

**QUEANBEYAN NATURE RESERVE**  
**PLAN OF MANAGEMENT**

**NSW National Parks and Wildlife Service**  
**November 1999**

This plan of management was adopted by the Minister for the Environment on 23<sup>rd</sup> November 1999.

**Acknowledgments:** This plan of management was prepared by the Queanbeyan District Office in consultation with the Southern Zone and the Planning Unit of the National Parks and Wildlife Service.

Particular acknowledgment is made of the draft *Rutidosia leptorrhynchoides* (Button Wrinklewort) Recovery Plan, J. D. Briggs and V. T. Corrigan (1998), and input from the Recovery Team.

Photograph of Queanbeyan Nature Reserve by Valda Corrigan.

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## FOREWORD

Queanbeyan Nature Reserve is located in Letchworth, a western suburb of the city of Queanbeyan, on the Southern Tablelands of NSW. It is a small area (2.241 ha) of mainly open grassy woodland and grassland which contains the endangered button wrinklewort *Rutidosis leptorrhynchoides* (Schedule 1 Part 1 *Threatened Species Conservation Act 1995*).

In the Queanbeyan-Canberra area, much of the remaining grassy woodland and grassland communities are found in small, often disturbed remnants which have been severely modified. The habitat of *R. leptorrhynchoides* has been subject to clearing for both agriculture and urban development, application of fertilisers, weed invasion and probably an altered fire regime.

Queanbeyan Nature Reserve contains the only population of *R. leptorrhynchoides* that is formally protected in NSW.

The primary purpose of the reserve is to preserve this population and its habitat. Secondary objectives are to protect a sample of grassy woodland and natural temperate grassland and manage the area in a regional context.

These objectives are in accordance with the conservation of the species under the Threatened Species Conservation Act 1995. The Act provides for the preparation of a species Recovery Plan within five years of listing and implementation of actions to promote the recovery of the species to a viable position. A draft recovery plan for the species has been prepared and relevant actions are incorporated into this plan of management.

Accordingly, this plan of management emphasises management programs aimed at ensuring the survival and, if possible, the expansion of the population of *R. leptorrhynchoides* in the reserve. To achieve this, particular attention will be given to implementation of appropriate research outcomes, the control of weeds and re-establishment of appropriate native species to provide optimum habitat for the survival of the plant in the reserve.

The plan of management outlines the Service's commitment to participating in research programs aimed at providing a better understanding of the habitat and management requirements of *R. leptorrhynchoides*.

The plan of management outlines the public and educational use of the reserve. General public use of the area will not be promoted because of the small size of the reserve, on-going research programs and the potential for visitor impact on the species. Instead specific visitation and reserve-care programs will be developed. In addition a broader community education program will promote the role of remnants and the conservation of locally threatened species.

This plan of management establishes the scheme of operations for Queanbeyan Nature Reserve. In accordance with the provisions of Section 76 of the *National Parks and Wildlife Act 1974* this plan of management is hereby adopted.

**Bob Debus**  
**Minister for the Environment**

## CONTENTS

FOREWORD.....	iii
1. INTRODUCTION.....	1
2. MANAGEMENT CONTEXT.....	2
2.1 NATURE RESERVES IN NEW SOUTH WALES.....	2
2.2 QUEANBEYAN NATURE RESERVE.....	2
2.2.1 Location and Regional Setting.....	2
2.2.2 Importance of Queanbeyan Nature Reserve.....	2
3. OBJECTIVES OF MANAGEMENT.....	5
3.1 GENERAL OBJECTIVES FOR NATURE RESERVES.....	5
3.2 SPECIFIC OBJECTIVES FOR QUEANBEYAN NATURE RESERVE.....	5
3.3 OVERALL STRATEGY.....	5
4. POLICIES AND FRAMEWORK FOR MANAGEMENT.....	6
4.1 NATURE CONSERVATION.....	6
4.1.1 Conservation of <i>Rutidosis leptorrhynchoides</i> and Remnant Woodland in the Reserve.....	6
4.1.2 Native animals.....	9
4.1.3 Pests.....	10
4.1.4 Fire management.....	12
4.2 CULTURAL HERITAGE.....	13
4.3 Use of the area.....	14
4.3.1 Promotion and public use.....	14
4.3.2 Research.....	15
4.3.3 Management and research access.....	16
5. PLAN IMPLEMENTATION.....	17
SELECTED REFERENCES.....	19

## 1. INTRODUCTION

The *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each nature reserve. A plan of management is a legal document that outlines how the area will be managed in the years ahead.

The procedures for the adoption of a plan of management for a nature reserve are specified in the Act:

- \* Where a plan of management has been prepared, the Director-General is required to refer the plan to the National Parks and Wildlife Advisory Council for its consideration and advice.
- \* The Director-General is required to submit the plan to the Minister, together with any comments or suggestions of the Advisory Council.
- \* The Minister may adopt the plan without alteration or with such alterations as the Minister may think fit, or may refer it back to the Director-General and Council for further consideration.

Although not a requirement under the Act, a plan of management for Queanbeyan Nature Reserve was placed on public exhibition from 24 December 1998 until 12 April 1999. A total of 8 submissions which raised 5 issues were received on the plan. All comments received were carefully considered by the National Parks and Wildlife Advisory Council. The submissions and the recommendations of the Council were in turn considered by the Minister for the Environment before adopting this plan of management for Queanbeyan Nature Reserve.

