.

Sections of the Arthur River to the east of the park can be accessed at various bridge crossings where fishing and informal camping occurs.

The park is important for wildlife conservation. There are several species of particular interest including the threatened endemic subspecies of swamp antechinus (*Antechinus minimus minimus*) and the rare broad-toothed mouse (*Mastacomys fuscus*). The spotted-tailed quoll (*Dasyurus maculatus maculatus*) and brown bandicoot (*Isodon obesulus*) are also believed to occur. Five species of bat are known to occur in the park and at least five species of aboreal (tree living) mammal.

The large tracts of rainforest found in the area form an important refuge for wet forest avifauna in Tasmania, including the endangered Tasmanian wedge-tailed eagle (*Aquila audax fleayi*) and the white form of the grey goshawk (*Accipiter novaehollandiae*).

The wet forest invertebrate fauna is believed to be diverse and includes many groups of Gondwanan descent. Small crustaceans known as amphipods have undergone great adaptive radiation in Tasmanian forests. At least eight species are present in the park, with the greater Tarkine region being one of the richest centres of diversity in the world. The giant freshwater crayfish (*Astacopsis gouldi*), which is rated as vulnerable, has

been found in the Keith River, the headwaters of which originate in the park.

The park holds considerable scientific interest due to the high number of endemic species, rare flora and fauna and significant vegetation communities. There are also a number of interesting geological features including the presence of basalt and basalt derived soils on Tertiary volcanics and possible magnesite karst features. The park and regional reserve have considerable scientific research potential for discovering previously undescribed species. There is considerable potential for the area to form an important educational resource focussing on the ecology of temperate rainforest.

1.3 Adjacent Land Use

1.3.1 Forestry Activity

The forests adjacent to the park and regional reserve are utilised for timber production by Forestry Tasmania. The area comes under the Murchison Forest District which is scheduled for the supply 400 cubic metres of Huon pine, 1700 cubic metres of blackwood, 2000 cubic metres of celery top pine (combined Murchison and Circular Head Districts) and 5000 metres of myrtle and sassafras between the period 1999-2002 (Forestry Tasmania, 1999).

On the northern boundary of the park, Forestry Tasmania has established the Arthur River Forest Reserve and a number of informal reserves, most significantly on the north-west boundary of the park. These reserves are exempted from timber harvesting but allow for other forestry activities including research, conservation works and fire management, subject to the Forest Practices Code.

1.3.2 Mineral Exploration and Mining (see Section B5.1)

The regional reserve adjacent to the park is available for mineral exploration, mining and quarrying activity. Two large-scale projects exist just outside the area, these include the delineation drilling of a magnesite resource south of the Arthur River

and iron ore mining from the Savage River mine several kilometres south-west of the park.

1.4 Threats to Park Values

Fire is the most serious threat to rainforest values in the Savage River region. Whereas myrtle wilt (*Chalara australis*) is the most significant plant disease.

There are a number of factors that detract from or have the potential to diminish the values and character of the park and the regional reserve. These factors include:

- activities associated with forestry, mineral exploration and mining such as roading, the increased risk of fire, habitat fragmentation, disease and intrusion of sclerophyll or other exotic species;
- wildfire which threatens the safety of visitors, and the long term survival of rainforest flora and specialised fauna;
- introduced plants, animals and diseases which invade the ecosystem and displace or destroy native species;
- unsuitable developments or activities which degrade natural or cultural values or spoil the character of the park, and
- the creation of an unplanned track network will increase access by visitors to vulnerable locations.

These factors must be effectively dealt with if the values and character of the park are to be retained in the long term.

2 Vision and Management Objectives

2.1 The Vision for the Park

Developing a vision for the park allows people to picture how the park will be in the future and to provide direction to management. This long term vision provides goals for sustaining the values of the park into the future by avoiding inappropriate development and undesirable management practices.

2.1.1 The Vision

That the park continues to exist as an unfragmented and intact ecosystem where evolutionary and ecological processes are able to occur unhindered by human activities and where land use practices adjacent to the park are carried out in such a way as to ensure minimal disturbance to park values.

A series of vision statements exist for the park. These statements are not listed in order of priority and have equal importance.

- The park contains a healthy and natural biodiversity, with viable populations of all native species and with minimal disturbance from human activities.
- There has been no significant disturbance to the land and no contamination of the land, air and water through human activities.
- The Aboriginal and historic heritage of the park is identified, well protected and interpreted for the public.
- Visitors are able to enjoy quiet and peaceful surroundings, and to pursue recreational activities based on the natural features of the park.
- Educational and research programs that provide an improved understanding of natural systems and species and that assist with management are encouraged.

2.1.2 Achieving the Vision

A series of performance indicators listed in Appendix 1 can be used to evaluate the success in implementing the management plan and the achievement of plan objectives. Each section of the management plan lists a series of specific management actions which provide more specific information on how the vision for the park is to be achieved in an operational sense.

These actions are measurable and will be used to evaluate implementation of the management plan to determine whether the vision for the park has been achieved.

Policies

- Review the plan ten years after gazettal or sooner if research, monitoring, or other circumstances demonstrate that this is required.
- In reviewing the plan, evaluate the implementation of the management actions and their effectiveness in achieving the management objectives for the park.
- Use the implementation schedule set out in Appendix 1 when evaluating the plan's implementation and outcomes.

2.2 Purposes and Management Objectives of National Parks

National parks are a class of reserved land under the *National Parks and Wildlife Act 1970*. They are large natural areas of land containing representative or outstanding samples of major natural regions, features or scenery.

Purposes

The purposes of reservation of national parks, as set out in the *National Parks and Wildlife Act 1970*, are the protection and maintenance of the natural and cultural

values of the area of land while providing for ecologically sustainable recreation consistent with conserving those values. Savage River National Park is reserved for these purposes.

Management Objectives

The complexity of factors to be considered in managing the park and the reasons these management objectives apply and the manner in which the management objectives will be achieved, are discussed in a number of different sections of the management plan. Those sections of the management plan that deal primarily with each management objective in the Act are shown in brackets.

The management objectives of national parks are set out in the *National Parks and Wildlife Act 1970* as follows:

- a) to conserve natural biological diversity (see Sections 3.4 and 3.5);
- b) to conserve geological diversity (see Section 3.2);
- c) to preserve the quality of water and protection of catchments (see Section 3.3);
- d) to conserve sites or areas of cultural significance (see Section 3.7);
- e) to encourage education based on the purpose of reservation and the natural or cultural values of the national park, or both (see Section 5.2);
- f) to encourage research, particularly that which furthers the purpose of reservation (see Section 10.1);
- g) to protect the national park against, and rehabilitate the national park following, adverse impacts such as those of fire, introduced species, diseases and soil erosion on the national park's natural and cultural values and on assets within and adjacent to the national park (see Section 4);
- h) to encourage tourism, recreational use and enjoyment consistent with the

conservation of the park's natural and cultural values;

- i) to encourage cooperative management programs with Aboriginal people in areas of significance to them in a manner consistent with the purpose of reservation and the other management objectives (see Sections 3.7 and 10.1), and;
- j) to preserve the natural, primitive and remote character of wilderness areas (Section 3.6).

Not all the management objectives for national parks detailed in the Act will necessarily apply to every park. Savage River National Park was created primarily for the protection of significant natural values, particularly rainforest and wilderness. The size of the park combined with the lack of development and relative inaccessibility means this park is ideally suited to wilderness protection. By taking these considerations into account management objective h) will apply to the park but with qualifications. The park will continue to be available for self-reliant recreation and limited recreational opportunities provided for on the perimeter of the park. A broader range of recreational opportunities will be provided for within the adjacent regional reserve and nearby Hellyer Gorge State Reserve.

2.3 Management Zones

The park has been zoned to ensure appropriate management and use in different parts of the reserves and to separate potentially conflicting use (see Table A1).

Objectives

The objectives of zoning are to:

- take account of localised features, conditions, and values;
- ensure substantial areas of the national park remain undisturbed; and

- protect and enhance national park values by directing tourism and recreation development to designated locations outside the park.

Policies

- Two management zones will apply to the park (refer to Map 3).

These are:

1. Wilderness Zone
 2. Natural (Limited Vehicle Access) Zone
- Tourism and recreation facilities and services will be provided for in the regional reserve and limited to those provided for in Section 6.1.2 of this management plan.
 - If vehicle access in any zone of the park or regional reserve needs to be restricted, apply the provisions of Regulation 12 of the *National Parks and Reserved Land Regulations 1999* or revise the management plan if permanent restricted areas are necessary.

Table A1 Management Zones – Savage River National Park

ZONE or SITE	DESCRIPTION	OBJECTIVES	POLICIES
Wilderness Zone	The Wilderness Zone includes the entire park as an area of high wilderness quality having remote and natural characteristics. It also includes some areas of lower wilderness quality due to the presence of roads and tracks.	<p>To allow natural processes to operate with minimal interference.</p> <p>To maintain the wilderness character of naturalness, tranquillity and isolation.</p> <p>To retain a challenging unmodified natural setting that suitably equipped people can visit for wilderness recreation and scientific purposes.</p>	With the exception of low impact walking tracks, no visitor facilities will be provided in this zone. Refer to Section 6.1.1.
Natural Zone (Limited Access)	This zone encompasses Junction Road which runs along the north-east boundary of the park but can only be accessed from one direction by vehicle.	<p>To provide access to one section of the park by vehicle for scenic driving at suitable times of the year when the fire risk is low.</p> <p>To recognise that this road provides the only opportunity for vehicle based visitors to experience a section of the park.</p>	Maintain road access for conventional vehicles and provide low key visitor facilities as outlined in Section 6.1.2.

3 Conservation

3.1 Topography and Climate

Most of the park is characterised by undulating hill country with ridges aligned south-west by north-east and deeply dissected by steep river valleys. This landscape has formed as a result of successive geological events. The Savage River (from which the park takes its name) is a deeply incised gorge that formed along fault lines running parallel to the Arthur Lineament, a belt of Precambrian metamorphic rocks which extend from Conical Rocks to Rocky Cape. The relatively linear north-east to south-west direction of the Savage River along the western boundary of the park is due to the presence of this extensive geological feature.

The Savage River is probably one of the more spectacular landscape features of the park. Another dominant topographic feature is Baretop Ridge which is an elevated ridge ranging from 600 to 700, located on the eastern side of the park. This feature has formed along a south-west to north-east orientation and appears to be composed of more siliceous rocks than the rest of the area, and probably remained as a slightly more elevated residual ridge above the erosion surfaces. The entire region has a high erosion hazard due to a combination of high rainfall and steep slopes (Richley, 1978).

The climate of the Savage River region is characterised by cool temperatures and high rainfall. Mean daily temperatures are in the range of 12 -20°C in summer and 3.5-9°C during the winter months. Frosts are frequent during the colder months and occasional snowfalls do occur. The park receives between 1500 to 2000 millimetres of rainfall annually, the majority of which occurs between June and August. Although there is a predominance of rainfall in winter, heavy rainfall may occur throughout the year.

3.2 Geodiversity

Geodiversity refers to the natural range or diversity of geological (bedrock), geomorphological (landform) and soil features, assemblages, systems and processes.

The geology of the region is dominated by the Arthur Lineament. Most of the park is underlain by greywackes ('dirty sandstones') and slatey mudstones of the Precambrian Age known as the Burnie and Oonah Formations, these rocks were metamorphosed to schists during the Cambrian period.

During the Tertiary period approximately 36 million years ago, a major phase of vulcanism occurred in north-west Tasmania. A large part of the area was covered by flood basalts, forming the plateaux which now covers the western part of the park. Only in north-west Tasmania did lava flows form unconfined basalt plains. In the upper Savage River area, the original flows were less widespread, and residual basement hills, including Baretop Ridge and the Precambrian hills that source the Rapid River remained above the lava flows during this volcanic period.

The south-eastern corner of the park has Cambrian mafic volcanics and ultramafics. All are partly covered by later Permian sediments and Tertiary basalt or Tertiary sediments. The park lies to the east of the Arthur Lineament within an area of poorly known pelitic schists of the Oonah Formation which is considered to have a low mineral prospectivity.

It is highly unlikely that any glaciation has occurred in the park. However there are possible karstified areas in the Oonah Formation rocks, which underlie a large portion of the park. However, no specific carbonate beds have been mapped in the Oonah Formation within the park, nor have any karst features been identified in that area.

A detailed study of the magnesite karst area in the north-west Tasmania did not identify any magnesite karst within the park (Household et al., 1999). Magnesite karst is a geomorphological feature within magnesite that is relatively rare in Australia and of considerable geoconservation significance. There are karst outcrops, and dolomite (carbonate rock) near the Arthur River, in the vicinity of Farquhars Bridge immediately north of the park.

Strong brown and yellowish brown podzolic soils (mainly with gradational profiles) cover most of the Savage River land system with strongly leached krasnozems on the extensive Tertiary basalt plateaux. A deep and uniformly textured light clay occurs on the footslopes whereas shallow skeletal soils occur on minor flowlines. Patches of gravelly red soils are also present (Richley, 1978). The krasnozem soils on the Tertiary basalt plateaux in the Arthur Lineament region are considered to be highly significant, as they represent the largest area of basalt soils in Tasmania that have not been cleared for agriculture and which still support undisturbed natural vegetation communities (Sharples, 1992).

The northern section of Baretop Ridge supports an area of blanket bog peat soils. These soils occur on flat to relatively steep undulating terrain, generally supporting cottongrass moorland vegetation. The soils, part of a more extensive blanket bog soil system in western Tasmania, are globally rare, and therefore of international geoconservation significance. These soils are highly erodible and will degrade if subjected to inappropriate burning regimes and are also extremely prone to physical disturbance. Given the inaccessibility of Baretop Ridge, neither of these factors is expected to be a problem within the park.

Objectives

The objectives of geoconservation in the park are to:

- protect, maintain and monitor geodiversity;

- protect, maintain and monitor sites of geoconservation significance;
- maintain the natural rates and magnitudes of change in earth processes; and
- minimise harmful impacts on geoconservation values.

Policies

- The geoconservation values of remaining natural systems will be best protected if human disturbance is minimised.
- Potential adverse impacts on geodiversity and earth processes will be assessed when planning any development or action, including land rehabilitation and stabilisation (see Section 4.3).
- Management practices and development will avoid or otherwise minimise impacts on the integrity of sites of geoconservation significance.

Actions

- Prepare and disseminate an inventory of sites of geoconservation significance.
- Monitor impacts on geodiversity.
- Promote public awareness and appreciation through public education and interpretation is required to minimise disturbance to geoheritage sites.

3.3 Water Quality

The park straddles the Pieman and Arthur River catchments. Numerous creeks originating in the park drain into the Savage River which in turn drains southwards into the Pieman River near Corinna. The Keith River, in the north of the park, originates on the western slopes of Baretop Ridge and drains into the Arthur River. The water

quality of these creeks is very high and supports rich and diverse aquatic environments.

The *State Policy on Water Quality Management 1997* requires that Protected Environmental Values (PEVs) and water quality objectives are set for all surface waters in Tasmania. The following Protected Environmental Values are proposed for Savage River National Park, having regard for the management objectives for national parks outlined in Schedule 4 of the *National Parks and Wildlife Act 1970*.

- A. Protection of Aquatic Ecosystems
 - (i) Protection of pristine or nearly pristine ecosystems.
- B. Recreational Water Quality & Aesthetics
 - (i) Primary contact water quality
 - (ii) Secondary contact water quality
 - (iii) Aesthetic water quality

That is, as a minimum, the water quality for the park shall be managed to provide water of a physical and chemical nature to support a pristine or near pristine aquatic ecosystem and which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in an aesthetically pleasing waters.

Actions

- Establish baseline water quality monitoring sites at key locations within the park to measure the impacts on water quality from adjacent land use activities.
- Respond to pollution incidents within the park involving any hazardous or noxious substances.

3.4 Flora

The vegetation of the park is dominated by cool temperate rainforest (See Map 4). These forests are of ancient origin and represent the remnants of once widespread

rainforests of the supercontinent Gondwana which split up around 50 million years ago. Australia, New Zealand and South America still possess related relict rainforest communities from these ancient times. The park has major floristic significance and provides evidence of Tasmania's ancient past.

Rainforest is defined as vegetation with trees greater than eight metres tall and dominated by one or more of the following species: myrtle (*Nothofagus cunninghamii*), sassafras (*Atherosperma moschatum*), leatherwood (*Eucryphia lucida*) and celery top pine (*Phyllocladus aspleniifolius*) which must be capable of regeneration in the absence of broad-scale catastrophic disturbances (Jarman, 1983).

The Savage River area contains some of the tallest and best examples of old growth undisturbed rainforest in Tasmania. All of the forest community types present in the park have been identified as priority forest communities during the comprehensive regional assessment. These communities within the park are callidendrous and thamnic rainforest on fertile sites (7394 ha.) and thamnic rainforest on less fertile sites (7562 ha.). The park is considered to be a major refuge for myrtle dominated rainforest and contains extensive stands of myrtle forest of which 50% is tall (>25 metres) and 50% short (8-25 metres). Five different rainforest communities have been identified in the park. They include;

1. Implicate rainforest dominated by celery top pine, myrtle beech and Myrtaceae spp.). over white waratah (*Agastachys odorata*) occurs on Precambrian mudstone;
2. Thamnic rainforest dominated by myrtle beech - leatherwood, celery top pine over Horizontal (*Anodopetalum biglandulosum*) is widespread and favours poorly-drained sites on basalt;
3. Callidendrous rainforest dominated by myrtle and sassafras over a tree fern (*Dicksonia antarctica*) and/or mother shield-fern (*Polystichum proliferum*)

understorey is widespread and favours well-drained basalt soils;

4. Intermediate rainforest dominated by myrtle beech, sassafras, leatherwood over hard water-fern (*Blechnum wattsi*)-tree fern favours steep-sloped basalt soils and characterised by the absence of horizontal and the presence of leatherwood. The understorey is dominated by tree fern and or mother shield-fern, and
5. Intermediate rainforest dominated by myrtle and sassafras over horizontal favours level sites.

The area contains a high number of higher plant species, many of which are endemic to Tasmania. The park contains seven plant species classified as rare or threatened under the Tasmanian *Threatened Species Protection Act 1995* (see Table A2). The area is also important for the conservation of lower plants. Two hundred and thirty nine bryophyte species representing 93 mosses and 146 liverworts have been identified so far for the Tarkine region.

There are small areas of wet sclerophyll forest communities present occurring in small isolated patches in the north-east and south-west corners of the park. These wet forests are dominated by tall white-topped stringbark (*Eucalyptus delegatensis*) (25 ha.), tall Smithton peppermint (*E. nitida*) (200 ha.), tall messmate stringybark (*E. obliqua*) (1500 ha.), tea-tree (*Leptospermum lanigerum*) and scented paperbark (*Melaleuca squarrosa*) swamp forest.

Dry sclerophyll communities include *Eucalyptus nitida* and *Eucalyptus obliqua* dry forest and blackwood (*Acacia melanoxylon*) (37 ha.), forest on rises. A significant component (2500 ha.) of the park includes vegetation that is classified as non-forest and was not mapped as part of the comprehensive regional assessment exercise.

The vegetation of these unmapped areas is comprised of communities such as moorland buttongrass and wet scrub communities. A small area of buttongrass moorland is known to occur on Baretop Ridge but its extent is

unknown. Buttongrass vegetation can include sedgelands, graminoid heathlands and scrub. They are characterised by mostly evergreen long lived perennials with small hard leaves. They are adapted to low fertility soils and have characteristics which facilitate their regeneration after fire. These communities are isolated and confined to Baretop Ridge and have probably originated from a natural fire regime.

The vegetation of the park has significant conservation value meaning that the conservation of plant communities and species is one of the major considerations of management.

Objectives

The objectives of flora conservation in the park is to:

- protect, maintain and monitor natural flora diversity;
- protect, maintain and monitor threatened flora species;
- protect, maintain and monitor plant communities of conservation significance and;
- minimise harmful impacts on park's indigenous flora.

Policies

- The following areas will be given high flora conservation priority:
 - rainforest communities;
 - restricted wet forest communities, and
 - any area containing threatened flora species or communities of conservation significance.
- Adverse impacts in high conservation priority areas will be avoided or limited to those which are localised and of minimal impact.
- Only local provenance of species native to the park will be used in rehabilitation works unless written approval is given for alternatives.

Table A2 Threatened Flora Species of Savage River National Park and Savage River Regional Reserve

Species	Common Name	Status
<i>Acacia gunnii</i>	ploughshare wattle	rare
<i>Acacia mucronata</i> var. <i>dependens</i>	variable sallow wattle	rare
<i>Caladenia alpina</i>	alpine caladenia	rare
<i>Dichelachne inaequiglumis</i>	asymmetrical plume-grass	rare
<i>Pimelea filiformis</i>	trailing rice-flower	rare
<i>Polygonum plebeium</i>	small knotweed	insufficiently known
<i>Senecio velleioides</i>	forest groundsel	rare
<i>Thelymitra circumsepta</i>	naked sun orchid	rare

- All practicable efforts will be made, consistent with the available resources, prevailing Fire Danger Index, fire intensity and fire crew safety, to exclude unwanted wildfire from or restrict its spread in high conservation priority areas.
- The collection of deadfall or cutting of trees for firewood or for other purposes in the park is illegal and regulations pertaining to this will be enforced.

Actions

- Map the extent and describe the non-forest communities present in the park.
- Prioritise the protection of the remnant, fire-excluded plant communities where possible to exclude wildfire (see Section 4.1).
- Prepare and/or implement management programs for threatened flora species and communities of conservation significance.
- Populations of rare species should be surveyed to determine their vigour and whether regeneration is occurring. Permanent plots should be established and monitored long term for this purpose.

3.5 Fauna

The rainforests of the Savage River area are an extremely valuable habitat for many

species including wet forest birds, unusual reptilian species and amphibians such as the Tasmanian tree frog (*Litoria burrowsae*). The comprehensive regional assessment identified key fauna habitat for rare and threatened forest fauna (north-east edge) and primitive and relictual fauna over most of the park. Table A3 lists those threatened species that have been recorded in the park.

Mammals

Twenty-two mammal species are known to occur in Tasmanian rainforest; a number of these are endemic to Tasmania including the Tasmanian devil (*Sarcophilus harrisi*), the dusky antechinus (*Antechinus swainsonii swainsonii*) and the rare broad-toothed mouse (*Mastacomys fuscus*) all occur in the area. The spotted-tailed quoll (*Dasyurus maculatus maculatus*) and brown bandicoot (*Isodon obesulus*) may be present in the park. The endemic long-tailed mouse (*Pseudomys higginsi*) occurs principally in rainforest habitat but has not been recorded in the park to date.

Old growth eucalypt forest provide hollows and cavities for five species of aboreal mammal, and at least five bat species. There are no introduced mammal species known to occur within the park.

Birds

The large tracts of rainforest found in the area are regarded as the most important refuge for wet forest avifauna in Tasmania. To date, sixty-two bird species have been recorded in the region covering the park. Two species of particular interest include the endangered Tasmanian wedge-tailed eagle

(*Aquila audax fleayi*) and the white form of the rare grey goshawk (*Accipiter novaehollandiae*) which nest in tall eucalypt and rainforest trees of the park and adjacent regional reserve. The forests of the Savage River region are considered critical habitat for these species in Tasmania (Slater, 1992).

Bird species recorded in wet forest habitats in the area include all twenty-two species regarded as common Tasmanian rainforest species, and all six species dependent on wet forest, including the grey goshawk, brush bronzewing (*Phaps elegans*), pink robin (*Petroica rodinogaster*), White's thrush (*Zoothera lunulata*), Tasmanian thornbill (*Acanthiza ewingii*) and scrubtit (*Acanthornis magnus*). In particular, old growth eucalypt forest provide hollows and cavities for at least fifteen species of bird.

Scrub, heath and moorland are widespread and important habitats occupied by animals with many interesting adaptations. Species of particular interest may include the ground parrot (*Pezoporus wallicus wallicus*) which is believed to occur in the park where buttongrass plains are present. Suitable habitat for ground parrots occurs between the Savage River to the Pieman River.

The wedge-tailed eagle is a subspecies endemic to Tasmania and is rated as vulnerable under the *Threatened Species Protection Act 1995* (Tasmania). It has also been included in the schedules of the *Commonwealth Endangered Species Act 1992* as a critically endangered subspecies. The species has been sighted on the north-eastern boundary of the park. Each nesting pair requires at least ten hectares of little disturbed forest, consisting primarily of old growth eucalypt forest on sheltered aspects. This species is an exceptionally shy nester and will desert a nest if exposed to medium or high levels of disturbance such as intensive recreation, logging and roading (Slater, 1992).

Management of the park and adjacent regional reserve needs to ensure protection of habitat threatened bird species.

Reptiles and Amphibians

The park has not been systematically surveyed for reptiles and only five species have been recorded. Of Tasmania's eleven amphibian species only three have been recorded in the park, two of these species, the Tasmanian tree frog (*Litoria burrowsi*) and the Tasmanian froglet (*Crinia tasmaniensis*) are endemic to Tasmania. Other species are expected to occur.

Fish

Thirteen species of freshwater fish are found in the area (see Appendix 4). The upper and lower reaches of the Savage River support a fish fauna with a range of age classes, although lower in abundance than for comparable reaches in the Whyte River catchment, to the east of the Heazlewood River. The presence of migrating fish (including spawning lampreys) in the upper reaches of the Savage River implies that fish do migrate upstream through the mining-impacted sections of the river, although not necessarily in numbers which might occur in the absence of mining impact (Davies & Cook, 1998).

Crustaceans

The very high annual rainfall experienced in the area has contributed to diverse aquatic habitats in rivers, creeks and riverlets. The freshwater crustaceans are of global significance as many groups such as amphipods, isopods and crayfish are relicts of the Gondwanan fauna or remnants from even earlier eras. Some small crustaceans, the amphipods, have undergone great adaptive radiation in Tasmanian forests. At least eight species are present in the park, with the greater Tarkine region being one of the richest centres of diversity for the group in the world.

The giant freshwater crayfish (*Astacopsis gouldi*) is endemic to the rivers in the north of Tasmania and the Arthur River catchment. The species occurs in the Keith River immediately downstream of the park. *A. gouldi* requires good forest cover to maintain the desired water temperature for optimum habitat. The species is also classed

as vulnerable under the Tasmania's *Threatened Species Protection Act 1995*. This species is the first invertebrate species to be listed on the *Commonwealth Endangered Species Act 1992*. A recovery plan has been developed for this species (DPIWE, 2000).

Adult giant freshwater crayfish prefer well-shaded deep pools in slow flowing creeks. Juveniles prefer medium to high flow rates of shallow water in riffle zones. Localised extinctions have occurred in the last ten years. Clearance of riparian vegetation and de-snagging has led to a decrease in burrow habitat and shelter for the species (Horwitz, 1994). Culverts placed during the construction of roads are suspected of impeding movement. Recreational fishing, has caused a significant negative impact on this species (Horwitz, 1994). There is often significant fishing pressure introduced by the provision of access to unexploited populations, with larger individuals taken preferentially. This reduces the breeding success of a local population (Taylor, 1991).

Other invertebrates

The range of invertebrates from Tasmanian wet forest is large and of great scientific interest containing as it does many groups of Gondwanan descent. Rotting logs, moss-covered substrates, soil and leaf litter are important microhabitats for many endemic archaic invertebrate groups in the area.

Land snails, flatworms, onychophorans, spiders, centipedes, millipedes, collembola and beetles have been found to be well represented in these habitats (Appendix 4).

Sampling for freshwater macroinvertebrate fauna has occurred at several control sites upstream from the Savage River mine site. These studies showed that the overall abundance and diversity was very high for these upstream sites and comparable to other unimpacted streams in the region (Davies, 1995).

The habitat of rare freshwater snails extends across the park. This group of snails forages, feeds and shelters on benthic algae, however little is known about their life

history. Species present include *Beddomeia angulata* and *Phrantela annamurrayae*. The survival of hydrobiid populations may be dependent on the retention of protective riparian vegetation, including along class 4 streams (ie small headwaters), and maintenance of water quality.

There is strong evidence that the Tasmanian invertebrate fauna is large and of great scientific interest, containing many relict and endemic species. A survey of invertebrates in Tasmanian rainforest included a sample site along the Savage River pipeline which provides an indication of the type of invertebrates present in myrtle beech dominated rainforest. The pipeline road is an important benchmark forest invertebrate site and the type locality for a number of invertebrate species. Studies in other vegetation types are required to provide a truly comprehensive picture of the entire invertebrate fauna present in the region.

Managing the park for the benefit of its terrestrial invertebrate fauna largely involves excluding fire from rainforest and wet forest habitats of the park.

Objectives

The objectives for fauna conservation in the park are to:

- protect, maintain habitat and monitor the diversity of indigenous fauna;
- protect, maintain and monitor threatened fauna species, in particular the giant freshwater crayfish and the spotted-tailed quoll;
- minimise harmful impacts on indigenous fauna and habitats;
- determine the presence of previously recorded species such as the wedge-tailed eagle and ground parrot; and
- survey the fauna to fill in gaps in present knowledge.