No operations may be undertaken within Queanbeyan Nature Reserve unless they are in accordance with this plan.

Additional information about the nature reserve or this plan of management may be obtained from the National Parks and Wildlife Service Office at 6 Rutledge Street, Queanbeyan or by phone on (02) 6299 2929.

## 2. MANAGEMENT CONTEXT

### 2.1 NATURE RESERVES IN NEW SOUTH WALES

Reserving areas for nature conservation as a general purpose was introduced into Australia with the establishment of Royal National Park in 1879.

Faunal reserves in New South Wales were first established under the *Fauna Protection Act 1948*. Under the *National Parks and Wildlife Act 1967* faunal reserves were reclassified as nature reserves. The *Fauna Protection Act* was replaced by the *National Parks and Wildlife Act 1974*.

Under the *National Parks and Wildlife Act*, nature reserves are areas of special scientific interest containing wildlife, natural environments or natural phenomena.

The purposes of nature reserves are defined in the Act as:

- (a) the care, propagation, preservation and conservation of wildlife;
- (b) the care, preservation and conservation of natural environments and natural phenomena;
- (c) the study of wildlife, natural environments and natural phenomena; and
- (d) the promotion of the appreciation and enjoyment of wildlife, natural environments and natural phenomena.

Nature reserves are valuable refuge areas where natural processes, phenomena and wildlife can be conserved and studied. They differ from national parks which include as a major objective the provision of appropriate recreation opportunities.

### 2.2 QUEANBEYAN NATURE RESERVE

#### 2.2.1 Location and Regional Setting

Queanbeyan Nature Reserve is located about 4 kilometres west-south-west of Queanbeyan City in Letchworth, a western suburb of Queanbeyan (see map on page 4). It is a small remnant (2.241 hectares) of open grassy woodland adjacent to the treeless native grasslands within the ACT, which contains the endangered button wrinklewort *Rutidosia leptorrhynchoides*.

The reserve is bounded to the north by private property and the Queanbeyan Race Course; to the east by a crown road and private property, to the south by the old Queanbeyan rubbish tip site and to the west by the Queanbeyan-Cooma railway line which is also the NSW/ACT border.

The reserve occupies lot 96, Parish of Queanbeyan, County of Murray and was dedicated on 8 March, 1989. Prior to dedication as a nature reserve it was managed by Queanbeyan City Council. It was part of a Crown Reserve for Municipal Purposes which included the Queanbeyan rubbish tip.

#### 2.2.2 Importance of Queanbeyan Nature Reserve

The primary purpose for the gazettal and management of Queanbeyan Nature Reserve is the protection of a population of the endangered *Rutidosia leptorrhynchoides*, a small slender to bushy perennial herb, and a remnant of its habitat.

The reserve contains an open woodland of Blakely's red gum *Eucalyptus blakelyi* and yellow box *Eucalyptus melliodora* with apple box *E. bridgesiana* and red stringybark *E. macrorhyncha*. This community is also considered endangered although it is not as yet listed under the Threatened Species Conservation Act.

The reserve has a relatively undisturbed understorey of grasses and forbs although some lower lying areas have been invaded by introduced pasture grasses including cocksfoot *Dactylis glomerata* and phalaris *Phalaris aquatica*. This woodland merges with adjacent naturally treeless grasslands outside the reserve. These are now highly disturbed.

It is the natural temperate grasslands and the ecotone between these grasslands and the adjacent woodland that in the Canberra-Queanbeyan area are usually the habitats for *R. leptorrhynchoides*. Most of these habitats have disappeared through agricultural practices and urban development and those remaining are highly disturbed or fragmented. These remnants are usually found on roadsides, travelling stock reserves, cemeteries railway easements and the occasional private landholding.

*R. leptorrhynchoides* has been recognised for most of this century as endangered. It is listed as endangered under the NSW *Threatened Species Conservation Act 1995* (TSC) Schedule 1 Part 1 and is considered endangered nationally (Schedule 1, Part I *Endangered Species Protection Act 1992*). To date Queanbeyan Nature Reserve is the only formally protected area within NSW for the species and its habitat. Nearby populations of the species within NSW remain unprotected although some sites within the ACT are formally protected.

Historical and recent records suggest that *R. leptorrhynchoides* has always had a disjunct distribution with a northern occurrence in the Canberra-Queanbeyan-Goulburn area and a southern occurrence on the plains west of Melbourne.

There are 23 sites recorded across its distribution: 9 sites in Victoria, 14 sites in the ACT-Queanbeyan area including a recently recorded site at Goulburn in NSW. A number of sites previously recorded as supporting the plant no longer contain *R. leptorrhynchoides*. Many of the existing sites are not protected adequately and contain small populations.

About 10,000 plants remain naturally in Victoria, with the largest population of around 5,000 plants occurring at Rokewood Cemetery.

In the ACT two sites protected within Canberra Nature Park on Red Hill support an estimated 5,000 plants. A further 50-100 plants are protected within Crace Grassland Reserve in Gungahlin. Stirling Ridge in the ACT, which is not formally protected, supports an estimated 70,000 plants. The future of the Stirling Range site is uncertain although steps are being taken to protect the area.

In NSW *R. leptorrhynchoides* also occurs on two unprotected sites close to the reserve; a site about 500m south of the reserve known as Letchworth and 'The Poplars' containing an estimated 8,000 plants about 1 km south-east of the reserve. This site is currently the subject of negotiations for protection.

Queanbeyan Nature Reserve, which formally protects some 10,000 plants, is therefore of great significance for the protection of *R. leptorrhynchoides* in NSW.

The reserve has further significance as it protects, in a highly urbanised and modified landscape, a small sample of modified open grassy woodland community Blakely's red gum *E. Blakelyi* - yellow box *E. melliodora* supporting a variety of woodland birds. The woodland has a grassy understorey dominated by kangaroo grass (*Themeda australis*), tussock grasses (*Poa sieberiana*), wallaby grasses and spear grasses (*Danthonia* and *Stipa* spp.), redgrass (*Bothriochloa macra*), and a diversity of forbs. Several shrub species also occur as minor components of the understorey. Such remnants are few and those that remain are highly threatened by inappropriate management. An important aspect of the management of Queanbeyan Nature Reserve is balancing the protection of this community with the requirements of *R. leptorrhynchoides*.

### 3. OBJECTIVES OF MANAGEMENT

#### 3.1 GENERAL OBJECTIVES FOR NATURE RESERVES

The following general objectives relate to the management of nature reserves in New South Wales:

- \* \* protection and preservation of scenic and natural features;
- \* \* maintenance of natural processes as far as is possible;
- \* \* conservation of wildlife;
- \* \* preservation of Aboriginal sites and historic features; and
- \* \* encouragement of scientific and educational inquiry into environmental features and processes.

\*

#### 3.2 SPECIFIC OBJECTIVES FOR QUEANBEYAN NATURE RESERVE

In addition to the above general objectives, the management of Queanbeyan Nature Reserve will be subject to the following specific objectives:

- \* \* ensure the survival, and if practicable, the expansion of the population of *R. leptorrhynchoides* within Queanbeyan Nature Reserve;
- \* \* encourage scientific inquiry into the population of *R. leptorrhynchoides* with emphasis on:
  - its biology;
  - its habitat requirements;
  - its management requirements;
- \* \* protect a remnant sample of Blakely's red gum - yellow box *E. blakelyi*-*E. melliodora* open grassy woodland;
- \* \* re-establish native plant species in areas infested with introduced pasture grasses cocksfoot *Dactylis glomerata* and phalaris *Phalaris aquatica*;
- \* \* ensure appropriate visitor use of the reserve;
- \* \* promote community awareness of the existence and importance of threatened ecosystems and species in the local area;
- \* \* encourage formal protection of adjacent sites containing *R. leptorrhynchoides* or grassland values within an enlarged and fragmented Queanbeyan Nature Reserve.

\*

#### 3.3 OVERALL STRATEGY

Primary emphasis in management of the nature reserve will be given to protection of the population of *R. leptorrhynchoides* by maintenance of its habitat and management or elimination of threats. This will be achieved by management of fire and control of introduced species, minimisation of human disturbance and adoption of appropriate research recommendations.

## 4. POLICIES AND FRAMEWORK FOR MANAGEMENT

This chapter contains the policies and framework for the management of Queanbeyan Nature Reserve together with relevant background information. Policies are summarised under the following section headings:

- \* 4.1 NATURE CONSERVATION
- 4.2 CULTURAL HERITAGE
- 4.3 USE OF THE AREA

The policies established in this plan of management provide the framework for future management and are consistent with anticipated resources available to the Service and with anticipated community trends, over the next five to ten years.

The actions identified are those proposals to which priority will be given in the foreseeable future. Other management actions may be developed over the life span of this plan consistent with the policies outlined below.

Where not specifically provided for this plan, management of the nature reserve will be in accordance with the National Parks and Wildlife Act, Threatened Species Conservation Act and in line with general Service policies.

### 4.1 NATURE CONSERVATION

#### 4.1.1 Conservation of *Rutidosia leptorrhynchoides* and Remnant Woodland in the Reserve

The vegetation of the nature reserve consists mainly of an open grassy woodland. Tree species include yellow box *E. melliodora* and Blakely's red gum *E. blakelyi*, with apple box *E. bridgesiana* and red stringybark *E. macrorhyncha*. Understorey species include native grasses such as kangaroo grass *Themeda australis*, the tussock grass *Poa sieberiana*, redgrass *Bothriochloa macra*, wallaby grasses *Danthonia* spp., and spear grasses *Stipa* spp. with low growing native forbs such as golden buttons *Chrysocephalum* spp., hoary sunray (*Leucochrysum albicans*) and bluebells *Wahlenbergia* spp.. Other native species occurring in the reserve include blue devil *Eryngium rostratum*, blue flax lily *Dianella revoluta* and the endangered *Rutidosia leptorrhynchoides*.

The presence of these last three palatable species suggests that grazing of the area in the past has been relatively light or intermittent, certainly over the past thirty years. Grazing of the reserve by domestic stock has not occurred since the reserve was gazetted in 1989, and is not permitted.

*E. melliodora*-*E. blakelyi* open grassy woodland is now largely cleared from the south west slopes and tablelands and what remains is largely unprotected. The reserve is therefore important for the protection of a small remnant of this community within an urban landscape. High priority is given to the protection of this remnant subject to the primary objective of management of the nature reserve to ensure survival of *R. leptorrhynchoides*.