Table A3 Threatened Fauna Species of Savage River National Park and Regional Reserve

Species	Common Name	Status
<i>Lathamus discolor</i>	swift parrot	endangered
<i>Accipiter novaehollandiae</i>	grey goshawk	rare
<i>Beddomeia angulata</i>	freshwater snail	rare
<i>Phrantela annamurrayae</i>	freshwater snail	rare
<i>Astacopsis gouldi</i>	giant freshwater crayfish	vulnerable
<i>Aquila audax fleayi</i>	wedge-tailed eagle (Tasmanian)	vulnerable

Policies

- The following park habitats will be left undisturbed or given special protection:
 - rainforest;
 - wet eucalypt forest;
 - any other threatened species habitat.
- All practicable efforts will be made to prevent adverse fire and other impacts on the breeding of threatened species.

hectares) are identified as ‘High Quality Wilderness’. This was determined from criteria used in the National Wilderness Inventory (NWI) (Leslie & Maslen, 1995). The NWI measured wilderness quality on a class scale by adding the scores from four variables:

1. remoteness from settlement;
2. remoteness from access;
3. apparent naturalness; and
4. biophysical naturalness.

Actions

- Conduct fauna surveys to fill gaps in knowledge useful for management and protection, in particular reptiles and amphibians.
- Discourage visitors from feeding wildlife by making them aware of the harmful effects of inappropriate food and dependence on humans.
- Implement relevant prescriptions from any threatened species recovery plans available for those species occurring in the park or adjacent regional reserve.
- Develop and implement specific management guidelines for freshwater snails.

These variables were applied in the Tasmanian comprehensive regional assessment. The park forms part of the 350 000 hectare ‘Tarkine Wilderness’ identified in the National Wilderness Directory and provided interim National Estate listing. This area was listed on the basis of Aboriginal heritage, natural and wilderness values.

Wilderness values found in the park include undisturbed hinterland rivers, extensive rainforest, and other forested habitats and isolated elevated buttongrass moorlands. The northern section of Baretop Ridge supports an area of blanket bog peat soils. The upper Savage River has been identified as an undisturbed catchment area that meets the threshold for National Estate significance (Tasmanian Public Land Use Commission 1997, p. 32). The upper Savage River comprises a particularly scenic and distinctive rainforested river gorge system in a natural state.

3.6 Landscape and Wilderness Values

The park possesses high quality wilderness and landscape values. Savage River is one of sixteen indicative areas of National Estate wilderness value (Tasmanian Public Land Use Commission 1997, p. 37). Extensive parts of the Savage River region (51 590

Objectives

The aims of wilderness conservation in the reserve are to:

- protect and maintain high quality wilderness values;
- sustain naturalness and a lack of disturbance;
- preserve a sense of tranquillity for visitors; and
- maintain the perception of isolation from settlement and human activities.

Policies

- Wilderness values will be protected through the designation of a low-use wilderness zone over the park with no visitor facilities to be provided (see Sections 2.3 and 6.1.1).

Action

- Monitor and respond to any adverse impacts on wilderness values.

3.7 Aboriginal and Historic Heritage

3.7.1 Aboriginal Heritage

The park lies within an area that was part of the tribal territory of the Big River and North tribes at the time of European contact. The Big River people were an inland group who largely occupied the mountainous plateau of the Central Highlands. The North tribe occupied the central north of Tasmania from the coast south to the base of the Western Tiers. It is highly likely that the two tribes would have visited one another's country travelling by well defined routes (Miedecke, 1996). Many of these routes were later used by European explorers.

No systematic archaeological surveys have been conducted in the region. The dense vegetation and high rainfall of the area makes the preservation of sites quite unlikely. The Tasmanian Aboriginal Site Index (TASI) lists no sites for the area. It has been suggested that the dense rainforest offered little incentive for human occupation unlike other areas of Tasmania. It has been

suggested that the area may have formed part of an extensive source of chert for the manufacture of stone tools, however, to date no Aboriginal quarry sites have been identified.

Aboriginal sites and the cultural landscapes of Tasmania have a strong and continuing significance to the Tasmanian Aboriginal community. Any sites that are present need to be located and protected, particularly from the impacts of development and visitor use. There is potential for the Aboriginal community to promote and interpret these sites to the wider community and provide greater understanding of Aboriginal culture in the park. New legislation dealing with Aboriginal heritage management is under consideration. At present, the *Aboriginal Relics Act 1975* applies.

Objectives

The objectives of management of Aboriginal heritage are, in cooperation with the Aboriginal community, to:

- identify and record any sites of Aboriginal heritage;
- protect and conserve any Aboriginal heritage; and
- interpret any Aboriginal heritage.

Policies

- Aboriginal heritage values will be assessed and protected in accordance with this management plan and any agreed national or state charter/guidelines for Aboriginal sites.
- Sites of Aboriginal significance will not be publicised unless the site has been assessed, in cooperation with the Aboriginal community, for educational or interpretative use. Where applicable, make use of any agreed Aboriginal interpretation strategy.
- The Aboriginal community will be consulted on any undertaking or

development which may impinge upon Aboriginal sites.

- All proposed landscape modification, development, or maintenance within the park will be subject to the prescriptions of Section 6.2 (Managing Development Works).
- As far as possible, development will be located well away from areas of Aboriginal heritage.
- Aboriginal heritage will not be deliberately disturbed for management, development or research purposes unless the Director determines there is no practicable alternative and a permit to disturb aboriginal relics has been issued under the *Aboriginal Relics Act 1975*.

Actions

- In cooperation with the Tasmanian Aboriginal Land Council (TALC), identify and record any Aboriginal sites.
- Consult with TALC and any local Aboriginal representatives on the management of Aboriginal heritage in the park.
- Monitor any Aboriginal sites for, and protect from damage or interference.
- Develop interpretation of any Aboriginal heritage of the park in consultation with TALC.

3.7.2 Historic Heritage

The first Europeans to explore north-west Tasmania were the Van Diemen's Land Company surveyors. In 1827, their chief surveyor Henry Hellyer explored and surveyed the land along the upper course of the Arthur River for suitable sheep grazing country. One of these areas, to the east of the present day township of Waratah, came to be known as the Surrey Hills block.

In January 1864, explorer Gordon Burgess cut a track from the Surrey Hills block

through to the west coast with companions Savage and Heazlewood. They explored the country south and west of Mount Cleveland. Burgess and Savage later identified a route through to the coast. The Heazlewood and Savage Rivers are named after these two explorers (Salt, 1982).

Early mineral exploration during the period 1876-77 led to the discovery of iron ore deposits in the Savage River area. The inaccessibility of the region precluded development of these deposits until the early 1960s when investigation into the ore body were undertaken, resulting in the establishment of the Savage River open cut mine in 1967 (Salt, 1982).

Mining in the region has left the most visible and physical remains of the most economically significant activity undertaken by European settlers to the region. Much of the early European history of the area is associated with mineral exploration and the establishment of various small mining operations. Many examples of this early mining activity are still apparent in the Heazlewood mineral field and Magnet Mines area, south of the park. Mineral prospecting tracks were established from the southern mineral fields into the regional reserve and possibly the park, however no mines were ever established as a result. The difficulty of the terrain probably deterred much would be mineral exploration of the area. There are no known historic sites or historic uses of the park.

Any sites that may be present in the park should be protected as evidence of mining history of the region. The most serious threats to most of the sites would be displacement from vegetation and natural erosion. Any historic heritage values of the park need protection from avoidable decay or disturbance, and maintenance of their historical integrity.

Objectives

The objectives of historic heritage conservation and management are to:

- identify and record any historic heritage in the park;
- actively conserve and maintain the heritage integrity and quality of significant cultural landscapes, heritage structures and other heritage features;
- protect and conserve historic heritage from damage;
- present and interpret historic heritage; and
- exclude intrusive development and activity.
- Remove damaging uses, activities and developments which intrude upon or detract from heritage values.
- Where possible mitigate natural processes which are having an adverse effect on heritage values.
- Prepare conservation policy statements or plans for all significant historic heritage features.
- Conserve and interpret key historic places for interaction with the general public.

Policies

- Conservation and management of historic heritage in the park and regional reserve will adhere to the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (The Burra Charter, 1999) and its associated guidelines.
- A conservation policy statement or conservation plan, including specific assessment of significance, will be prepared before any decisions about major works, use, removal or interpretation of individual elements of historic heritage. Such statements or plans will be prepared in accordance with the principles outlined in the Burra Charter, using the methodology outlined in Kerr (1996).
- A cyclical maintenance program should be developed and operate for any significant historic places.

Actions

- Identify, record and assess the significance of all historic features.
- Make safe any dangerous structures.

4 Protection

4.1 Fire Management

Fire is the most serious threat to rainforest values within the park. While some rainforest species are capable of regeneration after fire by coppicing and from seed (Duncan 1958, Barker, 1991), most are accustomed to random fires at an interval of 400 plus years. Fire frequencies greater than this have the potential to destroy rainforest (Harries, 1992).

North-west Tasmania is subject to an extreme weather range characterised by cold southerly airmasses from Antarctica, and by strong northerly airstreams which form over mainland Australia. North-easterly winds, when combined with dry conditions and high temperatures, are associated with the worst fire weather. Whereas north-westerly winds are generally more humid in this part of Tasmania.

In broad terms, rainforest and wet sclerophyll forest have evolved in the absence of fire and do not burn easily, unlike drier vegetation types. However, a major fire in the Savage River region in 1982 burnt out 47 900 hectares of vegetation, of which 15 000 hectares was rainforest, and demonstrated that these wetter vegetation types will burn under a particular set of circumstances. Conditions which attributed to the 1982 fires included a succession of low rainfall years giving rise to a high level of soil dryness, the presence of ground fuels, high temperatures, low humidity and strong northerly and westerly winds. Fortunately a combination of these conditions is an infrequent event.

In general terms the fire risk for the park is quite low. This is due to a combination of the average summer weather conditions in north-western Tasmania, the major fuel types in and around the park and the very limited public access.

Fire would seem to have been a major factor in shaping the vegetation patterns in the park. The predominance of mixed forest

(eucalypt and rainforest species) in the north of the park indicates that fire has passed through this area sometime in the last 200 years (Blanks, pers.comm 1999). Rainforest species can be expected to gradually reclaim this area in the continued absence of fire. Baretop Ridge, so named due to the absence of forest, is dominated by low scrub and heathland communities which have probably been maintained by spotting from wildfires outside the park. The wetter forest types at the base of Baretop Ridge have prevented these fires from spreading any further into the park (see Map 4).

Potential fire ignition sources include lightning, adjacent land use practices, such as forestry operations (timber harvesting, regeneration and hazard reduction burning), mineral exploration, mining and arson. There are continuing forestry operations in the Hellyer block to the north-east of the park which constitute a potential fire ignition source. It has been demonstrated that north-easterly winds are those most likely to be the major component influencing fire behaviour (Cadman et al., 1988). This was the major wind direction during the Savage River fire in 1982. Forestry activities are also occurring to the north of the Keith River and Rapid River catchment (Askey-Doran et al., 1992).

There are a number of eucalypt regeneration areas, primarily east of the Arthur River. Forestry operations are only a risk to the park during the harvesting and regeneration burning phase. Regeneration burns are high intensity fires required to stimulate eucalypt regeneration. They are intended to mimic a wildfire and for this reason are undertaken in autumn when ground fuels are dry but temperatures and winds are more favourable. Fire escapes from regeneration burns have occurred in the past and have the potential to do so again unless carefully managed.

Roads and regeneration coupes are only likely to be a risk under semi-drought conditions, high temperatures, low humidity and strong dry westerly winds. Danger

points in the road network are those to the north-east, north and north-west, where these roads pass through any dry eucalypt, healthland or buttongrass moorland vegetation types. These are flammable vegetation types and easy to start fires in, whereas mixed forest and rainforest are much harder areas in which to initiate a fire (but harder to extinguish once they become established).

Arson and increased access have a tendency to go hand in hand. A study on the causes of fires on the west coast of Tasmania (Cadman, 1995) has shown that most fires had their origin at points less than 500 metres from vehicle access roads (Ingles, 1985). The illegal harvesting of myrtle has been noted along Pykes Road on the north-east boundary of the park (see Map 5). This practice is a potential ignition source and also correlates to the presence of roads in the area.

In addition, there are dense thickets of leatherwood (*Eucryphia lucida*) which have colonised sections of Pykes Road and could constitute a fire hazard. For these reasons it may be necessary to limit public access into this area during the high fire risk period (January to March) of each year. Any licensed operators, such as apiarists, would be exempt providing they held an authority to enter the area. Signs to this effect would need to be located on the western side of the Arthur River, just past the Arthur River Chalet (see Sections 5.2.2 and 6.1.2).

Large wildfires outside the park may or may not be a problem for the park, depending on prevailing weather conditions, location and time of day. Sparks from a fire will become a problem if the fire is at a distance and upwind of the park. Any fires in the area are likely to be a rare event, but if they do occur they are likely to be of high intensity and virtually impossible to suppress.

There are large areas of scrub and buttongrass moorland on the north-west flank of the park. These westward facing slopes are drier and show evidence of having been fire affected in the past, they are predominately scrub communities and therefore more likely to burn. This area is a

potential fire risk to the park as they form potential landing spots for sparks, which could easily initiate a secondary ground fire in suitable areas of the park that in turn becomes a further source of sparks, throwing towards Baretop Ridge. At present there appears to be no vehicle tracks into these drier vegetation communities.

Baretop Ridge is a potential source of fire as it has clearly been subject to fire in the past and therefore more susceptible to any future fires. This risk is reduced to some extent by the flammable fuel types being confined to the crest of the ridge, therefore any ground fire would lose intensity and impetus as it burns down from the ridge and into the wet *Eucalyptus nitida* patches on the tops of the spurs. A ground fire burning downhill is unlikely to penetrate the rainforest to any significant extent except under exceptionally dry conditions.

Moorlands and heathlands to the south-east, south and south-west of the park are not judged to be a significant fire risk, as southerly winds which generally occur during the wetter months tend to be more humid.

There is a remote risk of fire originating from the Savage River mine site entering the regional reserve. However, as the mine site is to the south of the park and as the most fire prone days are related to northerly winds, the fire risk is not seen as significant. The mining company adheres to an emergency plan in the event of fire.

Fire prevention in the park is the ultimate aim of management and the minimisation of risk factors that have the potential to cause a wildfire. Appropriate risk management and ecological fire management strategies are essential to the overall management of the rainforest component of the park. The steep and inaccessible nature of the park makes fire suppression within the park virtually impossible unless natural fire boundaries such as rivers, wet vegetation types and certain landform features can be exploited.

The Parks and Wildlife Service is responsible under the *Fire Service Act 1979* and the *Fire Service (Miscellaneous)*

Regulations for all aspects of fire management within the park, including prevention, containment and suppression. Should a fire occur it is highly likely that it will have originated outside the park from the sources mentioned or by direct human actions.

Increased access has the potential to increase the fire risk to the park and regional reserve. The establishment and use of campsites and facilities will encourage higher levels of visitation, particularly during the summer months when the fire danger is most prevalent.

Park visitor activities and land use practices on adjacent land tenures pose the main fire risk to the rainforest values of the park. For this reason the park will be designated a Fuel Stove Only Area.

Objectives

The objectives of fire management are to:

- protect visitors, management staff and any nearby landowners;
- protection of rainforest values and other nature conservation values;
- protect park facilities and assets; and
- protect any neighbouring assets.

Policies

- The focus of wildfire prevention is on the protection of rainforest values. Every possible measure should be taken to exclude fire from the rainforest dominated areas of the park and priority placed on fire prevention rather than suppression.
- Fire management will accord any fire management plan developed for the park, and this management plan.
- To lessen the risk of arson or inadvertent ignition causing a wildfire, vehicle access along Pykes Road during the the

high fire risk (January to March) of each year will be restricted.

- Existing vehicle tracks will be maintained if they are required for fire management.
- Fire management and suppression procedures will accord with the Inter-Agency Fire Management Protocol agreed between the Parks and Wildlife Service, the Tasmania Fire Service and Forestry Tasmania.
- When fire danger conditions warrant, park staff may close all or some areas of the park by restricting vehicle access under Regulation 12 of the *National Parks and Reserved Land Regulations 1999*.

Actions

- In consultation with Forestry Tasmania install signage or barriers to limit public access along Pykes Road during the the high fire risk period (January to March) of each year.
- In consultation with Forestry Tasmania and the Tasmania Fire Service, prepare a fire management strategy for the park, regional reserve and adjacent State forest areas.
- Implement fire protection strategies to reduce the risk of wildfire where possible within the constraints of the available resources, prevailing Fire Danger Rating, fire intensity and fire crew safety, to exclude wildfire from fire sensitive communities.
- Explain fire management policies and fire safety procedures to visitors as part of an interpretive program for the park and adjacent regional reserve.
- Investigate the extent of tracks leading from apiary sites into the park and close to minimise the risk of arson.

4.2 Pests, Weeds, and Diseases

4.2.1 Introduced Fauna

No feral animal species have been noted in the park, this is due to the high level of integrity of the park, and the absence of roads and tracks which has minimised the opportunity for domestic animals to be dumped. In addition, the lack of fragmentation and high level of undisturbed habitat for native fauna has not allowed feral species to become established, making it one of the few places in Tasmania where native fauna is protected from the effects of feral species. Possible avenues of introduction include the Savage River pipeline, road and tracks adjacent to the park or located within the adjacent regional reserve.

European honey bees (*Apis mellifera*) have been introduced to the area from licensed apiary sites. There is no evidence to suggest that wild populations have become established as a result of this activity.

No trout have been recorded in the streams and rivers of the Savage River area, suggesting that the area is free of this introduced species.

The presence of species not indigenous to the park is out of keeping with the concept of a national park.

Objectives

The objectives of management of introduced fauna in the park are to:

- eradicate introduced species where this is feasible and warranted by the damage being caused; and
- control and manage introduced species where eradication is not practicable or warranted.

Policies

- New introductions of animals to the park will not be permitted without an

approved comprehensive scientific assessment.

- Eradication will only be attempted where non target species are not threatened by the proposed methods, unless the threat from the introduced species is greater than the threat from eradication methods.
- Eradication, control, and containment programs and priorities for feral species will be based on clear, well documented contemporary knowledge or, where necessary, additional research which;
 - identifies species requiring priority for control;
 - identifies areas of scientific or conservation significance where feral animals should be eradicated or controlled;
 - specifies the control methods to be used;
 - identifies protocols for the use of poison, shooting and trapping;
 - prescribes the appropriate time of year for control; and
 - outlines the structure of any further research into the most effective means of control.

Actions

- Make visitors aware that dogs are not permitted in the park.
- Avoid the introduction of any exotic animal species and remove where practicable.

4.2.2 Weeds

A weed is any plant, either native or exotic, growing in an area where it is not desired. The lack of tracks within the park have meant that weeds have not generally become established. Furthermore, weeds generally require some form of disturbance in order to become established and do not appear to have the ability to invade mature rainforest or wet forest. The presence of Pykes Road on the north-east boundary of the park

creates the potential for weeds to become established along roadside margins.

Most weeds in the region are limited to disturbed environments such as disused mine sites and tracks where light and nutrients are available and vehicles act as a vector for introducing weed seeds. Rehabilitated areas are also under threat from weed invasion and will require weed control as an aspect of rehabilitation.

Management of weeds in the park is therefore linked to disturbance (the creation of a suitable weed bed) and vehicles (vectors for weed introduction) and control of the few invasive weeds and thickets along roadsides. A number of weeds present on roadsides are capable of creating extensive roadside thickets affecting fire hazard, site lines, scenic views, naturalness etc. These include Canary broom (*Genista monspessulana*), English broom (*Cytisus scoparius*), Gorse (*Ulex europaeus*) and Monterey pine (*Pinus radiata*). None of these species have been noted along Pykes Road.

Objectives

The objectives of weed management in the park is to:

- eradicate weeds where this is feasible and warranted by the damage being caused; and
- control and manage weeds where eradication is not possible or warranted.

Policies

- In general, weed management will accord with the provisions of the introduced plants policy (Parks and Wildlife Service, 1998).
- Weed management will be linked with:
 - protection of natural and cultural values;
 - erosion control; and
 - revegetation works.
- An integrated regional approach to weed management, involving neighbouring

land managers, will be supported.

- Eradication or control of weeds will only be attempted where non target species are not threatened by the proposed methods, unless the threat from the weeds is greater than the threat from eradication methods.
- Weed eradication, control, and containment actions and priorities will be based on clear, well documented contemporary knowledge or, where necessary, additional research which:
 - identifies species requiring priority for weed control;
 - identifies areas where weeds should be eradicated or controlled, including where they should be retained as an interim means of environmental protection;
 - specifies methods of removal and disposal of weeds;
 - identifies protocols for the use of herbicides and fertilisers;
 - prescribes the appropriate time of year for control; and
 - outlines the structure of any further research into the most effective means of control.
- The assistance of volunteers will be sought for control and eradication where suitable planned and programmed works and effective supervision or direction are available.

Actions

- Roadside management adjacent to the park should be monitored to ensure that weeds are not becoming established.
- Prepare weed management programs for any weed species as they become identified.

4.2.3 Myrtle wilt

Myrtle forest is susceptible to a fungal pathogen (*Chalara australis*) which causes myrtle wilt disease. The fungus appears to be spread as wind borne spores through the

forest and will kill mature myrtle trees but does not appear to affect other species. The disease is almost invariably accompanied by secondary insect attack. The disease is believed to be at epidemic proportions in Tasmania's rainforest (Packham, 1991). The localised effects of this disease are increased by activities such as roading, timber harvesting and thinning. Roading associated with forestry activity is responsible for increasing the rate and spread of myrtle wilt (Packham, 1991).

The main impact of myrtle wilt is on forest structure through the loss of old growth trees and the subsequent increase in the amount of flammable material from dead trees and ground litter. It is the second of these problems that creates most concern as forestry operations and associated roading increases the risk of fire ignition. The disease does not pose a threat to the long-term survival of the species, as young trees appear to be unaffected.

Disturbance, which could predispose native vegetation to myrtle wilt, will be avoided or minimised, particularly where susceptible species are present (ie. *Nothofagus cunninghamii*). It is particularly important to avoid physically wounding trees (eg. blazing trunks to mark tracks). Options for reducing the level of disturbance and/or maintaining a buffer zone in the vicinity of susceptible plants, will be considered if the activity is unavoidable.

Careful management of the disease is important. The disease can be spread underground from areas of high disease incidence. It is possible to identify 'high risk areas' of forest and to manage them in a manner least likely to produce local outbreaks. High risk areas include mature, low altitude callidendrous forests with high myrtle density.

Objectives

The objectives of myrtle wilt management in the park are to:

- identify those areas of the park which are at high risk from myrtle wilt disease;

- and implement measures to minimise the spread of myrtle wilt within the park.

Policies

- When maintaining any existing roads on the boundary of the park, damage to adjacent myrtle forest should be minimised. The felling of trees and heaping of debris into undisturbed areas should be avoided wherever possible.
- Felled trees should be removed from the rainforest sites to avoid the build up of infected material.

Actions

- Undertake assessment of myrtle wilt risk for all development proposals and make recommendations to minimise the potential for disease incidence arising from any such developments.
- Investigate the extent of any tracks leading from apiary sites into the park and close to minimise the risk of arson and myrtle wilt impacting on the park
- Avoid direct damage to mature myrtles when undertaking any maintenance of roads or walking tracks.

4.2.4 *Phytophthora cinnamomi*

Phytophthora cinnamomi is a soil-borne fungus that causes severe root rot and subsequent death in some rainforest species. With the exception of localised infections, once an area is infected with *P. cinnamomi* there is no known practical means to eliminate it from that area. Control of infected plants with fungicides is difficult and expensive and needs to be maintained indefinitely.

Generally soil temperatures are too low under a closed rainforest canopy for the fungus to be active but it can be destructive if the canopy is removed by events such as fire. The fungus is unlikely to kill

significant areas of rainforest but may play a role in determining species composition in rainforest regenerating after fire. For example, a survey of implicate rainforest defoliated as a result of fire found large numbers of two year old seedlings and fire sprouts in the area to be infected by *P.cinnamomi* (Barker 1990, 1991).

To cause significant impact, the fungus requires the presence of susceptible host plants in moist warm soils. Buttongrass moorlands act as a host and will facilitate its spread once it becomes established. The fungus attacks a broad range of species, the plant families Epacridaceae and Proteaceae contain a number of species that are killed by the disease.

P. cinnamomi is generally associated with disturbance and transport of contaminated soil or water. An increase in the use of existing tracks and the construction of new ones could introduce *P. cinnamomi* into new areas. Inappropriate fire regimes can also create conditions favourable to the spread of the disease once it has become established (Palzer, 1985). The park has been insulated to a degree due to its remoteness and the absence of roads and tracks. In addition, the predominant vegetation types in the park generally have a low susceptibility to the disease.

Objectives

The objectives of *P. cinnamomi* management are to:

- limit the spread of *P. cinnamomi* in susceptible vegetation communities within the park; and
- educate the community and visitors in *P. cinnamomi* prevention hygiene measures.

Policies

- All practicable steps will be taken to prevent the spread of *P. cinnamomi* into uninfected areas where efforts to exclude the disease are warranted by the

values at risk.

- In general, limit development and recreation activity to those areas already infected or with a low priority for disease exclusion.
- Ensure that heavy machinery being used for roadside maintenance or other works is thoroughly cleaned and decontaminated before being used in other parts of the park.
- Any imported soil, fill or crushed rock used for rehabilitation or maintenance works will be obtained from sites where *P. cinnamomi* is not found, using *P. cinnamomi*-free machinery.
- Where direct seeding is not used, all plants used in planting works within areas free of *P. cinnamomi* will be propagated, in *P. cinnamomi*-free soil or other medium from certified *P. cinnamomi*-free nurseries.

Actions

- Identify and map those communities within the park that are susceptible to *P. cinnamomi*.
- Undertake periodic surveys of *P. cinnamomi* prone areas to monitor the disease status of the park.
- Inform visitors of the *P. cinnamomi* risk to the park, particularly those areas which contain plant species which may be susceptible to the disease.

4.3 Soil Conservation and Erosion Control

There are a series of tracks that enter the eastern side of the park from Pykes Road, these were probably established to assess the timber resource and are now primarily used by apiarists. These roads are the management responsibility of Forestry Tasmania.

Roadsides, in particular Pykes Road, is experiencing water erosion from inadequate drainage. The width of this section of road will narrow as the vegetation along the roadsides re-establishes, however in the interim, surface gravel and adequate drainage are required to maintain this road in a good state of repair.

Given the close proximity of Pykes Road to the park an agreed approach between Parks and Wildlife and Forestry Tasmania is required with regard to ongoing maintenance of the road and roadside management to ensure that the presence of the road is having minimal impact on the park.

Objective

The objective of soil conservation and erosion control in the park is to:

- prevent erosion and rehabilitate damaged areas, including old vehicle tracks.

Policies

- Erosion hazard and status assessments will be made where significant ground disturbance or soil exposure is proposed.
- Land rehabilitation and stabilisation will be carried out on the basis of a prior geomorphological assessment.
- Roadside vegetation management undertaken within or adjacent to the park should be carried out under the direction of departmental botanists.
- Vehicle access to specific areas may be restricted to protect natural or cultural values of high conservation value.

Actions

- Investigate the extent of any tracks leading from apiary sites into the park and close to minimise the risk of arson and myrtle wilt impacting on the park

(see Section B5.2).

- Investigate improved drainage works and the rehabilitation of roadside cuttings along Pykes Road.
- Rehabilitate, revegetate or otherwise stabilise disturbed or eroding areas.

4.4 Managing Visitor Impacts

At this point in time visitor impacts on the park are fairly minimal, this is due in large part to the low level of use. However, the illegal harvesting of myrtle has been noted along Pykes Road on the north-east boundary of the park. This practice is a potential fire risk and also correlates to the presence of roads in the area.

It is not known whether visitors are bringing dogs into the area, but it is very likely. Dogs and other domestic pets are not permitted in the park due to their impact on native species.

Objectives

The objectives for managing visitor impacts are to:

- protect, maintain and monitor environmental and heritage values;
- protect, maintain and monitor the special remote character of the park; and
- perpetuate the park in a state that is valued by visitors.

Policies

- Visitor numbers and activities will be limited to those which are ecologically sustainable.
- The best available and practicable technology will be used to protect environmental quality from human impacts.

- Develop information to educate the public about the wilderness values of the park.
- The maximum party size for licensed walking tour groups will be consistent with the principles of the Walking Track Management Strategy.(Tourism Tasmania et al., 1998).
- The general public will be encouraged to observe the same party size requirements as licensed groups.
- School and other groups undertaking educational activities will be encouraged to discuss their proposed program with district parks staff.

Actions

- Inform visitors of, and encourage them to apply minimal impact use of the park.