Within the reserve, *R. leptorrhynchoides* occurs predominantly on a low grassy westerly ridge on skeletal red-brown clayey loam with a broken rock substrate. This small area (about 150m sq) is situated where the woodland merges with natural grassland. The site is characterised by low soil moisture. Other scattered populations of *R. leptorrhynchoides*, with lower densities than that in the main population, occur in the open woodland of the reserve. The vegetation types associated with *R. leptorrhynchoides* in Queanbeyan Nature Reserve are grassland and grassy woodland communities.

*Rutidosia leptorrhynchoides* is believed to be pollinated by insects. It is probable that a number of insect species may be important pollinating agents. Seed remains

viable for at least four months in summer and autumn. In storage, seed is believed to remain viable for ten or more years. Germination of seed takes place normally in autumn to early spring and the plant flowers between October and March, but mainly during mid summer. It is believed that seed dispersal distances are low with seed falling to the ground and germinating not more than 1m from the parent plant (Scarlett and Parsons 1990), although genetic differences may lead to specifically different responses.

In the Queanbeyan-Canberra area *R. leptorrhynchoides* appears to prefer drier sites of relatively low nutrient status which receive relatively high light levels that provide opportunities for colonisation. The species seems to occur less frequently or not at all where tree shade is more continuous and there are no spaces between the grass tussocks, or where it is out-competed by grasses and introduced plants, or tree and shrub regrowth. Stock grazing may be detrimental to the long term survival of the population although Queensland populations occur in grazed areas.

Since fencing the area in 1989, significant eucalypt regeneration has occurred. Existing knowledge suggests that the unchecked regeneration of the numerous tree 'suckers' in the reserve will create an overstorey that will shade out *R. leptorrhynchoides*.

An important aspect of management then is to ensure that the tree species on the nature reserve do not regenerate to the extent that they effectively exclude light from the *R. leptorrhynchoides* plants. This is being addressed through selective control of the regeneration.

Maintenance of the habitat requirements for the colonisation, regeneration and possible expansion of the population is another important management consideration. Research results may provide important directions for management of *R. leptorrhynchoides* habitat in the reserve (refer 4.3.3).

Recent monitoring in the reserve suggests that the population has increased in the last few years. This suggests that current management practices may be appropriate for the time being.

Currently the understorey within the reserve, except in those places invaded by exotic pasture grasses (refer 4.1.3), exhibits characteristics which provide opportunities for colonisation and regeneration: spaces between grass tussocks which are open to sunlight and where *R. leptorrhynchoides* can successfully establish.

On some sites in Victoria there have been concerns that cessation of grazing may have contributed to the decline of the plant, resulting in the regeneration of tall native grasses such as *Themeda australis* and *Bothriochloa macra*. While to date there has been no evidence of this in sites in the Canberra-Queanbeyan area where grazing has been eliminated for more than thirty years, the population dynamics of *R. leptorrhynchoides* in the reserve will be monitored.

Research results from Victoria suggests that competition from native grasses may be reduced through application of fire to enable germination of *R. leptorrhynchoides*. Burning within the native grass areas would need to be introduced in the reserve on a small trial basis (1m x 1m trial plots) and the effects monitored before introducing burning on a larger scale.

Current data on the species' reproductive mechanisms suggest that an autumn burn would be most advantageous.

Slashing the native grassland sward is another technique used for reducing competition between *R. leptorrhynchoides* and native grasses that has been trialed elsewhere. Slashing however may be detrimental to desirable eucalyptus and shrub regrowth.

The small size of the reserve constrains the extent of suitable habitat and will inevitably limit the maximum population. In response to natural events the population may also vary in number and its spatial configuration may also change over time.

Based on the assessment that the population of *R. leptorrhynchoides* in the reserve has increased, the current management practices in the reserve which have included some use of chemicals to control invasive weeds (refer 4.1.3) and the exclusion of fire (4.1.4) do not appear to be detrimental to the species. However any management practices will need to be continually assessed against population dynamics to monitor potential impacts.

### **Recovery planning for *R. leptorrhynchoides* and integrated regional management**

The recovery plan for *R. leptorrhynchoides*, prepared under the requirements of the Threatened Species Conservation Act, provides management guidelines for the species. The regional recovery team, established in 1993, has been instrumental in the identification and implementation of actions listed in the earlier draft recovery plan. The plan is inclusive of all known sites of *R. leptorrhynchoides*.

The recovery plan details a number of management and research actions aimed at sufficiently stabilising the numbers of *R. leptorrhynchoides* to downgrade its classification from endangered to vulnerable in the next ten years. Recovery actions identified for the population within the reserve include monitoring the population, controlling introduced plants and contributing towards research programs into the plant's biology (refer 4.3.3).

Actions in the recovery plan which are applicable to Queanbeyan Nature Reserve are addressed in more detail within this plan of management and will be implemented consistent with the conservation objectives and policies of this plan of management.

The establishment of the recovery team has provided for the exchange of ideas between responsible agencies in NSW, Victoria and ACT. Consequently an integrated approach has been pursued for the management of this species with transfer of ideas across agencies. The Recovery Team will consider all relevant plans including: the National Recovery Plan for Rutidosia leptorrhynchoides, NSW Recovery Plan for Rutidosia leptorrhynchoides, Action Plan for Rutidosia leptorrhynchoides (ACT). This approach is working well in the local region and will continue to be fostered.

### **Conservation of nearby populations of *R. leptorrhynchoides* and other endangered species**

Close-by are two unprotected populations of *R. leptorrhynchoides* (refer to 2.2.2) as well as sites containing the endangered south-eastern lined earless dragon *Tympanocryptus lineata pinguicolla* and golden sun moth *Synemon plana*. These sites could be formally protected within an enlarged and fragmented Queanbeyan Nature Reserve. Management of small urban reserves is quite complex and requires cooperative approaches with neighbours and stakeholders. However an expanded reserve would provide both protection for the species and further opportunities for education and research. The Service will work with land owners and appropriate authorities with the aim of formal protection of these sites.

### **Policies**

- \* The habitat requirements of the endangered *R. leptorrhynchoides* will be protected. Conservation of the population will take priority over other management policies and actions

- \* An integrated approach to the management of the *R. leptorrhynchoides* will be maintained and encouraged through the recovery team, and through the informal exchange of ideas.
- \* Research recommendations for maintaining and expanding suitable habitat for *R. leptorrhynchoides* will be reviewed and implemented if appropriate. They will be trialed before adoption at the macro level.
- \* The sample of remnant *E. melliodora*-*E. blakelyi* woodland will be maintained.
- \* The regeneration of eucalypt trees and shrubs such as wattles will be controlled to conserve the woodland and maintain suitable habitat for *R. leptorrhynchoides*.

### **Actions**

- \* The population of *R. leptorrhynchoides* in the nature reserve, and the effect of management actions on the population, will be monitored using established methods for the species and in collaboration with the species' Recovery Team.
- \* Recommendations of the final species recovery plan will be applied in so far as such actions are consistent with the objectives and policies of this plan of management.
- \* Formal protection (within a fragmented and expanded Queanbeyan Nature Reserve) of sites in NSW to the south and south east containing endangered grassland species will be pursued in association with stakeholders.
- \* A selection of regenerating tree species will be removed annually using the cut and dab technique.
- \* The Service will actively encourage and support the establishment of a community group to assist in management of the nature reserve and the protection of *Rutidosia leptorrhynchoides*.

### **4.1.2 Native animals**

Although a small remnant, the reserve is important habitat for a variety of birds, with over 26 species recorded. They include the white-winged chough *Corcorax melanorhamphos* which nests in the reserve, pallid cuckoo *Cuculus pallidus*, striated pardalote *Pardalotus quadragintus*, silvereye *Zosterops lateralis*, noisy friarbird *Philemon corniculatus* and golden-headed cisticola *Cisticola exilis*. Protection of the woodland will be important for the retention of these species within the reserve.

A fauna survey has not been undertaken for the reserve and this is considered a priority. A number of threatened fauna occur in the nearby area and the reserve may provide habitat for these species. Locally occurring threatened species include pink-tailed legless lizard *Aprasia parapulchella*, striped legless lizard *Delma impar*, south-eastern lined earless dragon *Tympanocryptus lineata pinguicolla* and golden sun moth *Synemon plana*.

The Key's matchstick *Keyacris scurra* (a wingless grasshopper) is uncommon and occurs in grasslands that have had relatively little disturbance in the past. This species is likely to occur in the reserve.

### **Policy**

- \* The reserve will be managed to maintain the diversity of habitats and conserve populations of native animal species including invertebrates, at the same time as restoring habitat for *R. leptorrhynchoides*.

## Action

- \* A fauna survey will be conducted for the reserve which will target endangered and regionally significant species known to occur in the local area and management actions will be reviewed in the light of the findings and in accordance with principles established by the Recovery Team.

### 4.1.3 Pests

#### Weeds

Thirty six introduced plants are recorded from the reserve. While some of these occur in relatively low densities, others directly compete with *R. leptorrhynchoides* for space, nutrients, light and moisture. These include cocksfoot *Dactylis glomerata*, phalaris *Phalaris aquatica*, St Johns wort *Hypericum perforatum*, sweet briar *Rosa rubiginosa*, tree lucerne *Tagastaste sp*, Patersons curse *Echium plantagineum*, Monterey pine *Pinus radiata* and a variety of thistles.

Cocksfoot, with some scattered phalaris, occurs as a monoculture, especially in the lower-lying north and south-west sections of the reserve. It is found less densely in other areas of the reserve. These species are ready colonisers of disturbed and moist areas, thus competing with *R. leptorrhynchoides* for germination sites.

A trial herbicide/burning program, based on a method developed by the Victorian University of Technology, is being implemented with the objective of re-establishing native grasses such as *Themeda australis* and forbs in the areas of weed monoculture. However the drainage pattern in these areas and shading from exotic pines adjacent to the reserve on the northern boundary provide relatively higher moisture and nutrient levels and may favour exotics over natives irrespective of rehabilitation techniques. If the trial is successful, a long-term program will be undertaken to gradually reduce the area of exotic monoculture and expand the native understorey species.

Without aggressive rehabilitation using native grasses, fire may not be a useful management tool for the control of exotics such as cocksfoot and phalaris. When these grasses are burnt, the seed stored in the ground appears to quickly re-establish in the burnt areas which then exclude other species.

Slashing of the exotic sward before seed maturity and removal of the biomass may have the potential to reduce, over time, the seed store and provide opportunities for colonisation by native species. Slashing may also reduce the potential of the weeds to invade other areas. This method is being trialed on areas of cocksfoot monoculture.