5 Recreation Management

5.1 Recreation

In keeping with the values and accessibility of the park, there will be provision for low-key recreation within the park. Expanded tourism and recreation opportunities will be provided for in the regional reserve (see Section B6.1) and nearby Hellyer Gorge State Reserve.

Recreational driving, camping and fishing are the primary recreational activities undertaken adjacent to the park, either within the regional reserve or on State forest. The nature of use is expected to comprise mostly local rather than transient users. The distance of the park from the main highway and the lack of signage is likely to deter the majority of people from visiting the area. In addition, there are no developed visitor facilities such as toilets or camping areas. Other uses such as bushwalking are known to occur on an infrequent basis but probably occur at very low levels as there are no established walking tracks in the park. Any visitors to the park are expected to be self-reliant if they intend to go off-track.

The value of the park lies in its rainforest wilderness and its biological significance as a large area of virtually undisturbed habitat. The park does not lend itself to tourism as access is limited and therefore tourism development within the park will not be provided for.

Objectives

The objectives of recreation management are to:

- Protect and foster an appreciation of the special wilderness qualities of the park;
- understand the pressures that visitation may cause to the park; and
- provide for low levels of recreational use.

Policies

- Recreational opportunities will be limited to those activities with minimal impact on the park or to areas that are presently accessible by vehicle.
- Visitor infrastructure will be limited to that specified in Section 6.1.2 in keeping the wilderness values of the park.
- Visitor uses must be able to demonstrate that they are sustainable and do not adversely impact on the values of the park.
- Future visitor research will focus on an improved understanding of sustainable visitor numbers and characteristics, behaviour, needs and expectations, and assisting visitor management.

Actions

- If warranted, collect information on the levels and type of visitor use and visitor needs and expectations.
- Monitor whether visitor pressures are having an adverse impact on the park.

5.2 Access

The park is generally accessed from the north and east and one track from the south. There is walking access from the north via Pinners Track and vehicle access via Pykes road on the north-east boundary of the park. Although accessible by conventional vehicles, the gravel roads leading in from the Murchison Highway to Pykes Road are unsuitable for casual visitors. The one track that enters the park from the south is overgrown and impassable to vehicles.

The future level and nature of access will continue to be a critical management issue for the park. Increased access and vehicle

use provide the opportunity for arson and other illegal activities, such as the felling of myrtle and the introduction of feral animals and weeds. Fire frequency may also increase as a result of increased access.

All vehicle access for the public from the east is through State forest. The upkeep of roads and tracks on State forest to the north and east of the park has been the responsibility of Forestry Tasmania since January 2000. Continued access into the park from the north and east will depend on Forestry Tasmania and its long-term needs for access. Forestry Tasmania intends to maintain roads on an “as needs basis” and is in the process of identifying these access needs, including commercial uses such as licensed apiary sites.

Objectives

The objectives for access to and within the park are to:

- protect park values by concentrating and limiting developed visitor arrival points and travel routes to designated locations;
- maintain basic access to the park and to that necessary for educative, scientific or management purposes;
- direct access adjacent to the park appropriate to the zone in which it occurs and
- protect the park from inadvertent or deliberate wildfire.

5.2.1 Aircraft

There are no landing strips or helicopter access points within the park. The closest airstrip is at Wynyard on the north coast. Helicopters have been known to land on the boundary at the intersection of Pykes and Junction Roads. This could be used as a landing location in the event of an emergency.

Policies

- Airdrops within the park will only be permitted for management or emergency purposes.
- Except in an emergency, all aircraft, including helicopters, will require an authority to land or take off in the park, as required by the *National Parks and Reserved Land Regulations 1999*.

Action

- In consultation with relevant stakeholders, develop, or make use of existing overflight guidelines to minimise the impact of low flying aircraft on the recreational experiences of park visitors and on wildlife.

5.2.2 Vehicle Access

Forestry Tasmania intends to maintain access along the southern part of Blackwell Road, the entrance to which is on the southern side of Hellyer Gorge. Blackwell, Parrawee Creek, and Pykes Road are suitable for conventional vehicles in dry conditions. In wet conditions these roads can become slippery and should only be attempted by four-wheel drive vehicles.

In addition, vehicle access beyond the Arthur River along Pykes Road will be subject to a seasonal closure during the high fire risk period (January to March) of each year to protect the park from inadvertent or deliberate fires. Any licensed operators, such as apiarists, would be exempt from this general restriction providing they hold a valid authority to enter the area. Signs to this effect would need to be located on the western side of the Arthur River (see also Section 5.2.2 and 6.1.2). The Arthur Chalet will be as far as vehicles can go during this period.

There is vehicle access from the north along Farquhars Road via West Takone. This road passes through pine plantations and can be quite hazardous in the event of harvesting operations. However, signs are generally displayed. There is only walking access into

the park from this road via Pinners Track through the Arthur River Forest Reserve. It is not possible to drive along this track for any distance as it has become considerably overgrown. This track eventually links up with Pykes Road which forms the boundary between the park and the Arthur River Forest Reserve. Junction Road from the Pykes Road end is suitable for vehicles until it reaches the Arthur River. The bridge at this point is impassable due to the surface having eroded significantly from successive floods, however it is still passable by foot.

Policies

- Public roads and vehicle tracks adjacent to the park will be limited to those designated in this plan (see Table A4).
- Public use of motorised vehicles, including trail bikes and off-road vehicles, will only be permitted on the designated formed roads in the Natural (Limited Vehicle Access) Zone. Vehicle use anywhere else in the park, will not be permitted.
- In consultation with Forestry Tasmania limit public access along Pykes Road during the the high fire risk period (January to March) of each year.
- Those vehicle tracks not designated for public access or for management purposes will be closed and rehabilitated.
- Road maintenance will accord with the prescriptions of Section 6.2.
- To retain its natural character, no new vehicle tracks will be constructed within the park.

Actions

- In consultation with Forestry Tasmania install signage or barriers to limit public access along Pykes Road during the high fire risk period (January-March) of each year.

- Consult with licensed apiarists to arrange authorities to access Pykes Road during the high fire risk period.
- Bring roads designated for public and management use to an adequate standard.

5.2.3 Walking Access

The park has no designated or maintained walking tracks. It is possible to walk into the park from the north along Pinners Track via Farquhars Road. The track is located approximately 100 metres after crossing the Arthur River. This track is not signposted and can be easily missed. The track passes through the Arthur River Forest Reserve before exiting onto Pykes Road which forms the north-east boundary of the park.

A rough system of tracks lead around the northern side of Basalt Hill from the Mount Cleveland Road. Most of these tracks would have been put in to assess the timber resource or for mineral prospecting. One of these on the western side of Jones Creek appears to terminate approximately a kilometre from the eastern side of the Savage River gorge which is well within the park. The condition of this particular track is unknown. Some of these tracks have potential to be developed as walking tracks.

Policy

- Priority will be given to upgrading existing walking tracks within the adjacent regional reserve (see Part B, Section 6.2.3).

Action

- Formalise walking access into the park across State forest or through the Arthur River Forest Reserve by way of a suitable arrangement with Forestry Tasmania (see Part C, Section 9.1.3).

5.2.4 Mountain Bikes

The extensive vehicle track network in the adjoining State forest area east of the park lends itself to recreational mountain biking. Many of these tracks are overgrown and becoming unsuitable for vehicles, but could be used by mountain bikes. The lack of developed tracks restricts where this activity can occur within the park.

The use of mountain bikes in natural areas is increasing. However, the inappropriate use of mountain bikes can cause conflict with other users and impact on environmental values. Bike riders must be aware of other users, in particular vehicles and walkers. A mountain biking code has been developed for the use of mountain bikes in reserved lands such as national parks.

Policy

- Mountain bikes will be permitted on designated roads and vehicle tracks only.

Actions

- In cooperation with Forestry Tasmania designate and promote those roads and vehicle tracks available for mountain bike use.
- Promote and make available the Code of Practice for the use of mountain bikes in reserved areas.

5.3 Interpretation and Education

Visitors to parks and reserves are increasingly looking to enjoy, understand and appreciate their visit through high standard presentation of information, interpretation and education. Therefore, interpretation and education are critical to the delivery of quality park experiences, as well as fostering an appreciation of and caring attitude towards the park (Department of Tourism, Sport & Recreation, 1994). In keeping with the important wilderness

values of the park, most information, interpretation and education facilities for visitors will be located outside the park in nearby adjacent reserves.

Given that the park is quite new there are no existing interpretation or education facilities. Nearby Hellyer Gorge State Reserve (see Map 5) is ideally situated to cater for the majority of visitors passing through the area. It has day-use facilities, a camping area and toilets in an attractive riverside rainforest setting. The development of information facilities at this location would be far more accessible to visitors and cost effective. The standard of information at this location needs upgrading to provide more visually attractive and informative material on rainforest environment and the types of animals and plants that people are most likely to encounter during their visit. This area could also provide suitable information about the park.

In the interim signage informing visitors of the existence of the park should be provided. Signage in State forest areas will be limited to those roads that will be maintained to provide general public access (see Table A4).

Objectives

The objectives of interpretation and education for the park are to:

- encourage pre-visit awareness of their special recreational and remote character, and lack of facilities;
- reveal the diversity and values of the environmental features of the park;
- realise the educational values of the park;
- canvas issues to be confronted in managing the park; and
- increase public awareness of safety issues; and minimal impact techniques for the park.

Table A4 Public Access (Roads, Vehicle Tracks and Walking Tracks) close to Savage River National Park and Savage River Regional Reserve

Access type	Name	Managing Agency	Tenure
Formed gravel road	Pykes Road	PWS/Forestry Tasmania	Nat Park/State forest
	Farquhars Road	Forestry Tasmania	State forest
	Blackwell Road	Forestry Tasmania	State forest
	Parrawe Creek Road	Forestry Tasmania	State forest
Shared 4WD Vehicle and Walking Track	Roaring Meg Creek Trk	Parks & Wildlife	Regional Reserve
Walking Tracks	Pinners Track	Forestry Tasmania	Forest Reserve
	Jones Creek Track	Parks & Wildlife	Regional Reserve
Mountain Bikes	Any formed road in the regional reserve or in State forest in accordance with Forestry Tasmania's policy on the use of mountain bikes in State forest areas.		
Horse riding	Any other track in the regional reserve not designated solely for vehicles or walkers or in State forest in accordance with Forestry Tasmania's policy on the use of horses in State forest areas.		

Policies

- Suitable information facilities may be located in the Natural (Limited Vehicle Access) Zone of the park, including national park signage at key access points on the perimeter of the park (see Section 6.1.2).
- Interpretation programs and facilities will be located off-site, in the regional reserve or at Hellyer Gorge State Reserve.
- Improve the current level and quality of information provided to visitors at Hellyer Gorge State Reserve, prior to considering the development of similar facilities in the regional reserve.
- In liaison with tourism and educational interests investigate and as appropriate produce a “virtual visit” or multi-media presentation on the park for use in visitor centres in north-west Tasmania.
- School and other groups undertaking

educational activities will be encouraged to discuss their proposed program with district parks staff when planning their visit.

Actions

- Explain fire management policies and fire safety procedures to visitors as part of an interpretative program for the park and regional reserve.
- Develop suitable visitor information about the park at the Hellyer Gorge State Reserve.
- Install national park signage at the point where Pykes Road provides access to the north-eastern boundary of the park.
- Improve directional road signage from the southern approach off the Murchison Highway into the Arthur Chalet site and include information on road conditions.

- Where appropriate develop interpretation of the Aboriginal heritage of the park and regional reserve in consultation with the Aboriginal community.
- Inform visitors of, and encourage them to apply, minimal impact techniques for the park.

6 Development Works

6.1 Developing Facilities and Services

There are no developed visitor facilities within the park. Basic camping and fireplaces are present at the Arthur Chalet on State forest, to the east of the park (see Map 5). This area provides opportunities for swimming, fishing and canoeing. Forestry Tasmania does not intend to develop or promote this site however, it will remain available for informal camping. Any existing structures such as the chalet ruin will be removed. In general any future visitor facilities and services will be located within the adjacent regional reserve (see Table B2) or at existing facilities close to the park. Any visitor infrastructure within the park will be limited to that specified in sections 6.1.1 and 6.1.2

Because of its inherent values, the park does not need invented attractions. The generally unspoilt rainforest scenery and wild rivers are in themselves an attraction for visitors and present opportunities for a remote area experience. Inappropriate development could have a detrimental impact on the character of the park, both in very obvious and immediate ways, and in more subtle, incremental ways.

A day-use area with toilets and camping area is available at Hellyer Gorge State Reserve to the east of the park and regional reserve. The Murchison Highway passes through a section of Hellyer Gorge making it very accessible to tourist traffic. This would make an ideal location for the development of high quality interpretation and visitor facilities.

While flexibility in response to visitor needs, budgetary circumstances and protection of park values must be maintained, the general policies for development of visitor facilities and services are set out below.

6.1.1 Wilderness Zone

This includes the more remote and least disturbed areas of the park. This zone has important natural values due to relatively low human access and impact levels. The Regional Forest Agreement process identified high quality natural landscape values and key fauna habitat for threatened species in parts of the park and regional reserve, most of which are contained within this zone.

Parts of the zone are of particular significance for flora conservation. Protection of the different vegetation types and the sense of remoteness are the primary management concerns. The area is not permanently inhabited and recreational use is very low or non-existent. This area is generally more difficult to access and retains much of an undisturbed character.

Policy

- With the exception of walking tracks, no visitor facilities or services will be provided in this zone in accordance with its designation as a high quality wilderness area.
- Only low impact walking tracks will be considered suitable for this zone.

6.1.2 The Natural (Limited Vehicle Access) Zone

This zone encompasses the western side of Pykes Road which runs along the north-east boundary of the park and can only be accessed from the southern end by vehicle. The zone is primarily a corridor for vehicle based access along a four and a half kilometre section of the park boundary.

Policies

- Types and levels of facilities for recreation uses will be limited to those which minimise impacts on natural and cultural values.
- Facilities in this zone will be limited to those associated with the existing road, and may include a low key visitor destination point, management signage, visitor interpretation and short distance walking tracks.
- Limit access along Pykes Road during the the high fire risk period (January to March) of each year. Any licensed operators or apiarists would be exempt providing they hold an authority to enter the area (see also Section 4.1 and B5.2).
- Rubbish bins will not be provided in the zone and visitors will be required to carry their rubbish out.

Actions

- Make provision for a low-key arrival point for vehicle based visitors along the western side of Pykes Road with appropriate signage and provision for parking or vehicle turn-around.
- Monitor and respond to any user impacts.
- Maintain and, as necessary, upgrade the existing road to ensure protection of the environment and the reasonable safety of users.

6.2 Managing Developing Works

Development works can range from manipulative research, maintenance of existing tracks, provision of signage and installing or repairing services. Major developments are generally large in scale and often create the potential for substantial impacts on the values of the park, or have a material impact outside the park boundary. Major developments either within or

immediately adjacent to the park will not be supported by this management plan.

The *National Parks and Wildlife Act 1970* requires that, in managing development on reserved land, regard must be had to the Resource Management and Planning System (RMPS) objectives.

Objectives

The objectives of managing development works are to:

- avoid or minimise the impact of development works on park values;
- protect, maintain and monitor the special wilderness character of the park; and
- foster public confidence in any approved and appropriate development.

Policies

- Minor development works can occur provided they comply with the management objectives for the park and are consistent with the objectives of the management zone.
- Major developments that could significantly impact on the wilderness values of the park are not considered appropriate either within or immediately adjacent to the park.
- All developments and activities will be undertaken in accordance with the Reserve Management Code of Practice and this management plan.
- Assess all proposals for any development, landscape modification, research, management or maintenance work involving any ground breaking, structural disturbance, or environmental manipulation of any kind in accordance with procedures approved by the Director.

- Minimise areas of disturbance arising from any site works permitted by this plan.
- Where necessary, peg or fence to define the limits of the site which may be disturbed. If trees or shrubs or other site features to be retained occur within this area, protect them for the duration of the works.
- Private memorials or commemorative plaques will not be permitted in the park.

Actions

- Rationalise provision of facilities where impacts or demand do not warrant the scale or type of facility intended.
- Follow statutory requirements for planning and building approval before proceeding.
- Where they apply, ensure compliance with relevant Australian standards.
- Ensure the design, placement and construction of facilities are consistent with the scenic values of the park.

1 Overview**1.1 Location, Regional Context and Reservation History**

The Savage River Regional Reserve is located adjacent to the Savage River National Park (see Map 1). The existing regional reserve effectively surrounds the park on the western, southern and most of the eastern side, covering a total area of 17 680 hectares.

The exact boundaries of the Savage River Regional Reserve are set out on registered Plan Number 4549 and located in the Central Plan Office, Department of Primary Industries, Water and Environment in Hobart.

Regional Context

Both the regional reserve and the adjacent national park were created as additions to this CAR reserve system in Tasmania in order to improve the representation of rainforest on particular soil types and elevations. The forest communities of both the park and regional reserve were mapped as part of the comprehensive regional assessment for the Tasmanian Regional Forest Agreement.

Reservation History

The regional reserve, along with the park, constitutes the eastern half of what was a much larger Recommended Area for Protection (RAP) of 35 320 hectares. In 1988, the Working Group for Rainforest Conservation recommended that the Savage River RAP be reserved as a conservation area to protect rainforest on associated geology/altitude groups. However the Savage River RAP remained unresolved due to forestry and mining interests until 1997.

In 1997, the Resource Planning and Development Commission (RPDC) recommended that the eastern portion of the Savage River RAP become a national park

and regional reserve. The latter reserve category allows for the development of mineral deposits, and the small-scale use of other resources, while protecting the natural and cultural features.

The forests along the western portion of the RAP were attributed with commercial timber values, in particular myrtle forest and have remained on the Register of Deferred Forest Land. The Regional Forest Agreement is in place for twenty years but will be reviewed after five years. The decision on the future use of Deferred Forest Land will be made prior to this review. The RPDC has recommended that this area be added to the regional reserve at some later date.

In 1997, the RPDC recommended the inclusion of two additional areas that are contiguous with the existing regional reserve. These are the Horizontal Creek area, on the eastern side of the park, and the Roaring Meg Creek area, on the south-western end of the regional reserve, west of the Heazlewood River (see Map 1). The Horizontal Creek area is especially important as it provides a partial buffer along the eastern side of the park where it shares a boundary with State forest.

The regional reserve, along with the park, was gazetted on 30 April 1999. The two subsequent extensions were gazetted on the 27 December 2000.

1.2 Importance of the Regional Reserve

The regional reserve is important from an environmental, economic and social perspective.

During the comprehensive regional assessment process the area now included in the regional reserve was identified as having potential mineral deposits. For this reason it was classified under a reserve type that allows for the utilisation of mineral

resources in an environmentally sustainable manner.

The park is also biologically and geologically important. All forest community types present in the regional reserve have been identified as priority forest communities.

The leatherwood forests within the regional reserve are important to local apiarists for honey production. Several apiary sites are located on within the regional reserve, primarily in the proposed Horizontal Creek extension to the regional reserve on the western side of the Arthur River.

The regional reserve is also important for recreational users. The Arthur River contains brown trout (*Salmo trutta*) which make it a destination for recreational anglers. The area is also used for camping, swimming, canoeing, bushwalking, recreational prospecting and scenic driving. Those roads that access the Keith and Arthur Rivers are particularly important from a recreational perspective.

1.3 Adjacent Land Use

1.3.1 Forestry Activity

To the west of the regional reserve is an area of State forest known as the pipeline corridor, so named as it occurs on either side of the Savage River Mine pipeline track (see Map 1). Any harvesting in this area has been deferred pending the outcome of a state-wide deep red myrtle resource review (clauses 54 and 55 of the Tasmanian RFA). The resource review is in progress and is planned for completion by 2001. Until then, the area remains State forest and on the Register of Multiple Use Forest Land and is identified in the Murchison and draft Circular Head Forest Management Plans as a "harvest deferred" Special Management Zone pending the outcome of this resource review.

There are a number of eucalypt regeneration coupes in State forest areas between the eastern portion of the regional reserve and

the Arthur River. The oldest coupes (102 ha.) are in the vicinity of Pykes Road and were established in 1977. Two other eucalypt regeneration coupes, (209 ha.), located in the vicinity of Horizontal Creek on the western side of the Arthur River, were established between 1982 and 1988. Three smaller areas east off Junction Road were established in 1992 and another area south of Halfway Creek was established in 1991. There is a regeneration area to the north of Farquahars Road on the western side of the Arthur River Forest Reserve.

1.3.2 Mineral Exploration and Mining (see Section 5.1)

The regional reserve is available for mineral exploration, mining and quarrying activity. Mining and mineral exploration is controlled under the *Mineral Resources Development Act 1995*, *Land Use Planning and Approvals Act 1993* and the *Environmental Management and Pollution Control Act 1994*.

Two large-scale projects exist in the area, these include the delineation drilling of a magnesite resource south of the Arthur River and iron ore mining from the Savage River mine to the south-west of the regional reserve.

The Savage River mine lease area lies adjacent to the south-west boundary of the regional reserve (see Map 2). This open cut mine has been in operation since 1967 and is presently owned and operated by Goldamere Pty Ltd trading as Australian Bulk Minerals. The mine site consists of one main active pit and several disused pits, a concentrating mill, tailings dams, roading and dormitory accommodation for mine employees located at Savage River. A pipeline for the transport of iron ore and water slurry runs from the mine site to Port Latta on the coast, a distance of 85 kilometres. This pipeline travels below ground for approximately 70% of its length.

There are currently no mines operating within the regional reserve. Any future mining proposals within the regional reserve will be subject to a full environmental impact assessment and will need to comply

with specific environmental management conditions under the *Land Use Planning and Approvals Act 1993* and the *Environmental Management and Pollution Control Act 1994*.

1.4 Threats to Regional Reserve Values

Fire is the most serious threat to rainforest values in the Savage River region. Whereas myrtle wilt (*Chalara australis*) is the most significant plant disease.

There are a number of factors that detract from or have the potential to diminish the values and character of the regional reserve. These include:

- activities associated with forestry, mineral exploration and mining such as roading, the increased risk of fire, habitat fragmentation, disease and intrusion of sclerophyll or other exotic species;
- wildfire which threatens the safety of visitors, destroys facilities and the long term survival of rainforest flora and specialised fauna;
- introduced plants, animals and diseases which invade the ecosystem and displace or destroy native species;
- unsuitable developments or activities which degrade natural or cultural values or spoil the character of the park and the regional reserve, and
- the creation of an unplanned track network will increase access by visitors to vulnerable locations.

These factors must be effectively dealt with if the values and character of the regional reserve are to be retained in the long term.

2 Vision and Management Objectives

2.1 The Vision for the Regional Reserve

Developing a vision for the regional reserve allows people to picture how the regional reserve will be in the future and to provide direction to management. This long term vision provides goals for sustaining the values of the regional reserve into the future by avoiding inappropriate development and undesirable management practices.

2.1.1 The Vision

The regional reserve contains a healthy and natural biodiversity, with viable populations of all native species and with no significant disturbance from human activities.

- The regional reserve continues to support secure populations of other flora and fauna.
- Populations of threatened species within the regional reserve are stable or increasing.
- No new sites have been infected with myrtle wilt disease.
- Weed populations are not displacing native species.
- The risk from wildfire has been reduced significantly through a combination of education programs, cooperative arrangements with other land managers and effective fire management actions.

There has been no significant disturbance to the land and no contamination of the land, air and water through human activities.

- All plant communities are able to regenerate without disturbance.
- Damaged or degraded areas have been stabilised or rehabilitated and restored.
- Water quality is of a high standard.

The Aboriginal and historic heritage of the regional reserve is identified, well protected and interpreted for the public.

- Suitable interpretation of Aboriginal and historic sites has been provided.
- Arrangements are in place to consult with the Aboriginal community on the

management of Aboriginal heritage sites.

Commercial activities are being undertaken in a sustainable manner and without significant impact on the values of the regional reserve.

- Whereby site specific impacts for areas utilised for resource extraction are carefully managed and are adequately rehabilitated.
- Other users or visitors to the regional reserve are not being adversely affected by the commercial activities being undertaken.

Visitors are able to pursue recreational activities that are in keeping with the character of the regional reserve and that do not disturb or detract from the experience of other regional reserve users.

- Maintain low key camping area with limited facilities where small numbers of people are able to enjoy and pursue activities based on the the natural values of the regional reserve.

Recreational facilities and services are well sited and designed to be in keeping with the surroundings. These facilities should not threaten the environmental, cultural and recreational values of the regional reserve.

- All designated walking tracks are well maintained and clearly marked.
- Improved information and interpretation is available for the public at key accessible locations.
- Camping and day use areas are maintained to a high standard.

Educational and research programs that provide an improved understanding of natural systems and species and that assist with management are encouraged.

2.1.2 Achieving the Vision

A series of performance indicators listed in Appendix 1 can be used to evaluate the success in implementing the management plan and the achievement of plan objectives.

Each section of the management plan lists a series of specific management actions which provide more specific information on how the vision for the park is to be achieved in an operational sense.

These actions are measurable and will be used to evaluate implementation of the management plan to determine whether the vision for the regional reserve has been achieved.

Policies

- Review the plan ten years after gazettal or sooner if research, monitoring, or other circumstances demonstrate that this is required.
- In reviewing the plan, evaluate the implementation of the management actions and their effectiveness in achieving the management objectives for the regional reserve.
- Use the implementation schedule set out in Appendix 2 when evaluating the plan's implementation and outcomes.

2.2 Purposes and Management Objectives of Regional Reserves

Regional Reserves are a class of reserved land under the *National Parks and Wildlife Act 1970*.

They are an area of land -

- (a) with high mineral potential or prospectivity; and
- (b) predominantly in a natural state.

Purposes

The purposes of reservation of regional reserves, as set out in the *National Parks and Wildlife Act 1970*, are for mineral exploration and the development of mineral deposits in the area of land and the small-scale use of other natural resources of that area of land, while protecting and maintaining the natural and cultural values

of that area of land. Savage River Regional Reserve is reserved for these purposes.

Management Objectives

The management objectives of regional reserves are set out in Schedule 4 of the *National Parks and Wildlife Act 1970*.

The complexity of factors to be considered in managing the regional reserve, the reasons these management objectives apply and the manner in which the management objectives will be achieved, are discussed in a number of different sections of the management plan. The sections of the management plan that deal primarily with each management objective in the Act are shown in brackets. Those management objectives that will apply to the Savage River Regional Reserve are listed below.

- a) to provide for mineral exploration activities and utilisation of mineral resources (see Sections 5.1);
- b) to provide for the controlled use of other natural resources (see Section 5.2);
- c) to conserve natural biological diversity (see Sections 3.4 and 3.5);
- d) to conserve geological diversity (see Section 3.2);
- e) to preserve the quality of water and protect catchments (see Section 3.3);
- f) to conserve sites or areas of cultural significance (see Section 3.7);
- g) to encourage education based on the purpose of reservation and the natural or cultural values of the regional reserve, or both (see Section 6.2);
- h) to encourage research, particularly that which furthers the purpose of reservation (see Section 10.1);
- i) to protect the regional reserve against, and rehabilitate the regional reserve following, adverse impacts such as those of fire, introduced species, diseases and soil erosion on the regional reserve's

natural and cultural values and on assets within and adjacent to the regional reserve (see Section 4);

- j) to encourage and provide for tourism, recreational use and enjoyment consistent with the conservation of the regional reserve's natural and cultural values (see Section 6)
- k) to encourage cooperative management programs with Aboriginal people in areas of significance to them in a manner consistent with the purpose of reservation and the other management objectives (see Sections 3.7 and 10.1).

Not all the management objectives for regional reserves as detailed in the Act will apply to every reserve. The following objective will not apply to the regional reserve.

To provide for the taking, on an ecologically sustainable basis and where appropriate, of designated game species for commercial or private purposes or both.

The regional reserve does not lend itself to this type of use given the low level of accessibility and, in many areas, dangerous terrain. In addition, hunting is not known to be a pre-existing use of the reserve. Therefore, not providing for this activity in the reserve is unlikely to affect any known users of the area.

3 Conservation

3.1 Topography and Climate

The regional reserve is characterised by undulating hill country with ridges aligned south-west by north-east and deeply dissected by steep river valleys. The relief in the eastern portion of the Roaring Meg Creek extension is generally flatter and dominated by drier vegetation communities, probably as a result of fire. These landscapes have formed as a result of successive geological events. The Savage River is a deeply incised gorge that formed along fault lines that run parallel to the Arthur Lineament, a belt of Precambrian metamorphic rocks which extend from Conical Rocks to Rocky Cape. The relatively linear north-east to south-west orientation of the Savage River is due to the presence of this extensive geological feature.

The climate of the Savage River region is characterised by cool temperatures and high rainfall. Mean daily temperatures are in the range of 12 -20°C in summer and 3.5-9°C during the winter months. Frosts are frequent during the colder months and occasional snowfalls do occur. The park and adjacent regional reserve receives between 1500 to 2000mm of rainfall annually which occurs mainly between June and August. Although there is a predominance of rainfall in winter, heavy rainfall may occur throughout the year.