St Johns Wort is widespread in the reserve and is often found growing with the *R. leptorrhynchoides* plants, which makes traditional control methods difficult. To assist control of this species the mite *Aculus hyperici* and beetle *Chrysolina quadrigemina* are being established on the plants. Their effects on St Johns wort will be monitored. Plants away from *R. leptorrhynchoides* will continue to be sprayed with herbicide. Hand pulling of this species, which has been trialed in the ACT, is not a successful control method as hand-pulling only removes above ground material and the plants continue to grow from underground stolons.

Thistles can be controlled by hand using a pointed tool that removes all the root system. Annual control programs have kept thistle populations low.

The control of other weeds including sweet briar and African box thorn is an on-going program. Larger shrubs are removed by cutting, then painting with herbicide.

Pine wildings invade from an established trees on land adjacent to the northern boundary of the reserve. These plants can be controlled by annual and opportunistic hand-pulling. Additionally it would be useful to seek information from

the neighbouring landholder about the cultural and functional importance of the pines. Depending on the outcome of these discussions it may be possible to remove the pines, which would provide more light into the reserve and improve the habitat for *R. leptorrhynchoides*.

To maintain the woodland values of the reserve and at the same time prevent shading out the *R. leptorrhynchoides*, eucalypt and wattle regrowth is being controlled by selective cutting and poisoning of the stem. Each year a percentage of regrowth is being removed using this method. A selection of younger stock of varying ages has been identified for retention to ensure that individuals are available for recruitment. The amount of regrowth to be removed annually will need continual assessment to ensure that a balance is achieved between removal and retention of stock.

Re-invasion of weeds from adjacent lands is a continuing problem. The main weed sources are from the old tip site to the south (tree lucerne, cocksfoot, African lovegrass and phalaris), and the railway line and adjacent lands to the west (St Johns wort, briar, cocksfoot, and phalaris). Cooperative weed control programs with adjacent land managers will be required to assist containment of weeds in the reserve although in the longer term re-establishment of native species may help to out-compete the exotics.

A detailed weed control strategy and Review of Environmental Factors have been prepared for the reserve. These describe the main management actions to be undertaken in the next five years for the control of weeds and rehabilitation of native grassland and grassy understorey.

### **Introduced animals**

Few introduced animals have been observed in the reserve, with the exception of rabbits, hares and neighbouring dogs. It is likely that domestic cats also frequent the reserve and may impact on the native wildlife. The reserve is fenced with rabbit-proof netting and is checked regularly for holes. This practice will be maintained. At times, however, sections of fencing and gates have been illegally removed.

Controlling cats is difficult. An education program about the impact of cats on wildlife may assist in reducing their impact.

### **Policies**

- \* Non-native plants will be controlled and where practicable eradicated. Priority will be given to invasive species.
- \* Introduced animals will be controlled and where possible action will be taken to exclude them from the reserve.
- \* Grazing by domestic stock will not be permitted in the nature reserve.
- \* The Service will seek to restore, as far as is possible, the natural habitat of *Rutidosia leptorrhynchoides* on the nature reserve, including investigating any impacts from neighbouring properties.

### **Actions**

- \* Annual weed control programs and on-going trials will be implemented in accordance with the weed control strategy prepared for the reserve.
- \* A trial for re-establishing native grasses and forbs in areas infested with cocksfoot will be implemented in accordance with the prepared plan.
- \* Mite *Aculus hyperici* and beetle *Chrysolina quadrigemina* for the control of St Johns Wort will be established in the reserve.
- \* Pine wildings will be annually hand-pulled and the cut and dab technique used to control species such as tree lucerne and briar.

- \* Co-operative control of weeds with adjacent land managers, other relevant authorities and the community will be pursued.
- \* Information about the cultural and functional importance of the pines on the northern boundary will be sought from the neighbouring landholder.
- \* The Service will seek the removal of pines adjoining the nature reserve based on the above investigation.
- \* The fence around the reserve will be maintained.

#### **4.1.4 Fire management**

As the reserve is small, and set in a semi-urban environment, wildfire is not considered a major problem. The main threats of fire to the reserve are from activities along the Cooma-Queanbeyan railway easement immediately to the west, or from wildfire moving into the reserve from grassland west of the railway line.

Fire leaving the reserve may threaten urban dwellings to the east. A council laneway adjacent to the eastern boundary of the reserve is a strategic control line for fire containment. Eucalyptus regrowth will be controlled cooperatively to maintain this control line.

The Reserve is within the Yarrawlumla-Queanbeyan NSW fire control area. Fire control is addressed in the Yarrawlumla-Queanbeyan Bush Fire Management Plan which acknowledges the special significance of the nature reserve.

Under the *Rural Fires Act 1997* the Service is a fire authority. It is responsible for controlling fires on Queanbeyan Nature Reserve and ensuring that they do not cause damage to other land or property. The Service may also assist with the control and suppression of fires adjacent to the nature reserve.

The Service regards co-operative fire management as essential for the protection both of property and of the natural heritage of the reserve. An important part of the Service's fire management is participation as a member of the local Bush Fire Management Committee and contribution to the preparation of bush fire management plan which includes a plan of operations and a bush fire risk management plan.