3.2 Geodiversity

The geology of the region is dominated by the Arthur Lineament. The western portion of the regional reserve is underlain by greywackes ('dirty sandstones') and slaty mudstones of Precambrian Age known as the Burnie and Oonah Formations, these rocks were metamorphosed to schists during the Cambrian period.

The southern and eastern portions of the regional reserve are dominated by Cambrian igneous and sedimentary rocks. The most

prominent feature in the area is Mount Cleveland. The Arthur Lineament and associated volcanic sediments are considered to have high mineral prospectivity.

Part of the Mount Bertha /Savage River basalt plateau occurs in the western portion of the regional reserve. The kraznozem soils on the Tertiary basalt plateaux in the Arthur Lineament region are considered to be highly significant, as they represent the largest area of basalt soils in Tasmania which have not been cleared for agriculture and still support undisturbed natural vegetation communities (Sharples, 1992).

No karst landforms are known of within the regional reserve, the nearest magnesite karst is that found in the Lyons River area, immediately north-west of the regional reserve. Magnesite karst is a geomorphological feature within magnesite rock that is relatively rare in Australia and of considerable geoconservation significance. There are karst outcrops, and dolomite (carbonate rock) near the Arthur River, in the vicinity of Farquhars Bridge. The magnesite bodies strike discontinuously south south-west for at least ten kilometres in the area of the Keith and Lyons Rivers, within or immediately adjacent to the regional reserve. Surface karst features include above ground tower formations.

A detailed study of the magnesite karst area in north-west Tasmania did not identify any magnesite karst within the park or regional reserve (Household et al., 1999). There may be as yet undiscovered magnesite deposits in the region and these will most certainly lie within the mineralised belt of the Arthur Lineament, part of which lies within the regional reserve.

Objectives

The objectives of geoconservation in the regional reserve are to:

- protect, maintain and monitor geodiversity;
- protect, maintain and monitor sites of geoconservation significance;
- maintain the natural rates and magnitudes of change in earth processes; and
- where possible minimise harmful impacts on geoconservation values.

Policies

- The geoconservation values of natural systems should be considered when undertaking any mineral exploration or mining activities in order to minimise their disturbance.
- Any proposed mineral exploration in the regional reserve will be referred to the Mineral Exploration Working Group for consideration.
- Any mineral exploration in the regional reserve will comply with the Mineral Exploration Code of Practice 1999 (Mineral Resource Tasmania).
- Potential adverse impacts on geodiversity and earth processes will be assessed when planning any development or action, including land rehabilitation and stabilisation (see Section 4.3).
- Management practices and development will avoid or otherwise minimise impacts on the integrity of sites of geoconservation significance.

Actions

- Prepare and disseminate an inventory of sites of geoconservation significance.
- Monitor impacts on geodiversity.
- Promote public awareness and appreciation through public education and interpretation is required to

minimise disturbance to geoheritage sites.

3.3 Water Quality

Maintenance of water quality, particularly with regard to any mineral exploration or mining operations within the regional reserve is very important. One of the management objectives for regional reserves is to preserve the quality of water and protect catchments.

The *State Policy on Water Quality Management 1997* requires that Protected Environmental Values (PEVs) and water quality objectives are set for all surface waters in Tasmania. The following Protected Environmental Values are proposed for surface waters that have their headwaters within the regional reserve or adjacent national park:

- A. Protection of Aquatic Ecosystems
 - (i) Protection of pristine or nearly pristine ecosystems.

Having regard for the management objectives or regional reserves outlined in Schedule 4 of the *National Parks and Wildlife Act 1970*.

- B. Recreational Water Quality & Aesthetics
 - (i) Primary contact water quality
 - (ii) Secondary contact water quality
 - (iii) Aesthetic water quality

That is, as a minimum, the water quality for the regional reserve (with their headwaters within the regional reserve or adjacent national park) shall be managed to provide water of a physical and chemical nature to support a pristine or near pristine aquatic ecosystem and which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in an aesthetically pleasing waters.

The following Protected Environmental Values are proposed for surface waters which flow through the regional regional reserve from private land, State forest or unallocated Crown land:

- A. Protection of Aquatic Ecosystems
 - (I) Protection of modified (not pristine) ecosystems from which edible fish can be harvested.
- B. Recreational Water Quality & Aesthetics
 - (i) Primary contact water quality
 - (ii) Secondary contact water quality
 - (iii) Aesthetic water quality

That is, as a minimum, the water quality for the regional reserve shall be managed to provide water of a physical and chemical nature to support a modified, but healthy aquatic ecosystem from which edible fish may be harvested; which will allow people to safely engage in recreation activities such as swimming, kayaking, paddling or fishing in an aesthetically pleasing waters.

Actions

- Establish baseline water quality monitoring sites at key locations within the regional reserve to measure the impacts on water quality from adjacent land use activities.
- Liaise with Forestry Tasmania and Mineral Resources Tasmania on an ongoing basis to ensure integrated catchment management for rivers and streams within the regional reserve.
- Respond to pollution incidents within the regional reserve involving any hazardous or noxious substances.

3.4 Flora

Most of the vegetation in the regional reserve is dominated by cool temperate rainforest. These forests are of ancient origin and represent the remnants of once widespread rainforests of the supercontinent Gondwana which split up around 50 million years ago. Australia, New Zealand and South America still possess related relict rainforest communities from these ancient times. The western portion of the regional reserve contains some of the tallest and best

examples of old growth undisturbed rainforest in Tasmania.

The area is also important for the conservation of lower plants. Recent studies of lichen and mosses for the Tarkine region have identified new taxa. Two hundred and thirty nine bryophyte species representing 93 mosses and 146 liverworts have been identified so far (National Estate Listing). A number of these area expected to occur in the regional reserve.

The Roaring Meg Creek area contains small areas of rainforest and tall and dry messmate stringybark (*Eucalyptus obliqua*), both with old growth and wilderness qualities and dry Smithton peppermint (*E. nitida*) forest with high wilderness quality. Approximately 250 hectares of the regional reserve is classified as non-forest with high wilderness quality.

The eastern side of the regional reserve contains a mixture of tall and short rainforest with tall *E. obliqua* forest close to the Arthur River. Although these wet forest communities border rainforest, they are not considered rainforest species as they generally require fire to regenerate under natural conditions.

No rare or threatened species have been recorded in the regional reserve. Nearby Brassey Hill, which is outside the regional reserve, supports populations of three plant species classified as rare or threatened under the Tasmanian *Threatened Species Protection Act 1995* (see Table B1). The substrate of the Roaring Meg Creek area includes serpentine rocks support a rare and distinctive flora and is a priority flora site for funnel heath (*Epacris glabella*).

The regional reserve has major floristic significance and provides evidence for Tasmania's ancient past and as such has significant conservation values. The importance of the regional reserve for vegetation conservation means that conservation of plant communities and species is one of the major considerations of management. A number of threatened species have been recorded in the regional reserve and are listed in Table A3.

Table B1 Threatened Flora Species of Savage River Regional Reserve

Species	Common Name	Status	Comment
<i>Epacris glabella</i>	funnel heath	vulnerable	East side of Bronzite Hill
<i>Leptomeria glomerata</i>	creeping Tasman sandalwood	rare	Brassey Hill
<i>Micrantheum serpentinum</i>	serpentine micrantheum	rare	Bronzite Hill
<i>Spyridium gunnii</i>	Gunn's spyridium	rare	North of Basalt Hill

Objectives

The objectives of flora conservation in the regional reserve are to:

- protect, maintain and monitor natural flora diversity;
- protect, maintain and monitor threatened flora species;
- protect, maintain and monitor plant communities of conservation significance and;
- minimise harmful impacts on the regional reserves indigenous flora.

Policies

- The following areas will be given high flora conservation priority:
 - rainforest communities
 - restricted wet forest communities;and
 - any area containing threatened flora species or communities of conservation significance.
- Adverse impacts in high conservation priority areas will be avoided or limited to those which are localised and of minimal impact.
- Only local provenance of species native to the regional reserve will be used in rehabilitation works unless written approval is given for alternatives.
- Any fire management in high conservation priority areas, including fuel reduction burning and habitat management burning, will conform with this management plan.

- All practicable efforts will be made, consistent with the available resources, prevailing Fire Danger Index, fire intensity and fire crew safety, to exclude unwanted wildfire from or restrict its spread in high conservation priority areas.
- The cutting of live trees for firewood or for other purposes in the regional reserve is illegal and regulations pertaining to this will be enforced.

Actions

- Map the extent and describe the non-forest communities present in the regional reserve.
- Prioritise the protection of the remnant, fire-excluded plant communities where possible to exclude wildfire (see Section 4.1).
- Prepare and/or implement management programs for threatened flora species and communities of conservation significance.
- Populations of rare species should be surveyed to determine their vigour and whether regeneration is occurring. Permanent plots should be established and monitored long term for this purpose.

3.5 Fauna

The rainforests of the Savage River area are an extremely valuable habitat for many species including wet forest birds, unusual reptilian species and the Tasmanian tree frog

(*Litoria burrowsae*). The comprehensive regional assessment identified National Estate values within the regional reserve including small areas of glacial refugia and fauna species richness in the western part of the regional reserve.

Mammals

Twenty-two mammal species are known to occur in Tasmanian rainforest; a number of these are endemic to Tasmania including the Tasmanian devil (*Sarcophilus harrisii*), the dusky antechinus (*Antechinus swainsonii swainsonii*) and the rare broad-toothed mouse (*Mastacomys fuscus*) all occur in the area. The spotted-tailed quoll (*Dasyurus maculatus maculatus*) and brown bandicoot (*Isodon obesulus*) may also be present in the regional reserve. The endemic long-tailed mouse (*Pseudomys higginsi*) occurs principally in rainforest habitat but has not been recorded in the regional reserve to date.

Old growth eucalypt forest provide hollows and cavities for three species of aboreal mammal, and at least five bat species. There are no introduced mammal species known to occur within the regional reserve.

Birds

The large tracts of rainforest found in the area are regarded as the most important refuge for wet forest avifauna in Tasmania. To date, sixty-two bird species have been recorded in the region covering the regional reserve. Three species, two of which are endemic to Tasmania, breed predominately in rainforest habitat. The endangered Tasmanian wedge-tailed eagle (*Aquila audax fleayi*) and the white form of the rare grey goshawk (*Accipiter novaehollandiae*) nest in tall eucalypt and rainforest trees of the park and adjacent regional reserve. The forests of the Savage River region are considered critical habitat for this species in Tasmania (Slater, 1992).

Bird species recorded in wet forest habitats in the area include all twenty-two species regarded as common Tasmanian rainforest species, and all six species dependent on wet forest, including the grey goshawk, brush bronzewing (*Phaps elegans*), pink robin

(*Petroica rodinogaster*), White's thrush (*Zoothera lunulata*), Tasmanian thornbill (*Acanthiza ewingii*) and scrubtit (*Acanthornis magnus*). In particular, old growth eucalypt forest provide hollows and cavities for at least fifteen species of bird.

Scrub, heath and moorland are widespread and important habitats occupied by animals with many interesting adaptations. Species of particular interest include the ground parrot (*Pezoporus wallicus wallicus*) which is believed to occur in the regional reserve where buttongrass plains are present. A record exists from the Karilyn Creek area in the southern part of the regional reserve (RAOU 1980, GTSpot). Suitable habitat for ground parrots occurs from Savage River to the Pieman River.

The wedge-tailed eagle is a subspecies endemic to Tasmania. The species is rated as vulnerable under the *Threatened Species Protection Act 1995* (Tasmania). It has been included in the schedules of the *Commonwealth Endangered Species Act 1992* as a critically endangered subspecies. Each nesting pair of eagles requires at least ten hectares of little disturbed forest. Adults will desert a nest if exposed to medium or high levels of disturbance such as intensive recreation, logging and roading (Slater, 1992). A wedge-tailed eagle record exists for the south-west corner of the regional reserve, close to the Savage River.

Reptiles and Amphibians

The regional reserve has not been systematically surveyed for reptiles and only five species have been recorded. Of Tasmania's eleven amphibian species only three have been recorded within the national park, two of these species, the brilliant green Tasmanian tree frog (*Litoria burrowsi*) and the Tasmanian froglet (*Crinia tasmaniensis*) are endemic to Tasmania. Many more species are expected to occur.

Fish

Thirteen species of freshwater fish found in the area (see Appendix 4). The upper and lower reaches of the Savage River support a fish fauna with a range of age classes,

although lower in abundance than for comparable reaches in the Whyte River catchment. The presence of migrating fish (including spawning lampreys) in the upper reaches of the Savage River implies that fish do migrate upstream through the mining-impacted sections of the river, although not necessarily in numbers which might occur in the absence of mining impact (Davies & Cook 1998).

Crustaceans

The very high annual rainfall experienced in the area has contributed to diverse aquatic habitats in rivers, creeks and riverlets. The freshwater crustaceans are of global significance as many groups such as amphipods, isopods and crayfish are relicts of the Gondwanan fauna or remnants from even earlier eras. Some small crustaceans, the amphipods, have undergone great adaptive radiation in Tasmanian forests. At least eight species are present in the park, with the greater Tarkine region being one of the richest centres of diversity for the group in the world.

Other invertebrates

The range of invertebrates from Tasmanian wet forest is large and of great scientific interest containing many relict and endemic species. Rotting logs, moss-covered substrates, soil and leaf litter are important microhabitats for many endemic archaic invertebrate groups in the area. Land snails, flatworms, onychophorans, spiders, centipedes, millipedes, collembola and beetles have been found to be well represented in these habitats (Appendix 4).

Sampling for freshwater macroinvertebrate fauna has occurred at several control sites upstream from the Savage River mine site. These studies showed that the overall abundance and diversity was very high for these upstream sites and comparable to other unimpacted streams in the region (Davies, 1995).

The habitat of rare freshwater snails extends across the park. This group of snails forages, feeds and shelters on benthic algae, however little is known about their life

history. Species present include *Beddomeia angulata* and *Phrantela annamurrayae*. The survival of these hydrobiid populations may be dependent on the retention of protective riparian vegetation, including along class 4 streams (ie small headwaters), and maintenance of water quality.

A survey of invertebrates in Tasmanian rainforest included a sample site along the Savage River pipeline which provides an indication of the type of invertebrates present in myrtle dominated rainforest (Coy et al., 1993). The pipeline road is an important benchmark forest invertebrate site and the type locality for a number of invertebrate species and has been listed on the Register of the National Estate. Studies in other vegetation types are required to provide a truly comprehensive picture of the entire invertebrate fauna present in the region.

Managing the regional reserve for the benefit of its terrestrial invertebrate fauna largely involves excluding fire from rainforest and wet forest habitats.

Objectives

The objectives for fauna conservation in the regional reserve is to:

- protect, maintain habitat and monitor the diversity of indigenous fauna;
- protect, maintain and monitor threatened fauna species, in particular the giant freshwater crayfish and the spotted-tailed quoll;
- minimise harmful impacts on indigenous fauna and habitats;
- determine the presence or otherwise of previously recorded species such as the wedge-tailed eagle and ground parrot; and
- survey the fauna to fill in gaps in present knowledge.

Policies

- The following park habitats will be left undisturbed or given special protection:
 - rainforest;
 - wet eucalypt forest;
 - any other threatened species habitat.
- All practicable efforts will be made to prevent adverse fire and other impacts on breeding of threatened species.

Actions

- Conduct fauna surveys to fill gaps in knowledge useful for management and protection, in particular reptiles and amphibians.
- Discourage visitors from feeding wildlife by making them aware of the harmful effects of inappropriate food and dependence on humans.
- Implement relevant prescriptions from any threatened species recovery plans available for those species occurring in the regional reserve.
- Develop and implement specific management guidelines for freshwater snails.

3.6 Landscape and Wilderness Values

The regional reserve is considered to meet the National Estate threshold if the area exceeds 8000 hectares, is not fragmented, the majority of the area has a wilderness quality greater than 12 (the regional reserve has been rated at wilderness quality rating of between 12 and 13), and the nodal area of wilderness (the park) has a wilderness quality rating of equal to or greater than 14. (Tasmanian Public Land Use Commission 1997, p. 37).

The wilderness values of the regional reserve have been compromised to some degree by the proximity of the Savage River pipeline to the west, the presence of Corinna Road along a section of the southern boundary and

the presence of tracks within the regional reserve. The wilderness rating is determined by using criteria from the National Wilderness Inventory (Leslie & Maslen, 1995). The NWI measured wilderness quality on a class scale by adding the scores from four variables:

1. remoteness from settlement;
2. remoteness from access;
3. apparent naturalness; and
4. biophysical naturalness.

These variables were applied in the Tasmanian comprehensive regional assessment. The regional reserve forms part of the 350 000 hectare 'Tarkine Wilderness' identified in the National Wilderness Directory and provided interim National Estate listing. This area was listed on on the basis of Aboriginal heritage, natural and wilderness values.

The upper Savage River has been identified as an undisturbed catchment area that meets the threshold for National Estate significance Wilderness' (Tasmanian Public Land Use Commission 1997, p. 32). The upper Savage River comprises particularly scenic and distinctive rainforested river gorge system in a natural state.

All forest community types present in the regional reserve have been identified as priority forest communities during the comprehensive regional assessment.

National Estate values for the area include small areas of glacial refugia and fauna species richness in the western part of the regional reserve.

Objectives

The aims of wilderness conservation in the regional reserve are to:

- protect and maintain wilderness quality values;
- minimise the level of disturbance both visually and environmentally;

- preserve where possible a sense of tranquillity for visitors; and
- maintain the perception of isolation from settlement and human activities.

Policies

- Wilderness values will be protected through the careful placement visitor facilities and services (see also Sections 6.1, 7.1 and 7.2).
- Impacts to development sites will be confined to the immediate area and will require sensitive site management.
- Any development activity will consider the impacts of the activity on the adjacent areas of the regional reserve to ensure that no off-site impacts occur.
- Restore sites as close to their pre-development condition when use of the sites has ceased.
- Any mining development within the regional reserve will require a full and comprehensive environmental impact assessment in accordance with the *Mineral Resources Development Act 1995*, *Land Use Planning and Approvals Act 1993* and the *Environmental Management and Pollution Control Act 1994*.

Actions

- Monitor any impacts on wilderness values.
- Mineral Resources Tasmania will monitor the conditions of exploration licences to ensure that the Mineral Exploration Code of Practice is being followed.

3.7 Aboriginal and Historic Heritage

3.7.1 Aboriginal Heritage

The regional reserve lies within an area that was part of the tribal territory of the Big River and North tribes at the time of European contact. The Big River people were an inland group who largely occupied the mountainous plateau of the Central Highlands. The North tribe occupied the central north of Tasmania from the coast south to the base of the Western Tiers. It is highly likely that the two tribes would have visited one another's country travelling by well defined routes (Miedecke, 1996). Many of these routes were used by Europeans in their explorations of north-west Tasmania. No systematic archaeological surveys have been conducted in the region. The dense vegetation and high rainfall of the area makes the preservation of sites quite unlikely. The Tasmanian Aboriginal Site Index (TASI) lists no sites for the area. It has been suggested that the dense rainforest offered little incentive for human occupation unlike other areas of Tasmania. It has been suggested that the area may have formed part of an extensive source of chert for the manufacture of stone tools, however no Aboriginal quarry sites have been identified.

Aboriginal sites and the cultural landscapes of Tasmania have a strong and continuing significance to the Tasmanian Aboriginal community. Sites need to be located and protected, particularly from the impacts of development and visitor use. There is potential for the Aboriginal community to promote and interpret these sites to the wider community and provide greater understanding of Aboriginal culture in the regional reserve.

New legislation dealing with Aboriginal heritage management is under consideration. At present, the *Aboriginal Relics Act 1975* applies.

Objectives

The objectives of management of Aboriginal heritage are, in cooperation with the Aboriginal community, to:

- identify and record any sites of Aboriginal heritage;

- protect and conserve any Aboriginal heritage; and
- interpret any Aboriginal heritage.

Policies

- Aboriginal heritage values will be assessed and protected in accordance with this management plan and any agreed national or state charter or guidelines for Aboriginal sites.
- Sites of Aboriginal significance will not be publicised unless the site has been assessed, in cooperation with the Aboriginal community, for educational or interpretative use. Where applicable, make use of any agreed Aboriginal interpretation strategy.
- The Aboriginal community will be consulted on any undertaking or development which may impinge upon Aboriginal sites.
- All proposed landscape modification, development, or maintenance within the regional reserve will be subject to the prescriptions of Section 7.3 (Managing Development Works).
- As far as possible, development will be located well away from areas of Aboriginal heritage.
- Aboriginal heritage will not be deliberately disturbed for management, development or research purposes unless the Director determines there is no practicable alternative and a permit to disturb aboriginal relics has been issued under the *Aboriginal Relics Act* 1975.

Actions

- In cooperation with the Aboriginal community, identify and record any Aboriginal sites.
- Consult with TALC and any local Aboriginal representatives on the

management of Aboriginal heritage in the park.

- Monitor any Aboriginal sites for, and protect from damage or interference.
- Develop interpretation of any Aboriginal heritage of the regional reserve in consultation with the Aboriginal community.

3.7.2 Historic Heritage

The first Europeans to explore north-west Tasmania were the Van Diemen's Land Company surveyors. In 1827, their chief surveyor Henry Hellyer explored and surveyed the land along the upper course of the Arthur River for suitable sheep grazing country. One of these areas, to the east of the present day township of Waratah, came to be known as the Surrey Hills block.

In January 1864, explorer Gordon Burgess cut a track from the Surrey Hills block through to the west coast with companions Savage and Heazlewood. They explored the country south and west of Mount Cleveland. Burgess and Savage returned to force a way through to the coast, a journey taking nineteen days. The Heazlewood and Savage Rivers are named in honour of these two explorers (Salt, 1982).

Early mineral exploration in 1876-77 led to the discovery of iron ore deposits in the Savage River area. The inaccessibility of the region precluded development of these deposits until the early 1960s when investigation into the ore body was undertaken, resulting in the establishment of the Savage River open cut mine in 1967 (Salt, 1982).

Mining in the region has left the most visible and physical remains of what was the most economically significant activity undertaken. Much of the early European history of the area is associated with mineral exploration and the establishment of various small mining operations. Many examples of this early mining activity are still apparent in the Heazlewood mineral field and Magnet Mines area, south of the regional reserve.

Significant tin mines were established at Luina (Cleveland Mine) and Waratah (Mount Bischoff Mine). There were at least ten other mines in the area producing tin, but these were only small ventures in comparison with Mount Bischoff. In addition, there is a history of gold, nickel, silver-lead and other obscure minerals such as wolfram and osmiridium mining in the area.

Historic nickel and osmiridium prospects are located to the north of Gabbro Hill. Nickel deposits were mined at the Lord Brassey Mine near the Heazlewood River just outside the Roaring Meg Creek extension to the regional reserve. Mineral prospecting tracks were established from the southern mineral fields into the regional reserve, however no mines were ever established as a result. The difficulty of the terrain probably deterred much would be mineral exploration of the area.

Any sites that may be present in the regional reserve should be protected as evidence of mining history of the region. The most serious threats to most of the sites would be displacement from vegetation and natural erosion. The sites may become more accessible through the increased utilisation of the regional reserve for mineral exploration and other resource extraction activities. Any historic heritage values of the regional reserve need protection from avoidable decay or disturbance, and maintenance of their historical integrity.

The history of mineral exploration in the regional represents an opportunity for interpretation and education. However, the significance and integrity of the historic sites needs to be respected and maintained.

Historic features, including previously cleared areas, all form an identifiable heritage setting of varying significance. Conservation of heritage values requires not only attention to remaining structures, features, and artefacts, but also careful and sympathetic management of the surrounding settings and cultural landscapes.

Objectives

The objectives of historic heritage conservation and management are to:

- identify and record any historic heritage in the regional reserve;
- actively conserve and maintain the heritage integrity and quality of significant cultural landscapes, heritage structures and vegetation, and other heritage features;
- protect and conserve historic heritage from damage;
- present and interpret historic heritage; and
- exclude intrusive development and activity.

Policies

- Conservation and management of historic heritage in the regional reserve will adhere to the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (The Burra Charter, 1999) and its associated guidelines.
- A conservation policy statement or conservation plan, including specific assessment of significance, will be prepared before any decisions about major works, use, removal or interpretation of individual elements of historic heritage. Such statements or plans will be prepared in accordance with the principles outlined in the Burra Charter, using the methodology outlined in Kerr (1996).
- A maintenance program should be developed and operate for significant historic places.
- Introduced plants and cultural landscapes retained for their heritage significance will be managed to prevent their invasion of indigenous plant communities.

Actions

- Identify, record and assess the significance of all historic features.
- Make safe any dangerous structures.
- Remove damaging uses, activities and developments which intrude upon or detract from heritage values.
- Where possible mitigate natural processes which are having an adverse effect on heritage values.
- Prepare conservation policy statements or plans for all significant historic heritage features.
- Conserve and interpret key historic places for interaction with the general public.

4 Protection

4.1 Fire Management

Fire is the most serious threat to rainforest values within the regional reserve. While some rainforest species are capable of regeneration after fire by coppicing and from seed (Duncan 1958, Barker 1991), most are accustomed to random fires at an interval of 400 plus years. Fire frequencies greater than this have the potential to destroy rainforest (Harries, 1992).

North-west Tasmania is subject to an extreme weather range characterised by cold southerly airmasses from Antarctica, and by strong northerly airstreams which form over mainland Australia. North-easterly winds when combined with dry conditions and high temperatures are associated with the worst fire weather. Whereas north-westerly winds are generally more humid in this part of Tasmania.

In broad terms, rainforest and wet sclerophyll forest have evolved in the absence of fire and do not burn easily, unlike drier vegetation types. However, a major fire in the Savage River region in 1982 burnt out 47 900 hectares of vegetation, of which 15 000 hectares was rainforest, and demonstrated that these wetter vegetation types will burn under a particular set of circumstances. Conditions which attributed to the 1982 fires included a succession of low rainfall years giving rise to a high level of soil dryness, the presence of ground fuels, high temperatures, low humidity and strong northerly and westerly winds. Therefore, under certain conditions the entire park is vulnerable to fire, fortunately a combination of these conditions is an infrequent event.

Fire would seem to have been a major factor in shaping the vegetation patterns in the regional reserve. The predominance of mixed forest (eucalypt and rainforest species) in the east and southern part of the regional reserve indicates that fire has occurred in these areas but at a very low interval. Rainforest species can be expected

to gradually reclaim this area in the continued absence of fire.

In general terms the fire risk for the regional reserve is quite low. Visitor activities and land use practices on adjacent land tenures pose the main fire risk to the rainforest values of the regional reserve. Potential fire ignition sources include lightning, adjacent land use practices, such as forestry operations (timber harvesting, regeneration and hazard reduction burning), mineral exploration, mining and arson. There are continuing forestry operations in the Hellyer block to the north-east of the park which constitute a potential fire ignition source. It has been demonstrated that north-easterly winds are those most likely to be the major component influencing fire behaviour (Cadman et al., 1988). This was the major wind direction during the Savage River fire in 1982. Forestry activities are also occurring to the north of the Keith River and Rapid River catchment (Askey-Doran et al., 1992). There are a number of eucalypt regeneration areas on the eastern side of the regional reserve (see Map 4). The presence of eucalypt regeneration areas and the greater level of access make this a more vulnerable area to fire.

Forestry operations are only a risk to the park during the harvesting and regeneration burning phase. Regeneration burns are high intensity fires required to stimulate eucalypt regeneration. They are intended to mimic a wildfire and for this reason are undertaken in autumn (March to May) when ground fuels are dry but temperatures and winds are more favourable. Fire escapes from regeneration burns have occurred in the past and have the potential to do so again unless carefully managed. The fire management provisions from the Forest Practices Code applies to all roading, timber harvesting, plantation establishment and regeneration activities in all production zones, adjacent to the regional reserve.

Roads and regeneration coupes are only likely to be a risk under semi-drought

conditions, high temperatures, low humidity and strong dry westerly winds. Danger points in the road network are those to the north-east, north and north-west, where these roads pass through any dry eucalypt, heathland or buttongrass moorland vegetation types. These are flammable vegetation types and easy to start fires in, whereas mixed forest and rainforest are much harder areas in which to initiate a fire (but harder to extinguish once they become established). Any fires in the area are likely to be a rare event, but if they do occur they are likely to be of high intensity and virtually impossible to suppress.

Arson and increased access have a tendency to go hand in hand. A study on the causes of fires on the west coast of Tasmania has shown that most fires had their origin at points less than 500 metres from vehicle access roads (Ingles, 1985). Increased access has the potential to increase the fire risk to the regional reserve. The establishment and use of campsites and facilities in the reserve will encourage higher levels of visitation, particularly during the summer months when the fire danger is most prevalent.

There are large areas of scrub and buttongrass moorland on the western side of the regional reserve. These westward facing slopes are drier and show evidence of having been fire affected in the past, they are predominately scrub communities and therefore more likely to burn. This area is a potential fire risk to the regional reserve as they form potential landing spots for sparks, which could easily initiate a secondary ground fire in suitable areas of the park that in turn becomes a further source of sparks, throwing towards Baretop Ridge. At present there does not appear to be any vehicle tracks into these drier vegetation communities. The establishment of any new tracks into this area will necessitate the restriction of public access.

Moorlands and heathlands to the south-east, south and south-west of the regional reserve are not judged to be a significant fire risk, as southerly winds generally occur during the wetter months and are more humid. Forestry Tasmania have defined the Roaring Meg

Creek section of the regional reserve as an area of moderate priority management area in which a fire management strategy, including regular fuel reduction burning, should be developed in consultation with adjoining major landowners.

There is a remote risk of fire originating from the Savage River mine site entering the regional reserve. However, as the mine site is to the south west of the regional reserve and the most fire prone days are related to northerly winds, the fire risk is not seen as significant. The company adheres to an emergency plan in the event of fire.

Any tracks established for mineral exploration within the regional reserve are to be rehabilitated at the end of the exploration licence term or the rehabilitation commitment is taken up by the next exploration company who may wish to use the track. The Regional Forest Agreement states that the Mineral Exploration Code of Practice will operate in all CAR reserves.

Fire prevention in the regional reserve is the ultimate aim of management and the minimisation of risk factors that have the potential to cause a wildfire. Appropriate risk management and ecological fire management strategies are essential to the overall management of the rainforest component of the reserve. The steep and inaccessible nature of the area makes fire suppression on the north western side of the regional reserve virtually impossible unless natural fire boundaries such as rivers, wet vegetation types and certain landform features can be exploited.

The Parks and Wildlife Service is responsible under the *Fire Service Act 1979* and the *Fire Service (Miscellaneous) Regulations* for all aspects of fire management within the regional reserve, including prevention, containment and suppression.

Objectives

The objectives of fire management in the regional reserve are to:

- protect visitors and staff;
- protection of rainforest values and other nature conservation values;
- protect regional reserve facilities and assets; and
- protect any neighbouring assets.

with Forestry Tasmania and Tasmanian Fire Service is seen as a high priority.

- In the absence of a fire management plan maintain strategic firebreaks on the north- west boundary and implement access restrictions along Pykes Road on the north-east boundary of the park between January to March of each year.

Policies

- Any mineral exploration within the regional reserve will be in accordance with the relevant fire management provisions of the Mineral Exploration Code of Practice 1999.
- Access restrictions may apply to certain roads and tracks during the during high fire danger period. Legitimate commercial access to these areas will be permitted through the issue of an authority.
- All fire management actions including habitat management burning, fuel reduction burning, water hole and fire track construction or maintenance will be undertaken in accordance with Section 7.3
- Any fire management works will be undertaken in consultation with the relevant authorities.
- Fire management and suppression procedures will accord with the Inter-Agency Fire Management Protocol agreed between the Parks and Wildlife Service, the Tasmania Fire Service and Forestry Tasmania.
- Campfires are permitted at designated areas in the regional reserve, subject to certain conditions, and at designated fireplaces.
- Design, construct and manage all facilities within the regional reserve to minimise the likelihood of fire escapes.
- Development of a fire management plan for the regional reserve in cooperation

Actions

- In consultation with Forestry Tasmania and the Tasmania Fire Service, prepare a fire management strategy for the park, regional reserve and adjacent State forest areas.
- Prioritise the protection of the remnant, fire-excluded plant communities where possible within the constraints of the available resources, prevailing Fire Danger Rating, fire intensity and fire crew safety, to exclude wildfire.
- Explain fire management policies and fire safety procedures to visitors as part of an interpretive program for the park and regional reserve.
- Fit fire management tracks not designated for public use with secure, locked gates.

4.2 Pests, Weeds, and Diseases

4.2.1 Introduced Fauna

No feral animal species have been noted in the regional reserve. This is due mainly to the lack of fragmentation and high level of undisturbed habitat for native fauna which has not allowed feral species to become established. The lack of nearby population centres combined with the low level of visitation has minimised the opportunity for domestic animals to be dumped. Possible avenues of introduction include the Savage River pipeline, road and tracks adjacent to or within the regional reserve.

European honey bees (*Apis mellifera*) have been introduced to the area from licensed apiary sites. There is no evidence to suggest that wild populations have become established as a result.

Trout have been recorded in the Arthur River and area target for anglers to the area. It is not known if the species has invaded any of the smaller creeks and stream of the reserve. The species will predate on native fish species and for this reason will not be introduced into any new drainage systems in the regional reserve.

Cats have been noted within the Savage River mine lease area but mainly in association with the mine site.

The presence of species not indigenous to the regional reserve is undesirable and detrimental to the values of the reserve.

Objectives

The objectives of management of introduced fauna in the regional reserve are to:

- eradicate introduced species where this is feasible and warranted by the damage being caused; and
- control and manage introduced species where eradication is not practicable or warranted.

Policies

- New introductions of animals to the regional reserve will not be permitted without an approved comprehensive scientific assessment.
- Eradication will only be attempted where non target species are not threatened by the proposed methods, unless the threat from the introduced species is greater than the threat from eradication methods.
- Eradication, control, and containment programs and priorities for feral species will be based on clear, well documented

contemporary knowledge or, where necessary, additional research which;

- identifies species requiring priority for control;
- identifies areas of scientific or conservation significance where feral animals should be eradicated or controlled;
- specifies the control methods to be used;
- identifies protocols for the use of poison, shooting and trapping;
- prescribes the appropriate time of year for control; and
- outlines the structure of any further research into the most effective means of control.

- The entry of horses into the regional reserve will be subject the provisions of Section 6.2.5.

Actions

- Make visitors aware that dogs are not permitted in the regional reserve.
- Monitor any introduced animal populations and remove introduced species where practicable.

4.2.2 Weeds

A weed is any plant, either native or exotic, growing in an area where it is not desired. Weeds are opportunistic and generally require some form of disturbance in order to become established and do not appear to have the ability to invade mature rainforest.

Most weeds in the region are limited to disturbed environments such as disused mine sites and tracks where light and nutrients are available and vehicles act as a vector for introducing weed seeds. Rehabilitated areas are also under threat from weed invasion and will require weed control as an aspect of rehabilitation. The presence of roads and tracks within or adjacent to the regional reserve increases the likelihood of weed seed being transported and becoming established. Within the regional reserve and adjacent State forest areas, weeds are occasional and

limited to roadsides, including a few plants of Spanish broom (*Genista monspessulana*).

Land management agencies have a responsibility to prevent weed spreading from their land to neighbouring tenures. A series of logging and rainforest management trial areas were established by the Department of Forestry in the late 1970s and early 1980s. One of these trials established a plot of exotic eucalypts, including shining gum (*Eucalyptus nitens*), and conifer species together with rainforest dominants on basalt soil along a section of the Savage River pipeline track. This species, along with the other exotic species, present a threat to the regional reserve due to their invasive potential. Ideally, these exotics should be removed and the site monitored to ensure that regrowth does not occur.

Between the pipeline track and the regional reserve on the western side of the park is a Deferred Forest Area. This area has been set aside to assess the economic feasibility of harvesting this area for myrtle timber to supply to the furniture and craftwood industries. The establishment of tracks to extract myrtle would create an avenue for the introduction of weed species and the spread of myrtle wilt.

There is the potential for weeds to become established in areas disturbed for mineral exploration and the construction of tracks. It is important that the Mineral Code of Practice is followed to minimise the risk of weed introduction into the regional reserve. The leasees for the Savage River pipeline should be mindful of weeds occurring along the pipeline track and take measures to reduce them as should other land management agencies which share boundaries with the reserve.

The management of weeds in the regional reserve is linked to disturbance (the creation of a suitable weed bed) and vehicles (vectors for weed introduction) and control of the few invasive weeds and thickets along roadsides. A number of weeds present on roadsides are capable of creating extensive roadside thickets creating a fire hazard and affecting site lines, scenic views, naturalness etc. These species include Canary broom

(*Genista monspessulana*), English broom (*Cytisus scoparius*), gorse (*Ulex europaeus*) and radiata pine (*Pinus radiata*).

Objectives

The objectives of weed management in the regional reserve are to:

- eradicate weeds where this is feasible and warranted by the damage being caused; and
- control and manage weeds where eradication is not possible or warranted.

Policies

- In general, weed management will accord with the provisions of the introduced plants policy (Parks and Wildlife Service, 1998).
- Weed management will be linked with:
 - protection of natural and cultural values;
 - erosion control; and
 - revegetation works.
- An integrated regional approach to weed management, involving neighbouring land managers, will be supported.
- Eradication or control of weeds will only be attempted where non target species are not threatened by the proposed methods, unless the threat from the weeds is greater than the threat from eradication methods.
- Weed eradication, control, and containment actions and priorities will be based on clear, well documented contemporary knowledge or, where necessary, additional research which:
 - identifies species requiring priority for weed control;
 - identifies areas where weeds should be eradicated or controlled, including where they should be retained as an interim means of environmental protection;
 - specifies methods of removal and

- disposal of weeds;
 - identifies protocols for the use of herbicides and fertilisers;
 - prescribes the appropriate time of year for control; and
 - outlines the structure of any further research into the most effective means of control.
- The assistance of volunteers will be sought for control and eradication where suitable planned and programmed works and effective supervision or direction are available.

Actions

- Prepare weed management programs for any weed species as they become identified.
- Liaise with Forestry Tasmania and the Mineral Resources Tasmania to ensure that weeds are being controlled on neighbouring tenures or mineral licence areas.

4.2.3 Myrtle wilt

Myrtle forest is susceptible to a fungal pathogen (*Chalara australis*) which causes myrtle wilt disease. The fungus appears to be spread as wind borne spores through the forest and will kill mature myrtle trees, but does not appear to affect other species. The disease is almost invariably accompanied by secondary insect attack. The disease is believed to be at epidemic proportions in Tasmania's rainforests. The localised effects of this disease are increased by activities such as roading, timber harvesting and thinning. Roading associated with forestry activity is responsible for increasing the rate and spread of myrtle wilt (Packham, 1991).

The main impact of myrtle wilt is on forest structure through the loss of old growth trees and the subsequent increase in the amount of flammable material from dead trees and ground litter. It is the second of these problems that creates more concern as forestry operations and associated roading increases the risk of fire ignition. The

disease does not pose a threat to the long-term survival of the species, as young trees appear to be unaffected.

Careful management of the disease is important. The disease can be spread underground from areas of high disease incidence. It is possible to identify 'higher risk areas' of forest and to manage them in a manner least likely to produce local outbreaks. High-risk areas include mature, low altitude callidendrous forests with high myrtle density.

Policies

- Any roads or tracks development should be confined to forest types that contain a minimum of myrtle. Where this is not possible then a buffer zone is recommended.
- Where roads or tracks are constructed through forests containing myrtle, damage to adjacent forest should be minimised. The felling of trees and heaping of debris into undisturbed areas should be avoided wherever possible.
- In the construction of walking tracks care should be taken not to damage myrtle trees through cutting, blazing or nailing. If possible a boardwalk should be used so that surface roots are not damaged.
- In high-risk myrtle areas site facilities away from existing myrtle trees. Where it is absolutely essential to fell myrtle trees, choose isolated trees and avoid damage to other trees still standing.
- Felled trees should be removed from the rainforest site to avoid the build up of infected material.

Action

- Undertake assessment of myrtle wilt risk for all development proposals and make recommendations to minimise the potential for disease incidence arising from any such developments.

4.2.4 *Phytophthora cinnamomi*

Phytophthora cinnamomi is a soil-borne fungus that causes severe root rot and subsequent death in some rainforest species. With the exception of localised infections, once an area is infected with *P. cinnamomi* there is no known practical means to eliminate it from that area. Control of infected plants with fungicides is difficult and expensive and needs to be maintained indefinitely.

Generally soil temperatures are too low under a closed rainforest canopy for the fungus to be active but it can be destructive if the canopy is removed by events such as fire. The fungus is unlikely to kill significant areas of rainforest but may play a role in determining species composition in rainforest regenerating after fire. For example, a survey of implicate rainforest defoliated by fire found large numbers of two year old seedlings and fire sprouts in the area to be infected by *P. cinnamomi* (Barker 1990, 1991).

To cause significant impact, the fungus requires the presence of susceptible host plants in moist warm soils. Buttongrass moorlands act as a host and will facilitate its spread once it becomes established. The fungus attacks a broad range of species, the plant families Epacridaceae and Proteaceae contain a number of species that are killed by the disease.

The southern areas of the regional reserve are at greater risk from *P. cinnamomi* due to the more susceptible vegetation types and the presence of vehicle tracks. This risk is exacerbated in those areas that have been subject to fire in recent years, in particular in the Roaring Meg Creek area where bottongrass and heath species are present.

The potential does exist for *P. cinnamomi* to be introduced into this part of the regional reserve through the use of recreational vehicles, or commercial activities.

Care must be taken to avoid spreading *P. cinnamomi*. It is far most cost effective to prevent the disease from becoming established by minimising the number of

tracks and disease hygiene measures that to attempt to control the spread of the disease with chemicals.

Objectives

The objectives of *P. cinnamomi* management are to:

- limit the spread of *P. cinnamomi* in susceptible vegetation communities within the regional reserve; and
- educate the community and visitors in *P. cinnamomi* prevention hygiene measures.

Policies

- All practicable steps will be taken to prevent the spread of *P. cinnamomi* into uninfected areas where efforts to exclude the disease are warranted by the values at risk.
- In general, limit development and recreation activity to those areas already infected or with a low priority for disease exclusion.
- Ensure that heavy machinery being used for fire trail maintenance or other works is thoroughly cleaned and decontaminated before being used in other parts of the regional reserve.
- Any imported soil, fill or crushed rock used in any construction project in areas known to be free of *P. cinnamomi* and where exclusion of the disease is a priority, will be obtained from sites where *P. cinnamomi* is not found, using *P. cinnamomi*-free machinery.
- Where direct seeding is not used, all plants used in planting works within areas free of *P. cinnamomi* will be propagated, in *P. cinnamomi*-free soil or other medium from certified *P. cinnamomi* free nurseries.

Actions

- Identify and map those communities within the regional reserve that are susceptible to *P. cinnamomi*.
- Undertake periodic surveys of *P. cinnamomi* prone areas to monitor the disease status of the regional reserve.
- Inform visitors of the *P. cinnamomi* threat to the regional reserve, particularly those areas with a high predominance of susceptible plant species.

4.3 Soil Conservation and Erosion Control

There are a series of tracks that enter the regional reserve from the east and the south. The tracks from the east were probably established to assess the timber resource and are now primarily used by apiarists. The tracks from the south in the vicinity of the Heazelwood River were also constructed to access areas for timber harvesting. The majority of these tracks are now disused and are in the process of regenerating.

Tracks established for mineral exploration within the regional reserve have the potential to become eroded unless constructed properly and maintained and then rehabilitated at the cessation of exploration activity. Exploration tracks are expected to be of short duration and gates established to prevent public access into these sites. At the cessation of exploration activities these tracks will be rehabilitated. In all other areas of the regional reserve where there are no existing tracks, track construction should be kept to a minimum. Helicopters should be utilised for remote locations in the regional reserve.

Drill sites employ the use of heavy machinery and often require the stripping of surface vegetation and removal of topsoil. In such a high rainfall area these sites will actively erode unless stabilised. Management of drilling sites and tracks are detailed in the Mineral Exploration Code of Practice.

Objective

The objective of soil conservation and erosion control in the regional reserve is to:

- prevent erosion and rehabilitate damaged areas.

Policies

- Erosion hazard and status assessments will be made where significant ground disturbance or soil exposure is proposed.
- Track construction for mineral exploration will be undertaken in accordance with the Mineral Exploration Code of Practice.
- In remote locations equipment and personnel should be transferred by helicopter to the mineral exploration site.
- Land rehabilitation and stabilisation will be carried out on the basis of a prior geomorphological assessment.
- Where possible, ensure that disturbance to natural areas can be rehabilitated when the use of any sites for resource extraction ceases.
- Roadside vegetation management undertaken within the regional reserve should be carried out under the direction of departmental botanists.
- Public access may be restricted on tracks established for mineral exploration to reduce the potential for soil erosion, arson and the transfer of plant disease.

Action

- Rehabilitate, revegetate or otherwise stabilise disturbed or eroding areas, including old vehicle trails.

4.4 Managing Visitor Impacts

At this point in time visitor impacts on the regional reserve are fairly minimal, this is due in large part to the low level of use. However the unregulated nature of access combined with the minimal field presence has resulted in instances of myrtle trees being illegally felled for timber or burls. This practice is a potential fire risk and also correlates to the presence of vehicle tracks in the area.

Objectives

The objectives for managing visitor impacts in the regional reserve are to:

- protect, maintain and monitor environmental and heritage values;
- protect, maintain and monitor the special remote recreation character of the regional reserve; and
- perpetuate the regional reserve in a state that is valued by visitors.

Policies

- Visitor numbers, services and activities will be limited to those which are ecologically sustainable.
- The best available and practicable technology will be used to protect environmental quality from human impacts.
- Develop site based information to educate the public about protection policies of the Department.
- The maximum party size for licensed walking tour groups will be consistent with the principles of the Walking Track Management Strategy (Tourism Tasmania et al., 1998).
- The general public will be encouraged to observe the same party size requirements as licensed groups.

- Toilets not connected to sewage treatment facilities will be managed to ensure that adjacent water bodies are not polluted by waste discharged from them.
- The development of camping areas will be provided for within the regional reserve and, if necessary, tent sites defined to prevent environmental damage.
- School and other groups undertaking educational activities will be encouraged to discuss their proposed program with district parks staff.

Actions

- Inform visitors of, and encourage them to apply techniques for minimal impact use of the regional reserve.
- Encourage visitors to take their garbage with them, not to feed wildlife or to bring their pets into the reserve.
- Provide environmentally sustainable toilets in any future visitor areas.

5 Commercial Activities

5.1 Mineral Exploration, Mining and Quarrying Activity

The development of mineral resources is provided for in regional reserves. Mineral exploration and mining is controlled under the *Mineral Resources Development Act 1995*, which is administered by Mineral Resources Tasmania (MRT). Mineral exploration licences are exempt from the *Land Use Planning and Approvals Act 1999*. Should minerals be discovered, a mining lease is required under the *Mineral Resources Development Act 1995*. MRT sets the lease conditions and an environmental bond. At this stage a permit is also required from the appropriate municipal council in accordance with the *Land Use Planning and Approvals Act 1993*, and assessment under the *Environmental Management and Pollution Control Act 1994* before the commencement of mining activity.

The effects of mineral exploration vary. The early stages involve aerial reconnaissance, geophysical survey, mapping and stream sampling, all of which cause little to no environmental disturbance. Later stages involve the cutting of grid lines and drilling at selected sites. These activities involve clearing vegetation and the construction of access tracks for drilling equipment.

Mineral exploration is an assessment procedure which generally has low impact and in the great majority of cases does not result in the establishment of a mine. Mining has an impact on a restricted area, the size of which depends on whether the mine is open cut or underground. However mining can be expected to have off-site impacts as well.

Maintenance of water quality, particularly with regard to mining is important. Abandoned and operating mines can produce water pollution, which even at low concentrations, can exert chronic effects (Environment Australia 1998, p.11).

Mineral Resources Tasmania has developed a mineral exploration code of practice (Bacon, 1999) to guide mineral exploration activities and to avoid or minimise the impacts of exploration. These guidelines cover areas such as the construction and rehabilitation of access tracks, site management at drilling locations, fire prevention, drainage, re-vegetation of sites, use of helicopters, camping, controlling the spread of weeds and disease such as (*Phytophthora cinnamomi*). Although the code does not have specific guidelines to prevent the spread of myrtle wilt, Mineral Resources Tasmania seeks expert guidance when exploration activities are likely to affect areas vulnerable to the disease.

Proposed mineral exploration activities within the CAR reserve system and other areas considered to be sensitive, such as rainforest areas, must be commented on by the Mineral Exploration Working Group (MEWG). This body has representatives from Mineral Resources Tasmania, the Department of Primary Industries, Water and Environment, and Forestry Tasmania. Other departments and interested bodies are consulted on individual projects where required. The MEWG investigates the affect that any works may have on natural or cultural values and advise of any conditions to be placed on activities so that these values are not adversely or permanently affected. At present no exploration licences have been issued within the regional reserve.

The regional reserve also allows for the controlled use of other natural resources on a small scale such as quarrying. At present there are no authorised quarry sites within the regional reserve. Extraction is subject to a mining lease and permit conditions issued by the appropriate municipal authority following environmental assessment and the Quarry Code of Practice. Rehabilitation of the site is also required as a condition of the permit.

Policies

- Proposed exploration activities in the regional reserve are assessed by the Mineral Exploration Working Group for the potential impact on CAR values.
- Mineral exploration activity in the regional reserve must be conducted in accordance with the Mineral Exploration Code of Practice 1999.
- Any mining proposal within the regional reserve will be subject to a full environmental impact assessment and environmental management conditions as required by the *Environment Management and Pollution Control Act 1994*, *State Policies and Projects Act 1993* and the *Mineral Resource Development Act 1995*.
- Any quarrying activity will be subject to a permit issued by the appropriate municipal authority under the provisions the *Land Use Planning and Approvals Act 1993*, and in accordance with any stipulated environmental conditions and the Quarry Code of Practice.
- Where possible, ensure that disturbance to natural areas can be rehabilitated when the use of any sites for resource extraction cease.

Action

- Liaise with Mineral Resources Tasmania to ensure that that the exploration and development of mineral resources in the regional reserve is consistent with the conservation of natural and cultural values.

5.2 Beekeeping and Apiary Sites

Rainforest sites, particularly areas with leatherwood (*Eucryphia lucida*) are used by apiarists for honey production. Four licensed apiary sites exist within the eastern part of the regional reserve, mainly along Fowl and Flannel Roads. These sites are

generally left vacant during the non-flowering season, however certain sites maintain hives remain all year round and feed bees on a sugar solution during winter.

Most of these sites have been in use for a number of years. These sites are currently licensed under the *Forestry Act 1920*. As these areas are now located within the regional reserve the relevant licences will need to be re-issued under the *National Parks and Wildlife Act 1970*.

It has been suggested that that introduced honey bees (*Apis mellifera*) may affect native bee populations and the pollination ecology of leatherwoods. Further research is required but the effect is not currently judged to be significant enough to warrant limiting bee keeping activities near rainforest reserves (Duncan 1990). The use of the regional reserve for small scale resources extraction would seem to apply to this activity. The small number of sites is not considered to be a significant risk to the regional reserve. However the precautionary principle should apply for the park insofar as adequate buffers should exist between any new sites in the regional reserve and the park.

Objectives

The objectives of apiary site management are to:

- allow for reasonable access to leatherwood resources within the regional reserve; and
- ensure that apiculture does not adversely affect the values of the regional reserve.

Policies

- Caution should be exercised in the granting of new licences or leases for apiary sites into new areas of the regional reserve and adequate buffers should exist between any new sites in the regional reserve and the park.
- Any new sites will utilise existing roads and tracks, no new tracks will be

established for this purpose, nor will mineral exploration tracks be made available for this use.

- Assessments for new licences should take into account the findings of any scientific studies into the impacts of introduced bees on pollination in native flora and on invertebrate and other animals species that rely on access to pollen and nectar (RPDC 1999, p.15).
- New hive sites will be confined to existing cleared areas. The operator will be required to ensure that the hives are free from infection, wood rot, disease or any other injurious matter before bringing them into the regional reserve.
- Apiary sites should clearly identify the name of the licensee.
- Should apiary sites have been vacant in excess of two years the sites should be made available to another licence holder or rehabilitated.

Actions

- Consult with licensed apiarists to arrange authorities to access Pykes Road during the high fire risk period.
- Determine the location of all apiary sites within the park and regional reserve, the status of licences and transfer the administration of licences as necessary.
- Investigate the extent of tracks leading from apiary sites into the park and close to minimise the risk of arson and myrtle wilt impacting on the park.

5.3 Other Leases, Licences and Authorities

The *National Parks and Wildlife Act 1970* prohibits the conduct of commercial activities in State reserves without a valid licence. There are currently no concessions issued for commercial tourism operators to utilise the regional reserve for guided tours

and activities, nor have any been issued by Forestry Tasmania for adjacent State forest areas.

An authority is required to drive a vehicle in any reserved land except on a road. Where a mineral exploration licence is issued for a location within the regional reserve then exploratory tracks may be constructed subject to the conditions of the exploration licence and in accordance with the Mineral Exploration Code of Practice, the Reserve Management Code of Practice (in prep) and this management plan.

Objectives

The objectives of leases, licences and authorities are to:

- provide efficient high quality facilities and services to the public;
- manage and control uses and activities not undertaken by the managing authority;
- contribute to recovery of costs arising from leased, licensed or permitted uses; and
- ensure regional reserve values are protected.

Policies

- Leases, licences and authorities may be issued for the regional reserve, provided they are consistent with the goals, objectives, and prescriptions of this management plan.
- Authorities to conduct scientific research may be issued for the regional reserve.
- Subject to the *National Parks and Wildlife Act 1970* and this management plan, leases and licences to provide services within the regional reserve may be issued for tourism, recreation, or education purposes.

- Authority to conduct infrequent, organised events or activities within the regional reserve, of not more than one week duration, may be issued by the Director. Where Section 25B of the *National Parks and Wildlife Act 1970* applies, a business licence will be required.
- Consistent with Section 7.3 of this plan, an environmental and heritage effects assessment may be required before lease, licence or permit proposals are considered. A detailed, proposal specific, site plan may also be required.
- Compliance with the terms and conditions of leases, licences and authorities will be monitored and reviewed prior to any renewal.

6 Tourism and Recreation

6.1 Recreation Activities

The level of recreational use within the the regional reserve is believed to be quite low. The existing use is mainly comprised of local rather than transient users. The distance from the main highway, lack of visitor facilities and the absence of signage are the main factors that deter people from visiting the area.

The types of recreational use that occur include Angling for trout and other fish species in the larger rivers of the area, in particular the Arthur River as it is generally more accessible. Brown trout have been released into the Arthur River and are the primary target for anglers.

Limited bushwalking occurs in the regional reserve, mainly in the southern part where the country is more open and more tracks exist. The general absence of tracks and thick vegetation has limited walking opportunities on the eastern side of the reserve.

Recreational four-wheel driving is likely to occur wherever tracks have been established. This is particularly evident in State forest on the eastern side and in the south part of the regional reserve.

Recreational caving occurs in the Savage River region. However, there are no specific areas within the regional reserve that are utilised for this purpose.

Private rafting and kayaking are undertaken on sections of the Hellyer and Arthur Rivers which are generally more accessible. Commercial white-water rafting occurs on the Whyte River, which is close to but outside the regional reserve. There are no commercial operations that use the river for guided rafting trips. It is unlikely that commercial rafting would be a viable commercial operation in the park due to the very remote character of the area, the difficulty of access and the often unpredictable water flow. The river runs

through steep sided gorge country and is not accessible by road until past the Savage River mine site.

Objectives

The objectives of understanding the regional reserve visit are to:

- understand visitor pressures on the regional reserve; and
- provide the basis for effective visitor management.

Policies

- Tourism and recreational opportunities will be provided for within the regional reserve.
- Visitor facilities must be consistent with the management objectives for the regional reserve and this management plan.
- Visitor uses must be able to demonstrate that they are sustainable and do not adversely impact on the values of the regional reserve.
- Future visitor research will focus on an improved understanding of visitor numbers and characteristics, behaviour, needs and expectations, and assisting visitor management.

Actions

- If warranted, collect information on the levels and type of visitor use and where appropriate cater for visitor needs and expectations
- Monitor and investigate visitor pressures on the regional reserve.

6.2 Access

Access into regional reserve by vehicle is mainly from the east via the Murchison Highway and from the south via the Waratah-Corinna Road. Many of these tracks, particularly those from the south, have become overgrown. The level and nature of access is a critical management issue for the regional reserve and needs to be negotiated with Forestry Tasmania as part of an overall access strategy.

The upkeep of roads and tracks on State forest to the east of the regional reserve has been the responsibility of Forestry Tasmania since January 2000. Forestry Tasmania intends to maintain roads on an “as needs basis” and are in the process of identifying the long term access needs for the area, including commercial users such as apiarists. Future visitor access into the regional reserve will depend on those tracks that Forestry Tasmania continue to maintain.

With the increasing number of four-wheel drive vehicles many wild areas are facing increased vehicular use, resulting in track degradation and track proliferation problems. Track proliferation results in direct damage to flora and fauna and increases the likelihood of introductions, including cats and other feral animals, weeds and plant diseases like *Phytophthora cinnamomi*. Fire frequency may also increase as a result of increased access. Table A4 summarises those roads and tracks that provide access to the regional reserve.

Objectives

The objectives for access to and within the regional reserve are to:

- maintain, develop and promote opportunities for people, including those with disabilities, to visit;
- protect regional reserve values by concentrating and limiting developed visitor arrival points and travel routes to designated locations;

- maintain basic access to the regional reserve to that necessary for educative, scientific or management purposes;
- direct access within the regional reserve to those areas appropriate for visitor use.