The Service will co-operate with the local fire authority and liaise with adjoining land owners to prevent and suppress fire in and adjacent to Queanbeyan Nature Reserve.

Joint preventative measures could include the slashing/reduction of fuels from land immediately to the west (railway line easement) and south of the reserve to decrease potential ignition points for fire entering the reserve; and the removal of fuel on the council lane east of the reserve.

Other methods of fuel management such as ploughed breaks are not regarded as appropriate within the reserve because of its small size. Where such breaks are important, the Service will negotiate with Council or other land managers to construct these outside the perimeter of the reserve.

Public education programs about fire protection plans and strategies are important tools to obtain the cooperation of the public and are planned for inclusion in risk management plans required under the Rural Fires Act.

A fire management plan for the reserve will be prepared to address fire management issues and actions for fire prevention and control.

## Policy

- \* Fire within the reserve will only be initiated in response to the need for managed habitat modifications for the maintenance of the habitat of *R. leptorrhynchoides* or woodland communities or species.

## Actions

- \* A fire management plan will be developed for the reserve by the end of 2000.
- \* In cooperation with neighbouring landowners, fire preventative actions will be implemented adjacent to the reserve to mitigate against fire entering and leaving the reserve.

## 4.2 CULTURAL HERITAGE

To date no Aboriginal sites are recorded from the reserve. However, there are a number of archaeological sites of significance within the local area. The reserve is within the tribal land of the Ngunnawal people. The reserve's small size dictates that any assessment of Aboriginal heritage values can only be done within a broader context.

Under this plan there are no ground disturbance works proposed for the reserve which may impact on archaeological sites. The Land Council should be contacted, however, to gather information about the importance of the local area.

To date little information has been collated on the past European use of the area. This information may be useful in determining the pattern of use that maintained the habitat for *R. leptorrhynchoides*. Information could be collected through the local historic society and long-term residents of the area.

## Policies

- \* The Service will liaise with the Ngunnawal Local Aboriginal Land Council and other relevant Aboriginal community organisations about all aspects of management of Aboriginal heritage.
- \* Aboriginal sites found in the reserve will be protected from disturbance by human activities or feral animals.
- \* Work involving ground disturbance will be preceded by an inspection for Aboriginal sites.
- \* The location of Aboriginal sites will not be publicised except where:
  - the agreement of the Ngunnawal Local Aboriginal Land Council and other relevant Aboriginal community organisations has been obtained; and
  - a conservation study has been prepared and any management works necessary to protect the site from damage have been implemented; and
  - the site will be interpreted to promote public knowledge and appreciation of Aboriginal culture.
- \* Information about the past European use of the area will be collected.

## Actions

- \* Sample survey and recording will be undertaken for Aboriginal sites in the reserve.
- \* Information about the use and significance of the area will be sought from Aboriginal people.
- \* Information about the past European land-use of the area will be collected from local historic society and long-term residents of the area.

### 4.3 USE OF THE AREA

The major categories of use that may be appropriate in Service areas are:

- education about the environment and promotion of the area, the Service and the conservation of natural and cultural heritage;
- outdoor recreation in a natural setting;
- research; and
- management operations by the Service and other authorities with statutory responsibilities in the area.

The extent to which these categories of use will be provided for in Queanbeyan Nature Reserve is indicated below.

#### 4.3.1 Promotion and public use

Recreational use of the nature reserve is not appropriate because of its focus on conservation of an endangered species within a small remnant area. The reserve is currently an important research site and while this work continues visitation to the reserve will not be encouraged.

A community group could be established to assist in some management activities (see section 4.1.1). This would help to foster appreciation of the conservation of endangered species and create a sense of ownership of the reserve for the people of Queanbeyan.

There should be organised opportunities for groups to visit the reserve in the company of an informed guide during the spring- early summer flowering season of *R. leptorrhynchoides* and other woodland species. Spring visits also offer the opportunity to observe birdlife, appreciate the diversity of the woodland and the reserve's value as a site for the protection of the endangered *R. leptorrhynchoides*.

A viewing platform built in the north-west corner of the reserve is situated on a site suitable for the expansion of *R. leptorrhynchoides*. As habitat for the species within the reserve is limited this platform will be removed to enable expansion of the plant and reduce human impact through trampling the surrounding area where the plant occurs.

#### Promotion of conservation of locally threatened species and ecosystems

General promotion of the nature reserve for educational or other purposes is not appropriate because of its small size, potential threat to endangered species and research sites. Information about locally threatened and significant species and past use of the area by Aboriginal and European people will be developed and disseminated through a variety of community relations programs. Limited guided visits to the reserve during spring-summer flowering will be offered.

Education and community relations programs would be best developed in cooperation with Queanbeyan and Yarrowlumla Councils. The program would include information kits on local endangered species, including *R. leptorrhynchoides*, and their habitat requirements. This information would be accessible to the public through a variety of media including the local newspaper, school information kits and brochures.

The existing information signs in the reserve need replacing with a smaller, more informative sign about *R. leptorrhynchoides* and its habitat, and other features of the reserve. This is in keeping with the recovery plan actions for the species.

#### Policies

- \* General public use of the reserve will be permitted but not be promoted.