6.2.1 Aircraft

There are no landing strips or helicopter access points within the regional reserve. The closest airstrip is at Wynyard on the north coast.

Scenic flights over the Savage River area may be a way for people to view the area. However the impact of aircraft noise on sensitive wildlife species, such as wedge-tailed eagles, would need to be considered.

Policies

- Airdrops within the regional reserve will only be permitted for management or emergency purposes.
- Helicopters may be used for aerial reconnaissance during mineral exploration activities or to assist with the transport of equipment and personnel during drilling programs in remote locations.
- Except in an emergency, and in the case of an approved mineral exploration program, all aircraft, including helicopters will require an authority to land or take off in the regional reserve, as required by the *National Parks and Reserved Land Regulations 1999*.
- Mineral exploration companies must seek approval through Mineral Resources Tasmania, after comment from the MEWG and consultation with district parks staff, to overfly and land helicopters within the regional reserve.
- The operation of helicopters and the construction of helipads will be in accordance with the Mineral Exploration Code of Practice.

- Helipads will be of a temporary nature for the term of the exploration licence after which the area will be rehabilitated.

Action

- In consultation with Mineral Resources Tasmania, develop helicopter and aircraft overflight guidelines to minimise the impact of low flying aircraft or helicopters on visitors to the regional reserve and wildlife.

6.2.2 Vehicle Access

Vehicle access into the regional reserve is mainly from the eastern side through an area of State forest. The northern end of the regional reserve can be reached via Blackwell Road, just north of the old township site of Parrawe. The turn-off from the Murchison Highway is unmarked.. There is a maze of tracks through this area that should not be attempted unless equipped with detailed maps of the area. Although some of these roads are signed it is very easy to take a wrong turn.

The other route into the regional reserve is via Wandle and Flannel Roads. These roads pass through a timber harvesting and eucalypt regeneration area before entering the regional reserve for a short distance. Both of these roads can be slippery during or immediately after rain.

There is limited vehicle access to the regional reserve from the south via the Mount Cleveland Road off the main Waratah-Corinna Road, just past the examining town site of Luina. This route passes the gated track up to Mount Cleveland and crosses the Heazlewood River before turning right and following the eastern flank of Bronzite Hill, which is within the regional reserve (see Map 6). Other tracks head west but have become impassable. Many of these tracks were put in for mineral prospecting and have not been maintained.

Several four-wheel drive tracks enter the regional reserve at points further west along

the Waratah-Corinna Road. The first of these, Roaring Meg Creek track, is located just after the Heazlewood River. The creek must be forded as the bridge is no longer safe for vehicles. The bridge across the Roaring Meg Creek needs to be repaired or maintained to prevent erosion as this creek crossing is quite steep. In addition, streamside vegetation is being damaged by vehicles turning around at this point. After crossing the creek the track forks to the left and enters the regional reserve by following the course of Roaring Meg Creek. The right fork leads to Purcell Plains and passes the remains of the Lord Brassey nickel mine. Both of these tracks have steep and eroded sections.

There are two other tracks further along the Waratah-Corinna Road that lead to old quarry sites, the first of these rises steeply from the road and soon becomes impassable, the second can be followed a short distance to a quarry, after which it becomes very overgrown, and is only suitable for walking. These tracks provide limited opportunities for four-wheel driving in the regional reserve.

There are limited opportunities for conventional vehicles to the south of the regional reserve. One notable exception is where part of the regional reserve lies adjacent to the Waratah-Corinna Road and forms a pleasant scenic corridor.

Policies

- A management agreement with Forestry Tasmania will seek to maintain a suitable level of access and signage through State forest area adjacent to the regional reserve.
- Vehicle tracks within the regional reserve will be limited to those designated in this plan (see Table A4).
- Public use of motorised vehicles, including trail bikes and off-road vehicles, will only be permitted on designated formed roads or vehicle tracks. Off-road use anywhere else in

the regional reserve will not be permitted.

- Those roads and tracks not designated for public access or for management purposes will not be maintained. Visitors to the area should accept that use of these tracks is at their own risk.
- Vehicle track maintenance will accord with the prescriptions of Section 7.3.

Actions

- Bring tracks designated for public and management use to an adequate standard to ensure the safety of users.
- Rehabilitate, revegetate or otherwise stabilise disturbed or eroding areas, including unwanted vehicle trails.
- Improve directional road signage from the southern approach along the Murchison Highway into the Arthur Chalet site and include information on road conditions.
- Make available information on responsible recreational driving in the regional reserve.

6.2.3 Walking Access

There are a number of walking opportunities to be found at the southern end of the regional reserve into old mine workings. There is a little used four-wheel drive track that starts just after the Heazlewood River bridge and follows a good track beside Roaring Meg Creek for approximately five kilometres. There is a four kilometre return walk up to Lord Brassey nickel mine about fifty metres from the summit of Brassey Hill. This walk is just outside the regional reserve. Both walks offer superb scenery in open country, with views of distant hills and rainforest.

A rough system of tracks lead around the northern side of Basalt Hill from the Mount Cleveland Road. One of these tracks appears to travel north into the park. The

condition of this track appears to be very overgrown. These tracks were probably put in for timber harvesting or for mineral prospecting. A number of these tracks have potential to be developed as walking tracks.

Policies

- Priority will be given to upgrading existing tracks before any new tracks are constructed.
- In general, priority will be given to development of shorter walks before upgrading any longer walks.
- Before construction of any new walking tracks, or re-routing of existing tracks, survey the proposed route for disease risk, habitat and species significance, and heritage significance.
- Walking track development and maintenance will accord with Section 7.3.
- Exact track locations and standards will be determined, and construction undertaken, using appropriate guidelines of the Walking Track Management Manual (Blamey, 1987).

Action

- Maintain and, as necessary, upgrade existing walking tracks to ensure protection of the environment and the safety of users.

6.2.4 Mountain Bikes

The extensive track network in the adjoining State forest area east of the regional reserve lends itself to recreational mountain biking. Many of these tracks are overgrown and becoming unsuitable for vehicles, but have become a possible option for mountain bikes.

The use of mountain bikes is of mountain bikes can cause conflict with other users and impact on environmental and heritage

values. Bike riders must be aware of other users, in particular vehicles, walkers and horseriders.

Policies

- Mountain bikes will only be permitted on designated roads and vehicle tracks within the regional reserve.

Actions

- In consultation with Forestry Tasmania designate and signpost roads and vehicle tracks available for mountain bike use.
- Promote designated tracks and make available the Code of Practice for the use of mountain bikes in reserved areas.

6.2.5 Horse Riding

Horse riding is not known to occur in the regional reserve, the activity has the potential to cause erosion and transport of weeds, however it is considered to be a legitimate form of recreation and not inconsistent with the management objectives for the regional reserve.

Policies

- Horses will only be permitted on designated roads or vehicle tracks within the regional reserve.
- The entry of more than five horses into the regional reserve, at any one time, will be subject to an authority and a code of practice for their use.

Action

- As necessary disseminate and encourage compliance with a Code of Practice for the use of horses in the regional reserve.

6.3 Interpretation and Education

Visitors to parks and reserves are increasingly looking to enjoy, understand and appreciate their visit through high standard presentation of information, interpretation and education. Therefore, interpretation and education are critical to the delivery of quality visitor experience, as well as fostering an appreciation of and caring attitude towards reserved areas.

There are no interpretative centres in the the regional reserve. Nearby Hellyer Gorge State Reserve is ideally situated to cater for the majority of visitors passing through the area. The development of visually attractive and informative material on rainforest environment and the types of animals and plants that people are most likely to encounter during their visit at this location would be far more cost effective and accessible to visitors.

Objectives

The objectives of interpretation and education for the regional reserve are to:

- encourage pre-visit awareness of their special recreational and remote character, facilities, opportunities and experiences;
- reveal the diversity and values of the environmental and heritage features of the regional reserve;
- realise the educational values of the regional reserve;
- canvas issues to be confronted in managing the regional reserve;
- increase public awareness of safety issues; and
- Inform visitors of, and encourage them to apply minimal impact techniques for the regional reserve.

Policies

- Interpretation programs and facilities will mainly be concentrated off-site, such as Hellyer Gorge or in the more accessible parts of the regional reserve.
- Consider improvement to the current level and quality of information provided to visitors at Hellyer Gorge State Reserve, prior to the development of similar facilities in the regional reserve.
- Use interpretation to enhance visitor understanding and appreciation of the environmental and heritage values of the area, foster appropriate visitor behaviour and explain management strategies.
- Basic information, such as signage, and other facilities may be provided in the regional reserve in accordance with Section 7.1.
- Use of the regional reserve for teaching about its environmental and heritage values will be encouraged.
- School and other groups undertaking educational activities will be encouraged to discuss their proposed program with district parks staff when planning their visit.
- Inform visitors of the *P. cinnamomi* risk to the park and particularly those areas which contain a high predominance of plant species which may be susceptible to the disease.
- Where appropriate develop interpretation of the Aboriginal heritage of the regional reserve in consultation with the Aboriginal community.

Actions

- Develop suitable visitor information about the regional reserve at the Hellyer Gorge State Reserve.
- Improve directional road signage from the southern approach off the Murchison Highway into the Arthur Chalet site and include information on road conditions.
- Inform visitors of, and encourage them to apply minimal impact techniques for the regional reserve.
- Explain fire management policies and fire safety procedures to visitors as part of an interpretative program for the park and regional reserve.

7 Development Works

7.1 Developing Facilities and Services

At present there are no designated visitor areas within the regional reserve. However, there may be opportunities to develop visitor facilities and services in the future. At present the relative inaccessibility and lack of notable destinations for visitors to the regional reserve would suggest that the development of any future visitor facilities and services should occur only if visitor demand increases. In the interim, there will be an emphasis on upgrading existing facilities outside the regional reserve.

The most logical place for upgrading visitor services would appear to be at Hellyer Gorge State, a few kilometres to the east of the regional reserve. This area already has existing visitor facilities and its location on the Murchison Highway makes it very accessible to passing tourist traffic.

The inherent natural values of the regional reserve include the generally unspoilt rainforest scenery and wild rivers. These features are in themselves an attraction for visitors and present opportunities for a remote area experience that is reasonably accessible. Inappropriate development could have a detrimental impact on the character of the regional reserve, both in very obvious and immediate ways, and in more subtle, incremental ways. Use of the regional reserve for the construction of visitor facilities or other limited forms of development would need to be sympathetic to the surroundings and be carefully managed to minimise impact.

Objectives

The objectives of developing visitor facilities and services are to:

- provide opportunities for activities, relaxation, contemplation, enjoyment and educational experiences through direct contact or participatory

involvement with the values of the regional reserve;

- enrich visitor experiences of the regional reserve;
- encourage understanding of and support for both reserves by highlighting and presenting their values;
- safeguard the remote experience and special recreational character of the regional reserve;
- minimise impacts on regional reserve values;
- promote sound, sustainable, environmental behaviour and practices; and
- contribute directly to meeting the costs of researching, protecting, and managing the regional reserve.

Policies

- To provide for the heaviest visitor pressures and make most effective use of management resources, generally priority will be given to upgrading existing visitor facilities at Hellyer Gorge State Reserve.
- The development of any camping areas or other visitor facilities in the regional reserve should only occur if it can be demonstrated that existing facilities at Hellyer Gorge are insufficient.
- Any visitor facilities provided will complement rather than replicate those which are or could be provided in nearby areas such as Hellyer Gorge.
- Ensure facilities are low-key and of a scale and design which is visually unobtrusive.

- Development of recreational infrastructure or major redevelopment must be preceded by a comprehensive site analysis and site design process.
- All tourism and recreation will accord with any requirements and codes established by the Parks and Wildlife Service for sustainable environmental practices and behaviour and protection of heritage values.
- Playground equipment will not be provided in the regional reserve.
- Consult with the local community and users during the planning stages of any development proposal.

Actions

- Monitor and respond to any user impacts.

7.2 Assessing Tourism Development Proposals

The regional reserve has potential as a commercial tourism destination, and generally such opportunities are supported. However, it is essential that activities, either individually or cumulatively, do not undermine the values on which they are based.

Policies

- Development proposals will be considered in accordance with the provisions set out in Section B7.1.
- Proposals to develop tourism and recreational opportunities, facilities, or services in the regional reserve will be assessed using the following criteria:
 - base themselves on the features and values of the regional reserve;
 - ensure the viability, diversity, and values of environmental features and processes are not damaged;
 - adopt environmentally sustainable

- operating practices and use environmentally “best practice” goods and technologies;
- behave and operate in a manner compatible with protection of any Aboriginal and historic heritage features and values;
- explain the principles of minimal impact on environmental and heritage values to visitors;
- avoid impact on the legitimate enjoyment and experience by others of the regional reserve’s features and values;
- contribute to any external costs (for example road or sewerage upgrading) resulting from the proposal; and
- accord with the management plan, being sustainably achievable within the realistic capacity of management resources.

- Tourism and recreation development proposals will conform with and support realisation of this management plan, site plans, conservation plans, and any relevant visitor strategy.

- All proposals to develop tourism and recreational opportunities in the regional reserve will adopt environmental "best practice" methods for:
 - sewage treatment;
 - stormwater management;
 - water supply;
 - energy generation and conservation;
 - vehicle storage and maintenance;
 - machinery installation and maintenance;
 - fuel delivery and storage; and
 - storage and disposal of solid and liquid waste.

- Depending on the proposal, additional assessment guidelines and criteria may be required.

- Development will complement existing facilities and services, foster visitor appreciation and understanding of the regional reserve’s features and values and provide efficient, high quality service to the public.

Table B2 Summary of Permitted Facilities, Services, and Activities in Savage River National Park and Savage River Regional Reserve

e = existing, p = potential

Facility, Service or Use	National Park		Regional Reserve
	Wilderness Zone	Natural Zone	
Built accommodation	No	No	Limited (p)
Camping	No	No	Yes (p)
Standing Camp	No	No	Limited
Bicycles	No	Yes (e)	Yes (e)
Vehicles	No	Yes (e)	Yes (e)
Walking tracks	Yes (e, p)	Yes (e, p)	Yes (e, p)
Fire Trails	No	No	Yes (e, p)
Toilets	No	No	Yes (p)
Campfires	No	No	Yes (p)
Swimming	n/a	n/a	Yes (e)
Fishing/Angling	n/a	n/a	Yes (e)
Research	Conditional	Conditional	Yes (e, p)
Day-use facilities	No	No	Yes (p)
Domestic animals	No	No	No
Hunting	No	No	No
Interpretive signs	No	Yes (p)	Yes (p)
Direction signs	No	Yes (p)	Yes (e, p)
Rubbish Collection	No	No	No

- Tourism and recreation development proposals will provide a clearly demonstrated benefit to the Tasmanian community.
- All commercial development proposals will submit a detailed business and financial plan showing at least a three year projection of operations, demonstrating economic viability while according with this management plan.
- Any financial, infrastructure, managing authority services, or environmental resource subsidy of a tourism or recreation proposal will be made explicit and public.
- Tourism and recreation in the regional reserve will directly and identifiably make a contribution to research, conservation or management of the park and regional reserve.

7.3 Managing Development Works

Development works can range from manipulative research, construction of a new track, installation of a toilet, to constructing new buildings or refitting existing ones, and installing or repairing services. Major developments often create the potential for substantial impacts on the values of a reserve. Examples include accommodation developments and interpretation centres. This type of development will only be allowed in the regional reserve if they comply with the management objectives and can demonstrate that they can be operated in a sustainable manner.

The *National Parks and Wildlife Act 1970* requires that, in managing development on reserved land, regard must be had to the Resource Management and Planning System (RMPS) objectives.

Objectives

The objectives of managing development works are to:

- avoid or minimise the impact of development works on regional reserve values;
- protect and maintain the remote experience and special recreational character of the regional reserve; and
- foster public confidence in any approved and appropriate development.

Policies

- All developments and activities will be undertaken in accordance with the Reserve Management Code of Practice and this management plan.
- Proposals for any development, landscape modification, research, management or maintenance work involving any ground breaking, structural disturbance, or environmental manipulation of any kind will be assessed in accordance with procedures approved by the Director.
- Such development may require an approved site plan commensurate with the scale and type of proposed development
- Unless already covered by this management plan or detailed in a site plan, all major development proposals will require a comprehensive environmental and heritage effects assessment in accordance with guidelines established by the Service. This assessment will be made available for public scrutiny.
- Minimise areas of disturbance arising from any site works permitted by this plan.

- Where necessary, peg or fence to define the limits of the site which may be disturbed. If trees or shrubs or other site features to be retained occur within this area, protect them for the duration of the works.
- Areas adjacent to any development may need to be modified to reduce the risk of fire or plant disease escaping from the site.
- Private memorials or commemorative plaques will not be permitted in the regional reserve.
- Public memorials or commemorative plaques may be permitted in the regional reserve if they commemorate events or people of the area that are of regional, state, national or international significance and are approved by the Director.

Actions

- Rationalise provision of facilities where impacts or demands do not warrant the scale or type of facilities proposed.
- Follow statutory requirements for planning and building approval before proceeding.
- Where they apply, ensure compliance with the relevant Australian standards.
- Ensure the design, placement and construction of facilities is consistent with the scenic values of the regional reserve.
- Provide visitors with on-site information about the intent and progress of any significant developments.

8 Statutory Powers

8.1 Statutory Powers in the Regional Reserve

Under the *National Parks and Wildlife Act 1970*, statutory bodies may exercise powers in Regional Reserves without need for these to be provided for in a management plan and approved by both Houses of Parliament. However, section 21(4) of the Act provides that a management plan for any land within a regional reserve may prohibit or restrict the exercise of statutory powers in relation to that land.

In addition, under Regulation 6(1)(a) of the *National Parks and Reserved Land Regulations 1999*, the taking or possession of any form of wildlife, or the products of wildlife, on any reserved land, is prohibited. This includes the taking of wildlife, for use as bait, from within the regional reserve.

Three separate agencies presently undertake, or may intend to undertake, activities related to their statutory role within the boundaries of Savage River Regional Reserve. The following sections detail the conditions that will apply to the exercise of statutory powers in the Savage River Regional Reserve.

8.1.1 Department of Infrastructure, Energy and Resources

The Department of Infrastructure, Energy and Resources will exercise its powers in relation to conduct of mineral exploration, mining and quarrying activities within the regional reserve subject to the following conditions.

- Proposed mineral exploration, mining and quarrying activities within the regional reserve will be referred to the Mineral Exploration Working Group (MEWG).
- All exploration licences will be issued under the *Mineral Resources Development Act 1995*.
- All mineral exploration works will be conducted in accordance with the Mineral Exploration Code of Practice 1999.

- Any quarrying activity will be subject to a permit issued by the relevant local government authority under the *Land Use Planning and Approvals Act 1993*, the *Environment Management and Pollution Control Act 1994* and in accordance with the Quarry Code of Practice and any conditions set by the DPIWE.
- Any proposal to conduct mining will be assessed under the *Land Use Planning and Approvals Act 1993* and the *Environmental Management and Pollution Control Act 1994* before the commencement of work.

8.1.2 Electrical Supply Functions

In the exercise of its powers under the *Electricity Supply Industry Act 1995* in relation to the repair and maintenance of existing overhead distribution power lines within Savage River Regional Reserve, Aurora Energy Pty Ltd, or its authorised representative, must ensure that such activities are not contrary to the *National Parks and Reserved Land Regulations 1999*. Any other works will require the written approval of the Director of National Parks and Wildlife.

8.1.3 Inland Fisheries Service

The Inland Fisheries Service is authorised to exercise all its relevant powers under the *Inland Fisheries Act 1995* provided that, where works or activities are involved, the Inland Fisheries Service shall obtain the written approval of the Director of National Parks and Wildlife, prior to works or activities commencing, subject to the following conditions.

- no exotic fish are released into any water body in the regional reserve;
- any licence or other forms of advertising concerning fishing in the regional reserve should state that the collection of wildlife within the regional reserve, for use as bait, is prohibited, in accordance with the *National Parks and Reserved Land Regulations 1999*.

9 Cooperative Arrangements

9.1 Cooperative Management Arrangements

This section and the sections that follow will apply to both Savage River National Park and Savage River Regional Reserve.

The continuation of the park and regional reserve as a viable biological unit is largely dependent on adjacent land use and activities. As the reserves are virtually surrounded by State forest, the location and scale of forestry operations can have an impact on the natural values of the reserves. However, this land use could have positive benefits to the long-term integrity of the reserves provided that a low intensity forestry use is maintained in the area.

It is also essential that the Parks and Wildlife Service and Forestry Tasmania work together in protecting this special area from any off-site impacts associated with forestry activity. There are several areas in which a cooperative approach is required to assist with the conservation objectives of the reserves. These include fire protection, access, visitor facilities and tourism use and the continued operation of apiary sites.

9.1.1 Fire Protection

The risk of wildfire is the key management concern for the park and needs to be minimised as far as possible through cooperative management actions between the Parks and Wildlife Service and Forestry Tasmania. The main danger points for the park are the existing road and track network to the north-east, north and north-west of the park, and in particular where these tracks pass through drier, more flammable vegetation types.

There is a long chain of what appears to be moorland and heath along the north-west flank of the park. This area is of particular concern as there is access to this area along

Farquhars Road which increases the possibility of arson, in addition to possible mineral exploration and potential forestry activities at the northern end. All these activities constitute potential fire risks to the park and regional reserve.

The implementation fire protection strategies to reduce the risk of wildfire to protect fire sensitive communities in the park and regional reserve may include limiting public access along Pykes Road beyond the Arthur Chalet during the high fire risk period (January to March). Licensed operators or apiarists would be exempt from this restriction providing they hold a current authority to enter the area.

Forestry Tasmania has defined the Roaring Meg Creek section of the regional reserve as a moderate priority management area in which a fire management strategy, including regular fuel reduction burning, should be developed in consultation with adjoining major landowners. This should be extended to develop a fire management strategy for the park, regional reserve and adjacent State forest areas.

9.1.2 Vehicle Access

Forestry Tasmania assumed management responsibility of roads and tracks on State forest to the north and east of the reserves in January 2000. The policy of Forestry Tasmania with regard to the ongoing maintenance of these roads, tracks and bridges over the Arthur and Hellyer Rivers will have a considerable bearing on the patterns of visitor access in the future. Continued access into the park from the north and east will depend on Forestry Tasmania and its long-term needs for access. The policy of Forestry Tasmania (Murchison District) is to replace bridges and culverts and maintain roads on an "as needs" basis.

Two of these tracks access licensed apiary sites along Flannel and Fowl Roads on the eastern side of the regional reserve. The Fowl Road bridge over the Arthur River is in poor condition. At this point in time the road is not highly trafficked, the main users being apiarists.

The main route of access into the park from the east then becomes the bridge at the Arthur Chalet site. This bridge is in a good condition with concrete pylons and would be a good end point for the majority of visitors during the summer period. Beyond here it is suggested that access be limited along Pykes Road during the high fire risk period, as discussed in Section 9.1.

Roadside management along Pykes Road is another area that requires a cooperative approach in terms of preventing weeds and erosion control (see Sections A4.2.2 and A4.3).

9.1.3 Walking Access

Pinners Tracks is of particular interest as it accesses the northern end of the park through a section of the Arthur River Forest Reserve. Forestry Tasmania does not intend to maintain this track for vehicles therefore it is suited for walkers.

In addition, any vehicle tracks that are no longer maintained may become suitable walking tracks or mountain bike routes unless they are deemed necessary to close and rehabilitate.

9.1.4 Apiary sites

There are a number of licensed apiary sites along Pykes, Fowl and Flannel Roads. Those sites located within the park or regional reserve will require a transfer of licence to be administered under the *National Parks and Wildlife Act 1970*, at present they come under the *Forestry Act 1920*.

Objectives

The objectives of cooperative management are to:

- enlist a cooperative approach between Parks and Wildlife and Forestry Tasmania in conserving park and regional reserve values;
- encourage conservation and sound land management practices on lands adjoining the reserves; and
- enhance protection of and maintenance of reserve values.

Policies

- Forestry Tasmania is to be consulted when its interests may be affected.
- Develop management agreements in respect to access and infrastructure development and maintenance with Forestry Tasmania.
- For safety reasons visitors should be directed away from the Check Road bridge. Should it be too costly to repair the bridge for the sake of three apiary sites, then it may be worth considering relocation of these sites and closure of this bridge.

Actions

- Regularly liaise and develop good working relations with Forestry Tasmania on fire management and access issues and on projects of common interest.
- Formalise walking access into the park across State forest or through the Arthur River Forest Reserve by way of a suitable arrangement with Forestry Tasmania
- Develop an intra-agency agreement between PWS and Forestry Tasmania to cover land management practices adjacent to the reserves.
- Liaise with Forestry Tasmania to transfer the issue and administration of apiary site licences to DPIWE if located within the park or regional reserve.

- Liaise with Forestry Tasmania and Mineral Resources Tasmania to ensure that weeds are being controlled adjacent to the reserves.
- Volunteers will be encouraged when suitable, planned and programmed works and adequate supervision are available.

9.2 Community Support

Community recognition and support for the reserves is very important. There is considerable potential for the involvement of the local community groups and organisations in the management of the park and regional reserve.

Wildcare is an initiative developed as a partnership between volunteers and the Parks and Wildlife Service to deliver community action for natural and cultural heritage conservation. Interested groups can seek financial support for partnership projects under the Wildcare program.

Objectives

The objectives of fostering community support are to:

- develop community appreciation of and support for park and regional reserve values;
- promote a positive image of the park and regional reserve and its contribution to the community; and
- encourage community involvement in park and regional reserve management.

Policies

- Relevant people, communities and groups will be consulted when their interests may be affected.
- Partnerships will be developed with local and other communities and groups that wish to be involved in the management of the park and regional reserve in accordance with this management plan.

Actions

- Develop mechanisms and opportunities for consulting with people interested in management of the park and regional reserve.
- Encourage community involvement through the Wildcare structure.

10 Other Issues

10.1 Research and Monitoring

Research, involving surveying, recording, monitoring and analysing, is a requisite for conservation of the values of the park and reserve. The management objectives for both the park and the regional reserve allow for research provided it can be demonstrated to benefit management of the reserves. The reserve provide a unique scientific opportunity for research into rainforest ecology in the temperate zone.

Objectives

The objectives of research in the park or regional reserve are to:

- document and improve the understanding of environmental and heritage features and processes;
- use the reserves as a scientific reference area;
- monitor the natural rates and magnitudes of change;
- improve knowledge and understanding of visitor behaviour;
- assess impacts of and long term cumulative changes caused by development or use of the reserves; and
- assist and improve management of the reserve.

Policies

- All research proposed in this management plan will depend on availability of funding and other necessary resources.
- All proposed research which may have an impact on the reserves will require written approval of detailed study proposals and methods before research

begins, and be subject to this management plan.

- Researchers will submit to the managing authority not less than three copies of all work produced during the period of the research. The managing authority will determine requirements for the form of submission, its timing, confidentiality, and any other matters.
- Authorities for the collection of research material within the reserves will not be issued where the managing authority determines that it is possible and appropriate to collect the material outside them.
- Only research that does not have long term adverse effects on the environmental, heritage, or aesthetic values of the reserves will be permitted.
- The approval of the Tasmanian Aboriginal community will be obtained for any research involving Aboriginal heritage.
- Research which improves the documentation and understanding of the environmental features and processes of the reserves, or assists management of them will be encouraged.
- Research which improves the documentation and understanding of Aboriginal and historic heritage and archaeological features of the reserves, or assists management of them will be encouraged.
- Research which improves the recording and understanding of visitor numbers and characteristics, behaviour, needs and expectations, or assists visitor management will be encouraged.
- Use and development practices will be monitored for their effects on park or regional reserve values, and where necessary, modified.

- The efficacy of management practices in the park or reserve and the effects of management actions on park or regional reserve values will be monitored, and where necessary, modified.
- Any cumulative changes in park or regional reserve values will be documented at regular intervals.

Priorities for research

Map the extent and describe the non-forest communities present in the reserves.

Establish baseline data on the geoheritage, flora, fauna and cultural heritage of the reserves.

Undertake research into the ecological effects of a recurrent fire regime on buttongrass/scrub communities, and on the fauna that inhabits them.

Monitor and research the distribution, numbers and control of feral animals, weeds and diseases, particularly myrtle wilt.

Undertake water quality monitoring to assess the extent activities within or external to the reserves impact on values.

Systematic, reliable recording and analysis of visitor numbers, profiles and impacts.

10.2 Administration

Administratively, the park and regional reserve are part of the North-West District of the Parks and Wildlife Service. The Senior Ranger has day to day management responsibility and is based in Smithton.

Objectives

The objectives of administration of the park and regional reserve are to:

- coordinate and integrate management and implementation of the management plan;

- ensure management responsibilities are efficiently and effectively carried;
- ensure public safety and prompt response in emergencies; and
- enforce the management plan and relevant Acts and Regulations.

10.2.1 Search and Rescue, First Aid

Tasmania Police and the State Emergency Service have primary responsibility for all search and rescue within the park and reserves. District staff are often called upon to provide local knowledge.

Policy

- Resources for the park and regional reserve will be maintained at a level sufficient to provide a reasonable response to emergency situations.

Actions

- Cooperate with Tasmania Police and State Emergency Services in search and rescue operations.
- Ensure the training of staff in incident response procedures
- Park management staff are to maintain a reasonable store of first aid supplies.
- Educate and encourage visitors to adopt safe practices and provide them with sufficient information about potential hazards to enable them to make responsible decisions.
- Establish a risk management system that provides for regular identification, inspection, reporting and amelioration of existing and potential risks to public and staff safety.

10.2.2 Enforcement

Field staff based at Smithton are primarily responsible for enforcement of the park and regional reserve. The distance from a field

centre and the lack of district resources make the park and regional reserve a difficult area to effectively police. A major difficulty is presented by the size of the reserves and limitations in access. Patrolling of the area can only be done on an occasional basis.

At present the main law enforcement role is undertaken by rangers who are authorised under a range of Tasmanian legislation. However the cooperation of Forestry Tasmania and the Tasmania police is critical to the detection of infringements and to assist in situations that require a enforcement reponse.

Community assistance is critical to effective enforcement. The information provided by the community and visitors on illegal activities and inappropriate behaviour should be encouraged and a system developed to facilitate this assistance.

activities or inappropriate behaviour.

Policies

- Within the park and regional reserve, authorised staff of the Parks and Wildlife Service will be responsible for enforcing the provisions of the *National Parks and Wildlife Act 1970*, the *Aboriginal Relics Act 1975*, the *Threatened Species Protection Act 1995*, the *National Parks and Reserved Land Regulations 1999*, the *Wildlife Regulations 1999*, the *Aboriginal Relics Regulations 1978*, and any other Acts for which staff may be authorised.
- Authorised officers from the Inland Fisheries Service will be responsible for enforcing the provisions of the *Inland Fisheries Act 1995*.
- Other law enforcement will be the responsibility of Tasmania Police.

Action

- Incorporate a regular system of patrols to the area into the district work program to provide an enforcement presence and to deter any illegal

11 Implementation

11.1 Implementation of the Plan

Implementation of the actions proposed in this plan will be undertaken in stages and will be the responsibility of the relevant program areas within DPIWE. Achievement of these management actions will be evaluated as part of North West District's works program negotiated annually between the various program areas within DPIWE and operational staff.

Objectives

The objectives of implementing the plan are to:

- ensure that management actions are addressed in a timely and effective manner;
- implement the actions identified in the management plan with the assistance and direction from relevant program areas.

Policies

- The actions proposed in this plan are summarised in Appendix 2
- Implementation will be subject to the provision of funding and other resources sufficient to meet them.
- To coordinate effective implementation of this management plan, the district work program will be reviewed annually to assess whether management priorities for the park have been met.
- As a general rule, higher management priorities must be met prior to undertaking lower priority management tasks. However, if opportunities arise to fund and implement lower priority works these tasks can be undertaken, provided they are agreed to by program areas and operational staff.

- Performance indicators in Appendix 1 will be used to evaluate implementation of the plan.

Actions

- Inform program managers of the relevant actions in the management plan that are to be implemented by their program areas.
- Program managers are to review the implementation of the requirements of the management plan annually and revise their district's works program as necessary.
- Base any revision on analysis of past progress and incorporate newly identified requirements. Add a further year's program of tasks to the relevant district's work program.
- Annually evaluate the outcomes of management against the objectives of the management plan through the district's works program process.

11.2 Plan Revision

- Review the plan ten years after gazettal of its approval by the Governor, or sooner if research, monitoring, or other circumstances show this to be needed.
- Take into account the findings and recommendations of the relevant program areas in addressing and evaluating park management priorities in order to guide and progressively improve ongoing management of the park and regional reserve.
- The management plan may only be varied in accordance with the procedures set out in Sections 19 and 20 of the *National Parks and Wildlife Act 1970*.

Glossary and Abbreviations

Biodiversity (biological diversity) means the variety of life forms: the different plants, animals and micro-organisms, the genes they contain, and the ecosystems they form. It is usually considered at four levels: genetic diversity, species diversity, ecosystem diversity and community diversity.

Blanket Bog means a type of organic (peat) soil which typically occur over large areas of south-western, western and north-western Tasmania. They generally form over slow-weathering inert siliceous quartzitic substrates.

Callidendrous means a type of temperate rainforest characterised by tall (30+ metres) well-formed, often magnificent trees with open, shady understoreys dominated by tree and ground ferns.

CAR means a formal and informal reserve system incorporating both public land and private land that is based on the principles of comprehensiveness, adequacy and representativeness as described in JANIS (1997).

Conservation means all the processes and actions of looking after a place so as to retain its significance, always including protection, maintenance and monitoring.

Crown land means land owned by the state of Tasmania.

Deferred forest land means land specified in the Register of Deferred Forest Land.

DPIWE means the Department of Primary Industries, Water and Environment.

Earth processes means the interactions, changes and evolutionary development of geodiversity over time.

Endangered means a species in serious risk of disappearing from the wild state within one or two decades if present land use and other causal factors continue to operate.

Geoconservation means the conservation of geodiversity for its intrinsic, ecological and heritage values.

Geodiversity means the range or diversity of geological (bedrock), geomorphological (landform) and soil features, assemblages, systems and processes which exist naturally.

Geoheritage means those components of natural geodiversity which are of significant values to humans for purposes such as scientific research, education, aesthetics and inspiration, non-destructive recreation, cultural development and contribution to the 'sense of place' experiences by human communities.

Gondwanic means those plants and animals with an evolutionary history that stretches back to when Tasmania was part of the supercontinent Gondwana 50 million years ago.

High Quality Wilderness means an area larger than 8000 hectares having National Wilderness Inventory (NWI) ratings of 12 or greater, estimated by the methodology used in the NWI (Leslie and Maslen 1995).

Indigenous species means a species that occurs at a place within its historically known natural

range and that forms part of the natural biodiversity of a place.

Introduced species means a translocated or alien species occurring at a place outside its historically known natural range as a result of intentional or accidental dispersal by human activities.

Implicate means a type of temperate rainforest characterised by trees of less than 20 metres tall with mostly broken, uneven canopies and a dense network of stems in the understorey which makes upright movement through these forests almost impossible.

Karst are landforms produced where chemical solution and re-precipitation of rock in natural waters dominates over mechanical erosion processes. Well known phenomenon in limestones, but also occurs in many other rock types such as magnesite.

National Esate means those places defined under s.4 of the *Australian Heritage Commission Act 1975* (Cwth).

Natural integrity means the degree to which a natural system retains its condition and natural rate of change in terms of size, biodiversity, geodiversity and habitat.

Natural landscape means large, relatively undisturbed area with topographic and catchment integrity where natural processes continue largely unmodified by human intervention.

Mixed forest means wet eucalypt forest with a predominance of rainforest tree species.

Old-growth forest means forest that is ecologically mature and has been subject to negligible disturbance such as logging, roading and clearing.

Plantations means forests which are established by planting seedlings rather than sowing seed.

Precautionary principle means where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Protection means taking care of a place by maintenance and by managing impacts to ensure that significance is retained.

Rainforest means closed forest in areas of high rainfall dominated by one or more of the following species: myrtle beech (*Nothofagus cunninghamii*), sassafras (*Atherosperma moschatum*), leatherwood (*Eucryphia lucida*), celery top pine (*Phyllocladus aspleniifolius*) or huon pine (*Lagarostobus franklinii*) which must be capable of regeneration on the absence of broad-scale catastrophic disturbances.

Rare means species which are not currently considered endangered or vulnerable. Such species may be represented by a relatively large population in a very restricted area or by smaller populations over a wider range, or a combination of these two distribution patterns.

Recommended Areas for Protection (RAP) means areas recommended for reservation for the protection of significant plant communities.

Regional Forest Agreement (RFA) means an agreement between the State and Commonwealth Government made in November 1997 for the purpose of providing greater certainty and resource security for forest industries and consolidation of the conservation reserve system in Tasmania. The agreement remains in force for 20 years.

State forest means land described in Section 4B(1) of the *Forestry Act 1920* (Tas).

Thamnic means a type of temperate rainforest which is intermediate in structure between the tall callidendrous forests and low tangled implicate communitites. It includes trees of moderate height (often reaching 30 metres) and the presence of a well-developed shrub layer in the understorey.

Threatened species means a species deemed to be vulnerable or endangered and listed in the Schedules of the *Threatened Species Protection Act 1995* (Tas)

Wilderness means an area of land considered to meet the National Estate threshold if the total area was 8000 or more hectares, if the area was not fragmented, if the majority of the area had a wilderness quality greater than 12, and if the nodal area of wilderness quality equal to or greater than 14 was present (see East Gippsland National Estate assessment, Australian Heritage Commission & Department of Natural Resources and Environment 1996).



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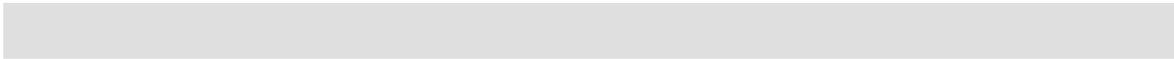
Appendix 1

Performance Indicators

Performance indicators provide a guide for evaluating the success of the implementation of the management plan and the achievement of its objectives. The following performance indicators will be applied when assessing the implementation of this plan.

- The natural diversity and conservation status of flora and fauna in the reserves has been maintained or enhanced.
- Populations of rare, threatened or endangered species within the reserves are stable or increasing. Populations of other native flora and fauna remain secure.
- Protected Environmental Values under the State Policy on Water Quality Management have been maintained.
- Water quality within the reserves remains excellent. There has been no deterioration of water quality within the reserves arising from activities within or adjacent to the reserves.
- There has been no incremental loss of the natural, primitive and remote character of wilderness areas.
- Any sites and areas of Aboriginal cultural significance have not been degraded. Sites and areas of Aboriginal cultural significance are conserved.
- Cooperative management programs have been developed with Aboriginal people in areas of significance to them.
- Any sites and areas of historic cultural significance have not been degraded. Sites and areas of historic cultural significance are conserved.
- The significant natural and cultural values of the reserves, and the purpose of reservation are clearly presented to visitors and the general community.
- The reserves provide an educational resource which is based on their natural and cultural values.
- Research has improved the foundation of knowledge that informs and guides reserve management or has furthered the purpose of reservation of the reserves.
- Research activities within the reserves have not significantly impacted on their values.
- Formerly damaged or degraded significant natural or cultural values of the reserves have been rehabilitated and restored where appropriate, feasible and sustainable. Other formerly degraded sites in the reserves have been rehabilitated, or are stable and not causing significant impact on their natural, cultural or recreational values.
- Threats or adverse impacts to the reserves natural and cultural values and assets (and, where relevant, to assets on neighbouring lands) have been identified and have been successfully averted, or are being managed within acceptable, and where necessary defined, limits. There is no ongoing cumulative degradation of the reserves natural or cultural values.

- The risk from wildfire to the reserves has been reduced significantly through a combination of education programs, cooperative arrangements with other land managers and effective fire management actions.
- There has been no new establishment of introduced species in the reserves (especially weeds, feral animals or disease). No new sites in the reserves have been infected with myrtle wilt disease.
- The number and nature of visits to the park are within sustainable, and where necessary, defined limits that do not cause significant or cumulative impacts on the natural and cultural values of the park. Use of the park is consistent with the provisions of the management plan.
- Facilities and services within the regional reserve are provided in accordance with the provisions of the management plan, relevant site plan, zoning scheme, licence conditions and/or other requirements approved by the Director of National Parks and Wildlife.
- Information and direction signs are sufficient to enable visitors to find their way to the park and around the regional reserve and are consistent with the Parks and Wildlife Service Signs Manual.
- There is general community familiarity with, and support for, the reserves and their management.
- Working relations between the Parks and Wildlife Service, the community and other land management agencies have improved.
- Obligations of international, national and state conservation agreements and other mandates have been met as appropriate.



Appendix 2

Implementation Priorities and Responsibilities

Note: The Program Areas nominated are responsible for the actions outlined in this schedule and to ensure that they are implemented during the lifetime of the plan.

The figure(s) in brackets under the Action column is the relevant section of the management plan in which the action is prescribed.

MANAGEMENT ACTIONS	PRIORITY	RESPONSIBLE PROGRAM AREA
Nature Conservation		
Map the extent and describe the non-forest communities present in the park and regional reserve. (A3.4, B3.4)	Very High	Nature Conservation Branch
Prioritise the protection of the remnant, fire-excluded plant communities where possible to exclude wildfire. (A3.4, A4.1, B3.4, B4.1)	Very High	Nature Conservation Branch/Fire Management Section
Establish baseline water quality monitoring sites at key locations within the park and regional reserve to measure the impacts on water quality from adjacent land use activities. (A3.3, B3.3)	Very High	Nature Conservation Branch
Prepare and/or implement management programs for threatened flora species and communities of conservation significance. (A3.4, B3.4)	Very High	Nature Conservation Branch
Undertake assessment of myrtle wilt risk for all development proposals and make recommendations to minimise potential for disease arising from any such developments. (A4.2.3, B4.2.3)	Very High	Nature Conservation Branch
Roadside management adjacent to the park should be monitored to ensure that weeds are not becoming established. (A4.2.2)	Very High	Nature Conservation Branch
Avoid direct damage to mature myrtles when undertaking any maintenance of roads or walking tracks. (A4.2.3, B4.2.3)	Very High	Nature Conservation Branch
Liaise with Forestry Tasmania and Mineral Resources Tasmania to ensure integrated catchment management for rivers and streams within the park and regional reserve. (B3.3)	High	Nature Conservation/ Planning & Visitor Services Branch

Populations of rare species should be surveyed to determine whether regeneration is occurring. Establish permanent plots for this purpose. (A3.4, B3.4)	High	Nature Conservation Branch
Conduct fauna surveys to fill gaps in knowledge useful for management and protection. (A3.5, B3.5)	High	Nature Conservation Branch
Monitor and respond to any adverse impacts on wilderness values. (A3.6, B3.6)	High	Nature Conservation Branch/Fire Management Section
Monitor and respond to any user impacts. (A6.1.1, B7.1)	High	Nature Conservation Branch/ Visitor Services Section
Mineral Resource Tasmania will monitor the conditions of exploration licences in the regional reserve to ensure that the Mineral Exploration Code of Practice is being followed. (B3.6)	High	Mineral Resources Tasmania
Implement the relevant prescriptions of any threatened species recovery plans for species occurring in the park or regional reserve. (A3.5, B3.5)	Moderate	Nature Conservation Branch
Investigate improved drainage works and the rehabilitation of roadside quarry sites along Pykes Road. (A4.3)	Moderate	Nature Conservation Branch
Investigate the extent of tracks leading from apiary sites into the park and close to minimise the risk of arson and myrtle wilt impacting on the park. (A4.1, A4.2.3, A4.3, B5.2)	Moderate	Nature Conservation Branch
Rehabilitate, revegetate or otherwise stabilise disturbed or eroding areas, including unwanted vehicle trails. (A4.3, B4.3, B6.2.2)	Moderate	Nature Conservation Branch
Identify and map those communities within the park and regional reserve that are susceptible to <i>P. cinnamomi</i> . (A4.2.4, B4.2.4)	Moderate	Nature Conservation Branch
Undertake periodic surveys of <i>P. cinnamomi</i> prone areas to monitor the disease status of the park and regional reserve. (A4.2.4, B4.2.4)	Moderate	Nature Conservation Branch

Avoid the introduction of any exotic animal species and remove where practicable. (A4.2.1, B4.2.1)	Moderate	Nature Conservation Branch
Prepare and disseminate an inventory of sites of geoconservation significance. (A3.2, B3.2)	Low	Nature Conservation Branch
Monitor impacts on geodiversity. (A3.2, B3.2)	Low	Nature Conservation Branch
Develop and implement specific management guidelines for native freshwater snails. (A3.5, B3.5)	Low	Nature Conservation Branch
Prepare weed management programs for weeds in the park and regional reserve as they become identified. (A4.2.2, B4.2.2)	Low	Nature Conservation Branch
Liaise with Forestry Tasmania and Mineral Resources on weed control adjacent to reserves. (B4.2.1, 9.1)	Low	Nature Conservation Branch
Cultural Heritage		
Identify, record and assess the significance of any historic features. (A3.7.2, B3.7.2)	High	Historic Heritage Section
In cooperation with TALC, identify and record Aboriginal sites. (A3.7.1, B3.7.1)	High	Aboriginal Heritage Section
Make safe any dangerous structures. (A3.7.2, B3.7.2)	High	Cultural Heritage Branch
Remove damaging uses, activities and developments that intrude upon or detract from heritage values. (A3.7.2, B3.7.2)	High	Cultural Heritage Branch
Where possible mitigate natural processes that have an adverse effect on heritage values. (A3.7.2, B3.7.2)	High	Cultural Heritage Branch
Consult with TALC and any local Aboriginal representatives on the management of Aboriginal heritage. (A3.7.2, B3.7.2)	Moderate	Aboriginal Heritage Section
Monitor Aboriginal sites for, and protect from damage or interference. (A3.7.1, B3.7.1)	Moderate	Aboriginal Heritage Section
Prepare conservation policy statements or plans for all significant historic heritage features. (A3.7.2, B3.7.2)	Low	Historic Heritage Section

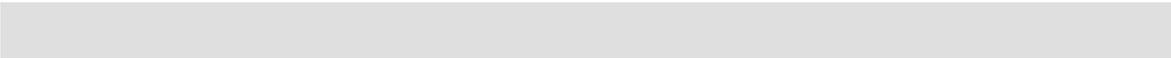
Conserve and interpret key historic places for interaction with the general public. (A3.7.2, B3.7.2, A5.2, B6.2)	Low	Historic Heritage Section / Planning & Visitor Services Branch
Fire Management		
In consultation with Forestry Tasmania install signage or barriers to limit public access along Pykes Road during the high fire risk period (Jan-March) of each year. (A4.1, A5.2.2, 9.1.1)	Very High	Fire Management Section
Implement fire protection strategies to reduce the risk of wildfire to protect fire sensitive communities. (A3.4, B3.4, A4.1)	Very High	Fire Management Section
Fit fire management tracks not designated for public use or those with seasonal closures with secure, locked gates. (A4.1, B4.1)	Very High	Fire Management Section
In consultation with Forestry Tasmania and the Tasmania Fire Service, prepare a fire management strategy for the park, regional reserve and adjacent State forest areas. (A4.1, B4.1, 9.1.1)	Very High	Fire Management Section
Recreation Management & Visitor Services		
Explain fire management policies and fire safety procedures to visitors. (A4.1, A5.2, B4.1, B6.3, 8.3.1)	Very High	Planning & Visitor Services Branch
Develop suitable visitor information about the park at the Hellyer Gorge State Reserve. (A5.2, B6.3)	Very High	Planning & Visitor Services Branch
Install national park signage at the point where Pykes Road provides access to the north-eastern boundary of the park. (A5.3)	Very High	Planning & Visitor Services Branch
Make provision for a low-key arrival point along the western side of Pykes Road with appropriate signage and provision for parking or vehicle turn-around. (A6.1.2)	High	Planning & Visitor Services Branch
Inform visitors of, and encourage them to apply minimal impact techniques for the park and regional reserve. (A4.4, A5.2, B4.4, B6.3)	High	Planning & Visitor Services Branch
Make visitors aware of the harmful effects on wildlife of inappropriate food and their dependence on humans. (A3.5, B3.5).	High	Planning & Visitor Services Branch

Monitor and investigate visitor pressures on the park and regional reserve and respond to any user impacts. (A5.1, A5.4.2, B6.1, B6.4.1)	High	Planning & Visitor Services/Nature Conservation Branch
Make available information on responsible recreational driving in the regional reserve. (B6.2.2)	Moderate	Planning & Visitor Services/Nature Conservation Branch
Inform visitors of the potential threat of <i>P. cinnamomi</i> to those areas of the regional reserve which are highly susceptible to the disease. (B4.2.4, B4.2.4)	Moderate	Planning & Visitor Services/Nature Conservation Branch
Bring tracks designated for public and management use to an adequate standard to ensure protection of the environment and the safety of users (A5.2.2, A6.1.2, B6.2.2)	Moderate	Planning & Visitor Services Branch
Improve directional road signage from the southern approach into the Arthur Chalet site and include information on road conditions. (A5.2, B6.2.2, B6.3)	Moderate	Planning & Visitor Services Branch
Maintain and clearly mark all designated walking tracks. (B6.2.3)	Moderate	Planning & Visitor Services Branch
If warranted, collect information on the levels and type of visitor use and where appropriate cater for visitor needs and expectations. (A5.1, B6.1)	Moderate	Planning & Visitor Services Branch
In cooperation with Forestry Tasmania promote available roads and vehicle tracks for the use of mountain bike in the regional reserve. (B6.2.4)	Moderate	Planning & Visitor Services Branch
Promote and make available the Code of Practice for the use of mountain bikes in reserved areas. (B6.2.4)	Moderate	Planning & Visitor Services Branch
Where appropriate develop interpretation of any Aboriginal heritage of the park and regional reserve in consultation with the Aboriginal community. (A3.7.1, A5.2, B3.7.1, B6.3)	Low	Visitor Services/Cultural Heritage Branch
Promote public awareness and appreciation through public education and interpretation is required to minimise disturbance to geoheritage sites. (A3.2, B3.2)	Low	Visitor Services/Nature Conservation Branch

As necessary, disseminate and encourage compliance with a Code of Practice for the use of horses in the regional reserve. (B6.2.5)	Low	Planning & Visitor Services Branch
Critical Incident Response		
Cooperate with Tasmania Police and SES in search and rescue operations. (10.2.1)	High	Visitor Services Branch (Critical Incident Response)
Ensure the training of staff in incident response procedures. (10.2.1)	High	Visitor Services Branch (Critical Incident Response)
Respond to pollution incidents within the reserves involving any hazardous or noxious substances. (A3.3, B3.3)	High	Visitor Services Branch (Critical Incident Response) and Environment & Planning Division
Park management staff to maintain a reasonable store of first-aid supplies (10.2.1)	High	Visitor Services Branch (Critical Incident Response)
Establish a risk management system that provides for regular identification, and amelioration of existing and potential risks to public and staff safety. (10.2.1)	Moderate	Visitor Services Branch (Critical Incident Response)
Cooperative Arrangements		
Regularly liaise and develop good working relations with Forestry Tasmania on management issues and projects of common interest. (9.1)	Very High	North West District
Formalise walking access into the park across State forest or through the Arthur River Forest Reserve by way of a suitable arrangement with Forestry Tasmania (A5.2.3, 9.1.3)	Very High	North West District
Develop an intra-agency agreement between PWS and Forestry Tasmania to cover land management practices adjacent to the reserves. (9.1)	Very High	Fire Management Section
Community Participation		
Develop mechanisms and opportunities for consulting with people interested in management through the Wildcare. (9.2)	High	Community Partnerships Section
Resource Use		
Liaise with MRT to ensure mineral exploration and development in the regional reserve is consistent with the conservation of natural and cultural values. (B5.1)	Very High	Planning Services Section

Consult with licensed apiarists to arrange authorities to access Pykes Road during the high fire risk period. (A5.2.2)	Very High	Property Services Branch
Determine the location and status of all apiary sites within the park or regional reserve and transfer those licences to DPIWE if located within the reserves. (B5.2, B5.3)	Moderate	Property Services Branch
Associated Plans and Guidelines		
In consultation with relevant stakeholders, develop, or make use of existing overflight guidelines to minimise the impact of low flying aircraft on the recreational experiences of park visitors and on wildlife. (A5.2.1, B6.2.1)	Moderate	Planning Services Branch
Development Works		
Rationalise provision of facilities where impacts or demand do not warrant the scale or type of facility intended. (A6.2, B7.3)	High	Planning & Visitor Services Branch
Follow statutory requirements for planning and building approval for any development in the regional reserve (A6.2, B7.3)	High	Planning Services Section /District Manager
Where they apply, ensure compliance with relevant Australian standards. (A6.2, B7.3)	High	Planning & Visitor Services Branch
Ensure the design, placement and construction of facilities are consistent with the scenic values of the park and regional reserve. (A6.2, B7.3)	High	Planning & Visitor Services Branch
Provide visitors with on-site information about the intent and progress of any significant developments. (A6.2, B7.3)	Moderate	Planning & Visitor Services Branch
Enforcement		
Incorporate a regular system of patrols to the area into the district work program to provide an enforcement presence and to deter any illegal activities or inappropriate behaviour. (10.2.2)	Very High	District Manager
Plan Implementation		
Inform program managers of the relevant actions in the management plan that are to be implemented by their program areas. (10.1)	Very High	District Manager

<p>Program managers are to review the implementation of the requirements of the management plan annually and revise their district's works program as necessary. (10.1)</p>	<p>High</p>	<p>Individual Program Managers</p>
<p>Annually evaluate the outcomes of management against the objectives of the management plan through the district's works program process. (10.1)</p>	<p>High</p>	<p>Program Managers/District Manager</p>



Appendix 3

Known Flora of Savage River National Park and Savage River Regional Reserve

E	=	endemic to Tasmania
I	=	introduced to Tasmania
T	=	Listed in the Schedules of the <i>Threatened Species Protection Act 1995</i>

DICOTYLEDONAE

<u>FAMILY</u>	<u>Species Name</u>	<u>Common Name</u>
APIACEAE	<i>Hydrocotyle hirta</i>	Hairy Pennywort
ASTERACEAE	E <i>Bedfordia salicina</i>	Tasmanian Blanket Leaf
	<i>Cassinia aculeata</i>	Dolly Bush
	<i>Gnaphalium collinum</i> var <i>collinum</i>	Cudweed
	I <i>Hypochoeris radicata</i>	Cat's Ear or Flatweed
	<i>Olearia argophylla</i>	Musk
	E <i>Olearia persoonioides</i>	Geebung Daisy Bush
	<i>Olearia phlogopappa</i>	Daisy Bush
	<i>Olearia stellulata</i>	Dusty Daisy Bush
	T <i>Senecio velleioides</i>	Forest Groundsel
CAMPANULACEAE	<i>Wahlenbergia</i> sp.	Bluebell
CARYOPHYLLACEAE	<i>Scleranthus biflorus</i>	Knawel; Twin-flower Knawel
CASUARINACEAE	<i>Allocasuarina littoralis</i>	Bulloak
	E <i>Allocasuarina monilifera</i>	Necklace Sheoak
CUNONIACEAE	E <i>Anodopetalum biglandulosim</i>	Horizontal
	<i>Bauera rubioides</i>	Bauera; Wiry Bauera; River Rose
DILLENIAEAE	<i>Hibbertia empetrifolia</i>	Scrambling Guinea-flower
	<i>Hibbertia riparia</i>	Erect Guinea-flower
DROSERACEAE	<i>Drosera peltat</i> ssp. <i>auriculata</i>	Tall Sundew
ELAEOCARPACEAE	E <i>Aristotelia peduncularis</i>	Heart Berry
EPACRIDACEAE	E <i>Archeria hirtella</i>	Archeria
	<i>Cyathodes juniperina</i>	Pink or Crimson Berry
	E <i>Epacris corymbiflora</i>	Stragglng Heath
	E, T <i>Epacris glabella</i>	Funnel Heath
	<i>Epacris impressa</i>	Common Heath
	<i>Leucopogon ericoides</i>	Pink Beard-heath
	<i>Monotoca glauca</i>	Gloden Wood
	<i>Sprengelia incarnata</i>	Pink Swamp Heath
	E <i>Trochocarpa cunninghamii</i>	Stragglng Trochocarpa
	E <i>Trochocarpa gunnii</i>	Sweet-scented Trochocarpa