- \* Guided visits to the reserve during the spring-summer flowering period will be organised. Such visits would be in the company of a service representative.
- \* Community awareness of the importance of the reserve will be developed through controlled visitation and reserve-care projects.
- \* Information about the conservation of locally threatened species will be promoted in cooperation with the Queanbeyan and Yarrowlumla councils
- \* Structures for public viewing will not be built in the reserve.
- \* Unauthorised vehicles will not be permitted in the reserve.

### **Actions**

- \* The establishment of a local community group will be encouraged to assist in promotion of information about threatened species, native grasslands and remnant woodlands.
- \* The existing viewing platform in the reserve will be removed.
- \* Information about locally threatened species will be prepared and distributed in cooperation with stakeholders. This information will include advice about the impact of domestic pets on *Rutidosia leptorrhynchoides*.

### **4.3.2 Research**

The *R. leptorrhynchoides* Recovery Plan outlines requirements for scientific investigation.

Queanbeyan Nature Reserve is one of a number of sites for research being undertaken by the Centre for Plant Biodiversity, CSIRO Division of Plant Industry. His project is studying the genetic and demographic effects of habitat fragmentation on endangered natural temperate grassland species, *Rutidosia leptorrhynchoides* and *Swainsona recta*. The results of this research will contribute to management prescriptions for the species.

Other proposed research programs include:

- effect management practices such as burning and slashing on population dynamics of *R. leptorrhynchoides* and other grassland/woodland species;
- breeding systems of *R. leptorrhynchoides*;
- genetic variation of *R. leptorrhynchoides*;
- competition between *R. leptorrhynchoides* and both native and introduced plants.

Data and findings from research studies and surveys will be adopted in the management of *R. leptorrhynchoides* and the nature reserve generally.

As the results of these projects are important to the future management of the reserve it is important that the integrity of the study plots is protected.

The location of the reserve is close to Canberra tertiary institutions and the size and formal protection of the population means that it is likely that the reserve will be a desirable study site in the future. Such research will be encouraged as long as the integrity of the reserve and the species within it are not compromised.

### **Policy**

- \* Research will be encouraged in the reserve as long as the integrity of the species within it are not compromised.

### **4.3.3 Management and research access**

Management or research vehicles within the reserve cause damage to vegetation, compaction of soil, alteration of drainage and dispersal of weeds. Authorised vehicles will need clearance to enter the reserve for specific management activities such as weed control. Wherever possible vehicles will not be used in the reserve.

To assist with regulating vehicle entry a rabbit and dog proof steel single-pole cross gate will be erected to replace the existing mesh and wire construction which was put in place after the illegal removal of a number of traditional gates.

#### **Policy**

- \* Vehicles will not be used in the reserve unless essential. Management or research vehicles will require clearance from the District Manager before entering the reserve to undertake designated works

#### **Action**

- \* A rabbit and dog proof steel single-pole cross gate will be erected at the reserve eastern boundary.

## 5. PLAN IMPLEMENTATION

This plan of management is part of a system of management developed by the National Parks and Wildlife Service. The system includes the National Parks and Wildlife Act, management policies, established conservation and recreation philosophies, and strategic planning at corporate, regional and district levels.

The implementation of this plan will be undertaken within the annual programs of the Service's Queanbeyan District. Priorities, determined in the context of district and regional strategic planning, will be subject to the availability of necessary staff and funds and to any special requirements of the Director or Minister.

District programs are subject to ongoing review, within which works and other activities carried out at Queanbeyan Nature Reserve are evaluated in relation to the objectives laid out in this plan.

The environmental impact of all development proposals will continue to be assessed at all stages of the development and any necessary investigations undertaken in accordance with established environmental assessment procedures.

Section 81 of the Act requires that this plan shall be carried out and given effect to, and that no operations shall be undertaken in relation to the nature reserve unless they are in accordance with the plan. However, if after adequate investigation, operations not included in the plan are found to be justified, this plan may be amended in accordance with section 76(6) of the Act.

As a guide to the implementation of this plan, relative priorities for identified activities are summarised below:

<b>High Priority</b>	<b>Plan ref</b>
* Monitor the <i>R. leptorrhynchoides</i> population and the effect of management actions	4.1.1
* Implement final species recovery plan	4.1.1
* Trial re-establishment of natives in areas infested with cocksfoot	4.1.3
* Implement fire prevention actions on adjacent land	4.1.4
* Remove a selection of regenerating trees annually	4.1.1
* Undertake fauna survey targeting significant species	4.1.2
* Undertake annual weed spraying	4.1.3
* Establish pest control species <i>Aculus hyperici</i> and <i>Chrysolina quadrigemina</i>	4.1.3
* Control pine wildings and introduced shrubs such as tree lucerne and briar	4.1.3
* Pursue cooperative weed control with neighbours	4.1.3
* Remove viewing platform	4.3.1
* Erect rabbit and dog proof steel single-pole cross gate on eastern boundary	4.3.3
* Seek information about pines on northern boundary and the possibility of removal	4.1.3

**Medium Priority**

- \* Seek protection of other sites containing endangered grassland species 4.1.1
- \* Maintain the fence around the reserve 4.1.3
- \* Prepare a fire management plan for the reserve 4.1.4
- \* Seek information about use of the area by Aboriginal people 4.2
- \* Collect information about past European land-use 4.2
- \* Undertake survey for Aboriginal sites in the reserve 4.2
- \* Establish community group to assist in management 4.1.1,4.3.1
- \* Prepare and distribute information kits about locally threatened species 4.3.1

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