ERICACEAE	E <i>Gaultheria hispida</i>	Snow Berry
ESCALLONIACEAE	E <i>Anopterus glandulosus</i>	Tasman Laurel
EUCRYHIACEAE	E <i>Eucryphia lucida</i>	Leatherwood
EUPHORBIACEAE	E, T <i>Micrantheum serpentinum</i>	Serpentine Micrantheum
FABACEAE	<i>Aotus ericoides</i>	Golden Pea; Common Aotus
	<i>Daviesia latifolia</i>	Bitter-leaf
	<i>Daviesia ulicifolia</i>	Native Gorse
	I <i>Genista monspessulana</i>	Spanish broom
	<i>Oxylobium arborescens</i>	Tall Oxylobium; Golden Shaggy Pea
	<i>Oxylobium ellipticum</i>	Golden Rosemary
	<i>Pultenaea gunnii</i> var. <i>gunnii</i>	Gloden Bush-pea
	<i>Pultenaea juniperina</i>	Prickly Beauty
FAGACEAE	<i>Nothofagus cunninghamii</i>	Myrtle Beech
GERANIACEAE	<i>Geranium potentilloides</i>	Mountain Geranium
GOODENIACEAE	<i>Goodenia lanata</i>	Native Primrose
	<i>Scaevola hookeri</i>	Creeping Fan-flower
HALORAGACEAE	<i>Gonocarpus humilis</i>	Low Raspwort
	<i>Gonocarpus tetragynus</i>	Common Raspwort
	<i>Gonocarpus teucriodes</i>	Raspwort
LAMIACEAE	<i>Prostanthera lasianthos</i>	Christmas Bush
	E <i>Westringia rubiaefolia</i>	Sticky Westringia
LAURACEAE	<i>Cassythya pubescens</i>	Hairy Dodder-laurel
LILIACEAE	<i>Blandfordia marginata</i>	Christmas Bells
MIMOSACEAE	<i>Acacia dealbata</i>	Silver Wattle
	T <i>Acacia gunnii</i>	Ploughshare Wattle
	<i>Acacia melanoxylon</i>	Blackwood
	<i>Acacia mucronata</i> var. <i>dependens</i>	Variable Sallow Wattle
	<i>Acacia mucronata</i> var. <i>mucronata</i>	Variable Sallow Wattle
	<i>Acacia terminalis</i>	Sunshine Wattle
	<i>Acacia verticillata</i>	Pricky Moses
MONIMIACEAE	<i>Atherosperma moschatum</i>	Sassafras
MYRTACEAE	<i>Baeckea ramosissima</i>	Baeckea; Rosy Heath-myrtle
	<i>Baeckea leptocaulis</i>	Slender Baeckea
	<i>Callistemon pallidus</i>	Lemon Bottlebrush
	E <i>Callistemon viridiflorus</i>	Prickly Bottlebrush
	E <i>Eucalyptus amygdalina</i>	Black Peppermint
	E <i>Eucalyptus delegantensis</i> ssp. <i>tasmaniensis</i>	White-topped Stringybark
	E <i>Eucalyptus nitida</i>	Smithton Peppermint
	<i>Eucalyptus obliqua</i>	Brown-top or Messmate Stringybark

	<i>Eucalyptus ovata</i>	Swamp, Black or Marrawah Gum
	<i>Eucalyptus regnans</i>	Mountain Ash; Stringy Gum
	<i>Eucalyptus sieberi</i>	Tasmanian Ironbark
	<i>Eucalyptus viminalis</i> ssp. <i>viminalis</i>	Manna Gum
	E <i>Leptospermum glaucescens</i>	Semi-glaucous Tea-tree
	<i>Leptospermum lanigerum</i>	Woolly Tea-tree
	E <i>Leptospermum nitidum</i>	Shiny Tea-tree
	<i>Leptospermum scoparium</i> var. <i>scoparium</i>	Manuka
	<i>Melaleuca squarrosa</i>	Scented Paperbark
	<i>Melaleuca squamea</i>	Swamp Paperbark
ONAGRACEAE	<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>	Billardiere's Willowherb
PITTOSPORACEAE	<i>Billardiera longiflora</i>	Climbing Blueberry
	<i>Pittosporum bicolor</i>	Cheesewood
POLYGALACEAE	<i>Comesperma volubile</i>	Blue Love Creeper
	<i>Comesperma retusum</i>	Purple Milkwort
POLYGONACEAE	<i>Polygonum arenastrum</i>	Small Knotweed
PROTEACEAE	E <i>Agastachys ordorata</i>	White Waratah
	<i>Banksia marginata</i>	Silver Banksia
	E <i>Cenarrhenes nitida</i>	Native Plum; Port Arthur Plum
	E <i>Hakea epiglottis</i>	Beaked Hakea
	<i>Hakea lissosperma</i>	Needle Bush; Mountain Needlewood
	E <i>Lomatia tinctoria</i>	Guitar Plant
	<i>Persoonia juniperina</i> var. <i>juniperina</i>	Prickly Geebung
	E <i>Telopea truncata</i>	Waratah
RHAMNACEAE	<i>Pomaderris apetala</i>	Dogwood
	<i>Pomaderris elliptica</i>	Yellow Dogwood
	<i>Pomaderris pilifera</i>	Hairy Yellow Dogwood
	E, T <i>Spyridium gunnii</i>	Gunn's Spyridium
ROSACEAE	<i>Acaena novae-zelandiae</i>	Bussy; Bidy-widdy
	E <i>Rubus gunnianus</i>	Alpine Raspberry
RUBIACEAE	<i>Coprosma nitida</i>	Mountain Currant Bush
	<i>Coprosma quadrifida</i>	Native Currant
RANUNCULACEAE	<i>Clematis aristata</i>	Australian Clematis
RUTACEAE	<i>Boronia pilosa</i>	Hairy Boronia
	<i>Nematolepis squamea</i>	Satinwood; Lancewood
	<i>Philotheca virgata</i>	Twiggy Wax-Flower
	<i>Zieria arborescens</i>	Stinkwood
SANTALACEAE	<i>Leptomeria drupacea</i>	Drupe Bush
SAPINDACEAE	<i>Dodonaea viscosa</i> ssp. <i>spathulata</i>	Broadleaf Hop-bush

SCROPHULARIACEAE	<i>Veronica calycina</i> T <i>Veronica serpyllifolia</i>	Hairy Speedwell Thyme-Leaved Speedwell
STYLIDIACEAE	<i>Stylidium graminifolium</i>	Grass Trigger Plant
THYMELAEACEAE	E <i>Pimelea cinerea</i> <i>Pimelea drupacea</i> <i>Pimelea humilis</i> E, T <i>Pimelea filiformis</i> <i>Pimelea sericea</i>	Grey Pimelea Cherry Rive-flower Dwarf Rice-flower Trailing Rice-flower Silky Pimelea
TREMANDRACEAE	<i>Tetradlea glandulosa</i>	Pink-bells
URTICEAE	<i>Urtica incisa</i>	Nettle
VIOLACEAE	<i>Viola hederacea</i> ssp. <i>hederacea</i>	Ivy-leaf Violet; Wild Violet
WINTERACEAE	<i>Tasmania lanceolata</i>	Mountain Pepper
 <u>GYMNOPERMAE</u>		
PHYLLOCLADACEAE	E <i>Phyllocladus aspleniifolius</i>	Celery Top Pine
PODOCARPACEAE	E <i>Lagarostrobos franklinii</i>	Huon Pine
 <u>MONOCOTYLEDONAE</u>		
CENTROLEPIDACEAE	<i>Centrolepis strigosa</i>	Hairy Centrolepis; Bristlewort
CYPERACEAE	<i>Carex appressa</i> <i>Gahnia grandis</i> <i>Gymnoschoenus sphaerocephalus</i> <i>Isolepis aucklandica</i> <i>E Isolepis limbata</i> <i>Lepidosperma elatius</i> <i>Lepidosperma filiforme</i> <i>Lepidosperma laterale</i> <i>Schoenus maschalinus</i> <i>Tetraria capillaris</i> <i>Uncinia tenella</i>	Tall Sedge Cutting Grass Button Grass Club-rush Fringed Club-rush Tall Sword-sedge Common or Thread Rapier-sedge Variable or Broad Sword-sedge Leafy or Dwarf Bog-rush Hair-sedge; Bristle Twig-rush Delicate Hook-sedge
IRIDACEAE	E <i>Diplarrena latifolia</i> <i>Diplarrena moraea</i> <i>Libertia pulchella</i> var. <i>pulchella</i>	Mountain Flag Iris White Flag Iris Pretty Grass-flag
JUNCACEAE	<i>Juncus bassianus</i> <i>Juncus pallidus</i> <i>Juncus planifolius</i> <i>Juncus procerus</i> <i>Luzula flaccida</i>	Wet Forest Rush Pale Rush Broad-leaf Rush Great Rush Flaccid Luzula
LILIACEAE	<i>Dianella tasmanica</i> <i>Drymophila cyanocarpa</i>	Tasman Flax-lilly Turquoise Berry

ORCHIDACEAE	<i>Acianthus pusillus</i> T <i>Caladenia alpina</i> <i>Chiloglottis</i> sp. <i>Corybas</i> sp. <i>Gastrodia sesamoides</i> <i>Glossodia major</i> E <i>Pterostylis</i> aff. <i>longifolia</i> “black striped” <i>Thelymitra aristata</i> T <i>Thelymitra circumsepta</i> T <i>Townsonia viridus</i>	Alpine Caladenia Bird Orchid Helmet Orchid Potato Orchid Wax-lip Orchid Great Sun Orchid Naked Sun Orchid Beech Orchid
POACEAE	<i>Danthonia</i> sp. <i>Deyeuxia monticola</i> T <i>Dichelachne inaequiglumis</i> <i>Poa labillardierei</i> var. <i>labillardierei</i>	Wallaby-grass Bent Grass Asymmetrical Plume-grass Tussock Grass
RESTIONACEAE	<i>Acion monocephalum</i> <i>Empodisma minus</i>	Smooth-glume Restio Spreading Rope-rush
XANTHORRHOEACEAE	<i>Lomandra longifolia</i>	Sagg
<u>PTERIDOPHYTA</u>		
ASPLENIACEAE	<i>Asplenium bulbiferum</i> ssp. <i>gracillimum</i> <i>Asplenium falbellifolium</i> <i>Asplenium terrestre</i>	Mother Spleenwort Necklace Fern Ground Spleenwort
BLECHMACEAE	<i>Blechnum minus</i> <i>Blechnum nudum</i> <i>Blechnum wattsii</i>	Soft Water-fern Fishbone Water-fern; Black-stem Hard Water-fern
CULCITACEAE	<i>Calochlaena dubia</i>	Common Ground-fern; Rainbow Fern
DENNSTAEDTIACEAE	<i>Histiopteris incisa</i> <i>Hypolepsis amaurorachis</i> <i>Hypolepsis rugosula</i> <i>Pteridium esculentum</i>	Bat’s Wing Lonely Ground-fern Ruddy Ground-fern Bracken; Austral Bracken
DICKSONIACEAE	<i>Dicksonia antarctica</i>	Tree-fern; Soft Tree-fern
DRYOPTERIDACEAE	<i>Polystichum proliferum</i> <i>Rumohra adiantiformis</i>	Mother Shield-fern Leathery Shield-fern; Shield Hare’s-foot
GLEICHENIACEAE	<i>Gleichenia dicarpa</i> <i>Gleichenia microphylla</i> <i>Sticherus tener</i>	Pouched Coral-fern Scrambling Coral-fern Silky Fan-fern
GRAMMITIDACEAE	<i>Ctenopteris heterohylla</i> <i>Grammitis billardierei</i> <i>Grammitis magellanica</i> ssp. <i>nothofagetii</i>	Gipsy-fern Finger-fern Beech Finger-fern

	<i>Gymnoschoenus sphaerocephalus</i>	Button Grass
HYMENOPHYLLACEAE	<i>Hymenophyllum australe</i>	Australe Filmy-fern
	<i>Hymenophyllum cupressiforme</i>	Common Filmy-fern
	<i>Hymenophyllum flabellatum</i>	Shiny Filmy-fern
	<i>Hymenophyllum marginatum</i>	Boardered Filmy-fern
	<i>Hymenophyllum peltatum</i>	Alpine Filmy-fern
	<i>Hymenophyllum rarum</i>	Narrow Filmy-fern
	<i>Polyphlebium venosum</i>	Veined Bristle-fern
LYCOPODIACEAE	<i>Lycopodium deuterodensum</i>	Bushy Clubmoss
POLYPODIACEAE	<i>Microsorium pustulatum</i>	
	<i>Phymatosorus pustulatus</i>	Kangaroo Fern
PSILOTACEAE	<i>Tmesipteris obliqua</i>	Long Fork-fern

Sources: North et al. 1998, Askey-Doran et al. 1992, GT Spot (DPIWE) Database, Hickey et al. 1988, Ziegler, 1983 and Salt, 1982.

Appendix 4

Known and Predicted Fauna from Savage River National Park and Regional Reserve

E	=	endemic to Tasmania
I	=	introduced to Tasmania
T	=	Listed in the Schedules of the <i>Threatened Species Protection Act 1995</i>

Mammalia

Platypus	<i>Ornithorhynchus anatinus</i> ^{1,2}
Echidna	<i>Tachyglossus aculeatus setosus</i> ^{1,2}
Swamp antechinus	<i>Antechinus minimus minimus</i> ²
Dusky antechinus (Tasmanian)	<i>Antechinus swainsonii swainsonii</i> ^{1,2}
Spotted-tailed quoll	<i>Dasyurus maculatus maculatus</i> ^{1,2}
E Eastern quoll	<i>Dasyurus viverrinu</i> ²
E Tasmanian devil	<i>Sarcophilus harrisii</i> ^{1,2}
White-footed dunnart	<i>Sminthopsis leucopus leucopus</i> ²
Southern brown bandicoot	<i>Isodon obesulus</i> ²
Eastern barred bandicoot	<i>Perameles gunnii</i> ²
Common wombat	<i>Vombatus ursinus</i> ^{1,2}
Sugar glider	<i>Petaurus breviceps breviceps</i> ^{1,2}
Common ringtail possum	<i>Pseudocheirus peregrinus viverrinus</i> ^{1,2}
Brush-tail possum	<i>Trichosurus vulpecula fuliginosus</i> ^{1,2}
Little pygmy possum	<i>Cercartetus lepidus</i> ²
Eastern pygmy possum	<i>Cercartetus nanus</i> ²
E Long-nosed potoroo	<i>Potorous tridactylus apicalis</i> ²
Bennetts wallaby	<i>Macropus rufogriseus rufogriseus</i> ^{1,2}
E Tasmanian pademelon	<i>Thylogale billardieri</i> ^{1,2}
Water rat	<i>Hydromys chrysogaster</i> ²
Broad-toothed rat	<i>Mastacomys fuscus fuscus</i> ²
E Long-tailed mouse	<i>Pseudomys higginsii</i> ²
Swamp rat	<i>Rattus lutreolus velutinus</i> ²
Greater long-eared bat	<i>Nyctophilus timoriensis</i> ¹
Lesser long-eared bat	<i>Nyctophilus geoffroyi pacificus</i> ^{1,2}
King River eptesicus	<i>Eptesicus regulus</i> ^{1,2}
Large forest eptesicus	<i>Eptesicus darlingtoni</i> ^{1,2}
Little forest eptesicus	<i>Eptesicus vulturinus</i> ^{1,2}

Reptilia

Mountain dragon	<i>Tympanocryptis diemensis</i> ²
White's skink	<i>Egernia whitii</i> ²
Southern grass skink	<i>Pseudemoia entrecasteauxii</i> ²
Metallic skink	<i>Niveoscincus metallicus</i> ^{1,2}
Tasmanian tree skink	<i>Niveoscincus pretiosus</i> ²
Eastern three-lined skink	<i>Bassiana duperreyi</i> ²
She-oak skink	<i>Cyclodomorphus casuarinae</i> ²

Blue-tongued lizard	<i>Tiliqua nigrolutea</i> ²
Copperhead snake	<i>Austrelaps superbus</i> ²
Eastern whip snake	<i>Drysdalia coronoides</i> ²
Tiger snake	<i>Notechis ater</i> ²
Amphibia	
E Tasmanian tree frog	<i>Litoria burrowsae</i> ^{1,2}
Brown tree frog	<i>Litoria ewingi</i> ^{1,2}
T Green and gold frog	<i>Litoria raniformis</i> ²
Tasmanian smooth frog	<i>Geocrinia laevis</i> ²
Southern bull/banjo frog	<i>Limnodynastes dumerili insularis</i> ²
Brown-striped frog	<i>Limnodynastes peronii</i> ²
Eastern froglet	<i>Ranidella signifera</i> ²
E Tasmanian froglet	<i>Crinia tasmaniensis</i> ^{1,2}
Pisces	
Short-headed lamprey	<i>Mordacia mordax</i> ²
Short-finned eel	<i>Anguilla australis</i> ²
I Brown trout	<i>Salmo trutta</i> ²
I Rainbow trout	<i>Oncorhynchus mykiss</i> ²
Jollytail	<i>Galaxias maculatus</i> ²
Spotted galaxias	<i>Galaxias truttaceus</i> ²
Climbing galaxias	<i>Galaxias brevipinnus</i> ²
Tasmanian mudfish	<i>Neochanna cleaveri</i> ²
Tasmanian whitebait	<i>Lovettia sealii</i> ²
Australian grayling	<i>Prototroctes maraena</i> ²
Tasmanian smelt	<i>Retropinna tasmanica</i> ²
Blackfish	<i>Gadopsis marmoratus</i> ²
Freshwater flathead	<i>Pseudaphritis urvillii</i> ²
Gastropoda	
T Hydrobiid snail	<i>Beddomeia angulata</i> _
T Hydrobiid snail	<i>Phrantela annamurrayae</i> _
Land snail	<i>Cystopelta petterdi</i>
Land snail	<i>Geminoropa hookeriana</i>
Land snail	<i>Helicarion cuvieri</i>
Land snail	<i>Mulathena fordei</i>
Land snail	<i>Paralaoma caputspinulae</i>
Land snail	<i>Stenacapha hamiltoni</i>
Crustacea	
T Giant Freshwater Crayfish	<i>Astacopsis gouldi</i>
Amphipod	<i>Keratroides albidus</i> _
Amphipod	<i>Keratroides vulgaris</i> _
Amphipod	<i>Mysticotalitrus tasmaniae</i>
Amphipod	<i>Mysticotalitrus cryptus</i>
Amphipod	<i>Neorchestia plicibrancha</i>
Amphipod	<i>Orchestiella neambulans</i>
Amphipod	<i>Tasmanorchestia annulata</i> _

Isopod	<i>Cubarinae</i> spp.
Isopod	<i>Notoniscus chiltoni</i>
Isopod	<i>Plymphiloscia notleyensis</i>
Isopod	<i>Plymphiloscia</i> sp.
Isopod	<i>Styloniscus hirsutus</i>
Isopod	<i>Styloniscus squarrosus</i>
Isopod	<i>Styloniscus sylvestris</i>
Isopod	<i>Styloniscus</i> spp.
Chilopda	
(Lithobiomorpha)	<i>Anopsobiine</i> sp.*
	<i>Henicops maculatus</i> *
(Craterostigmomorpha)	<i>Craterostigmus tasmanianus</i> *
(Scolopendromorpha)	<i>Cryptops</i> sp.*
(Geophilomorpha)	<i>Tasmanophilus</i> sp.*
	<i>Zelanion</i> sp.*
Diplopoda	
(Chordeumatida)	<i>Australeuma mauriesi</i> *
	<i>Australeuma simile</i> *
	<i>Reginaterreuma tarkinensis</i> *
(Polydesmida)	<i>Asphalidesmus leae</i> *
	<i>Gasterogramma psi</i> *
	<i>Gasterogramma</i> sp.1*
	<i>Gasterogramma</i> sp.2*
	<i>Lissodesmus perporosus</i> *
	<i>Lissodesmus</i> sp. NW1*
	<i>Tasmaniosoma</i> sp.1*
	<i>Tasmaniosoma</i> sp.2*
	genus A, sp.1*
	genus C, sp.5*
	genus D, sp.2*
	genus E, sp.1*
(Polyzoniida)	siphonotid 'AcuMes'*
	siphonotid 'HetLin'*
	siphonotid 'SipIns'*
(Sphaerotheriida)	<i>Procyliosoma</i> sp.*
(Spirostreptida)	<i>Amastigogonus</i> spp.*
Harvestmen	
	<i>Austropsopilio</i> ssp.
	<i>Calliuncus vulsus</i>
	<i>Calliuncus</i> sp.
	<i>Mestonia</i> sp.
	<i>Nuncioides</i> sp.
	<i>Spinicrus nigricans</i>
	<i>Spinicrus</i> sp.
	<i>Tasmanopilio</i> sp.
Spiders	
	<i>Amaurobiidae</i> sp.
	<i>Bathyphantes</i> sp.
	<i>Hadrotarsus</i> sp.
	<i>Laperousea</i> sp.
	<i>Linyphiidae</i> sp.
	<i>Liocranidae</i> sp.

Pseudoscorpions

Meta sp.
Micropholcomma sp.
Mysmena sp.
Teranodes sp.
Textricella sp.
Toxops sp.
Ulesanis sp.
Victanapis sp.
Austrochthonius australis
Protochelifer sp.
Protogarypinus sp.
Pseudotyranochthonius sp.

Insecta

(caeciliid booklice)
(ectopsocid booklice)
(pseudocaeciliid booklice)
(trogiid booklice)

Enderleinella sp.
Ectopsocus froggatti
Heterocaecilius brunellus
Trogium pulsatorium

(acanthosomatid bugs)
(achilid bugs)
(cicadellid bugs)

Elasmostethus sp.
Achilus sp.?
Batracomorphus sp.
Paralimnus smithtoniensis
Newsteadia sp.
Hemiodoecus leai

(ortheziid bugs)
(peloridiid bugs)

(anobiid beetles)
(anthribid beetles)

Deltocryptus sp.
Xynotropis micans
Xynotropis sp.
Microchaetes sp.
Pedilophorus gemmatus
Pedilophorus sp.

(cantharid beetles)
(carabid beetles)

Heteromastix sp.
Amblytelus placidus
Mimotrechus carteri
Notonomus politulus
Sloaneana tasmaniae
Trechimorphus diemenensis
Theprisa convexa

(cerambycid beetles)
(chalcodryid beetles)
(chrysomelid beetles)
(ciid beetles)
(clambid beetles)
(coccinellid beetles)

Ochyra sp.
Sirrhas limbatus
Paropsis sp.
Cis sp.
Sphaerotherax sp.
Diomus sp.
Rhyzobius alphabeticus

(colydiid beetles)

Ablabus sp.
Caanthus sp.
Mniophilus sp.
Corylophodes ssp.
Chrysophoracis pulcher
Merimnetes sp.

(corylophid beetles)
(curculionid beetles)

(derodontid beetles)
(elaterid beetles)

Nothoderodontus darlingtoni
Conoderus sp.

(eucinetid beetles)	<i>Eucinetus</i> sp.
(lathridiid beetles)	<i>Aridius nodifer</i>
	<i>Bicava</i> sp.
	<i>Enicmus</i> sp.
	<i>Lathridius obseletus</i>
(leiodid beetles)	<i>Agyrtodes</i> sp.
	<i>Myrmicholeva</i> sp.
	<i>Nargiotes antipodum</i>
	<i>Nargomorphus confertus</i>
	<i>Nargomorphus apicalis</i>
	<i>Nargomorphus jeanneli</i>
	<i>Paragyrtodes percalceatus</i>
	<i>Pseudonemadus</i> sp.
	<i>Zeadolopus</i> sp.
(nitidulid beetles)	<i>Epuraea victoriensis</i>
	<i>Notobrachypterus</i> sp.
(phalacrid beetles)	<i>Litochrus brunneus</i>
(pselaphid beetles)	<i>Eupinella dentiventris</i>
	<i>Palimbolus</i> sp.
	<i>Rybaxis</i> sp.
	<i>Rytus</i> sp.
(ptiliid beetles)	<i>Philagarcia</i> sp.
(salpingid beetles)	<i>Neosalpingus</i> sp.
(sphindid beetles)	<i>Aspidiphorus</i> sp.
(staphylinid beetles)	<i>Austroaesthetus passerculus</i>
	<i>Heterothops</i> sp.
	<i>Hyperomma</i> sp.
	<i>Mesoaesthetus tasmanicus</i>
	<i>Ocalea</i> sp.
	<i>Protopriscus</i> spp.
	<i>Quedius</i> sp.
	<i>Scaphisoma</i> sp.
	<i>Sepedophilus</i> sp.
(tenebrionid beetles)	<i>Achora serricollis</i>
	<i>Brycopia</i> sp.
(zopherid beetles)	<i>Latometus differens</i>
(geometrid moths)	<i>Acodia pauper</i> _
	<i>Chrysolarentia callima</i> _
	<i>Chrysolarentia conifasciata</i> _
	<i>Chrysolarentia epicteta</i> _
	<i>Euphyia interruptata</i> _
	<i>Euphyia leptophrica</i> _
	<i>Euphyia strumosata</i> _
	<i>Euphyia synchora</i> _
	<i>Larentia erasta</i> _

Sources: Salt, 1982, Rounsevell et al. 1991, Coy et al. 1993, _Records from GTSpot (DPIWE) Database. ² Records from Slater 1992, *Confirmed records from R. Mesibov 2000.

Appendix 5

Known Bird Species from Savage River National Park and Savage River Regional Reserve

T = Listed in the Schedules of the *Threatened Species Protection Act 1995*

Common Name	Species name
Beautiful firetail	<i>Emblema bella</i>
Black currawong	<i>Strepera fuliginosa</i>
Black-faced cuckoo-shrike	<i>Coracina novaehollandiae</i>
Blackbird	<i>Turdus merula</i>
Boobook owl	<i>Ninox novaeseelandiae</i>
Brown falcon (Tasmanian)	<i>Falco berigora tasmanica</i>
Brown goshawk	<i>Accipiter fasciatus fasciatus</i>
Brown quail; swamp quail	<i>Coturnix ypsilophora ypsilophorus</i>
Brush bronzewing	<i>Phaps elegans</i>
Common skylark	<i>Alauda arvensis</i>
Common starling	<i>Sturnus vulgaris</i>
Clinking currawong	<i>Strepera arguta</i>
Crescent honeyeater	<i>Phylidonyris pyrrhoptera</i>
Dusky robin	<i>Melanodryas vittata</i>
Dusky woodswallow	<i>Artamus cyanopterus cyanopterus</i>
Eastern spinebill	<i>Acanthorhynchus tenuirostris</i>
European goldfinch	<i>Carduelis carduelis</i>
European greenfinch	<i>Carduelis chloris</i>
Fan-tailed cuckoo	<i>Cacomantis flabelliformis prionurus</i>
Flame robin	<i>Petroica phoenicea</i>
Forest raven	<i>Corvus tasmanicus tasmanicus</i>
Golden whistler	<i>Pachycephala pectoralis</i>
Great cormorant	<i>Phalacrocorax carbo novaehollandiae</i>
Green rosella	<i>Platycercus caledonicus</i>
Grey fantail	<i>Rhipidura fuliginosa albiscapa</i>
T Grey goshawk	<i>Accipiter novaehollandiae</i>
Grey shrike-thrush	<i>Colluricincla harmonica harmonica</i>
Ground parrot	<i>Pezoporus wallicus wallicus</i>
Ground thrush	<i>Zoothera dauma</i>
Hoary-headed grebe	<i>Poliiocephalus poliocephalus</i>
Laughing kookaburra	<i>Dacelo novaeguineae novaeguineae</i>
Marsh harrier	<i>Circus aeruginosus gouldi</i>
Masked lapwing	<i>Vanellus miles novaehollandiae</i>
New Holland honeyeater	<i>Phylidonyris novaehollandiae</i>
Olive whistler	<i>Pachycephala olivacea</i>
Pacific black duck	<i>Anas superciliosa superciliosa</i>
Peregrine falcon	<i>Falco peregrinus macropus</i>
Pink robin	<i>Petroica rodinogaster</i>
Scarlet robin	<i>Petroica multicolor boodang</i>
Satin flycatcher	<i>Myiagra cyanoleuca</i>
Scrubtit	<i>Acanthornis magnus</i>
Shining bronze-cuckoo	<i>Chrysococcyx lucidus plagosus</i>
Silver gull	<i>Larus novaehollandiae novaehollandiae</i>
Silvereye	<i>Zosterops lateralis lateralis</i>
Southern boobook (Tasmanian)	<i>Ninox novaeseelandiae leucopsis</i>

Southern emu wren	<i>Stipiturus malachurus littleri</i>
Spur-wing plover	<i>Vanellus novaehollandiae</i>
Spotted pardalote	<i>Pardalotus punctatus</i>
Striated pardalote	<i>Pardalotus striatus striatus</i>
Strong-billed honeyeater	<i>Melithreptus validirostris</i>
Sulphur-crested cockatoo	<i>Cacatua galerita galerita</i>
Superb fairy wren; blue wren	<i>Malurus cyaneus cyaneus</i>
Swamp harrier	<i>Circus approximans gouldi</i>
T Swift parrot	<i>Lathamus discolor</i>
Tasmanian native hen	<i>Gallinula mortierii</i>
Tasmanian thornbill	<i>Acanthiza ewingii</i>
Tree martin	<i>Hirundo nigricans nigricans</i>
T Wedge-tailed eagle (Tasmanian)	<i>Aquila audax fleayi</i>
Welcome swallow	<i>Hirundo neoxena</i>
White-browed scrub wren (Tasmanian)	<i>Sericornis humilis</i>
White-faced heron	<i>Ardea novaehollandiae</i>
White goshawk	<i>Accipiter novaehollandiae</i>
White-throated needletail	<i>Hirundapus caudacutus</i>
Yellow-rumped thornbill	<i>Acanthiza chrysorrhoa</i>
Yellow-tailed black cockatoo	<i>Calyptorhynchus funereus xanthanotus</i>
Yellow-throated honeyeater	<i>Lichenostomus flavicollis</i>
Yellow wattle bird	<i>Anthochaera paradoxa</i>

Sources: Salt, L 1982, Thomas, D 1979, GTSpot Database (DPIWE) Database.