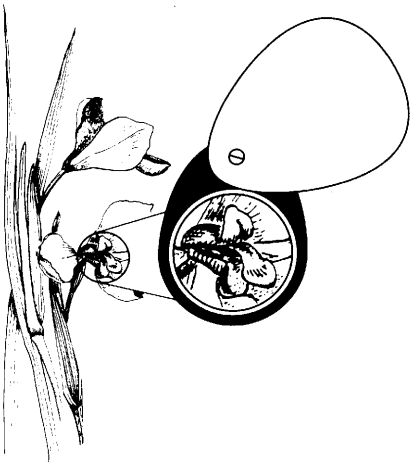

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KNOCKLOFTY RESERVE

VEGETATION MANAGEMENT PLAN

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June 2001

For the Friends of Knocklofty Bushcare Group

Parks & Landscape Unit, Hobart City Council

PREFACE

This report has been funded by the Natural Heritage Trust as part of a project managed by the Friends of Knocklofty Bushcare Group [FOKL] titled “Restoration of threatened flora communities and habitats for threatened fauna on Knocklofty Reserve” – NHT Project no. N99060.

Thanks to Tony and Janet Ault for their unbounded enthusiasm and drive to create a better Knocklofty. Tony is acknowledged for Appendices 4, 5, 7, and 8 plus careful and valuable comments to the report and especially Appendix 6. Janet's wonderful sandwiches and bottomless coffee have made meetings a delight.

Bruce Champion, a life time member of the Australian Plant Society, is congratulated for implementing a seed and cutting propagation plan which has resulted in Bruce and other FOKL members successfully growing various plants from Knocklofty including the rare Tall Wallaby Grass (*Rytidosperma procerum*) and Ploughshare Wattle (*Acacia gunnii*). Bruce is acknowledged for Appendix 3.

FOKL have made numerous recommendations for adjustments in plant selection most of which have been adopted. *This is reflected in the planting list planned for 2001 shown in Appendix 8.*

Various staff of Hobart City Council have had significant inputs including Kerry Heatley, Rob Mather, Jill Hickie, Mark Philips, Paulus Toonen and the Bushcrew.

Raymond Brereton - Threatened Species Zoologist, DPIWE, provided input to the section on Swift Parrots

Steven Mallick, project officer with DPIWE undertook an assessment of Bandicoot habitat and his report is included in full (Appendix 2).

Hans Wapstra and Richard Schahinger, Resource management and Conservation, DPIWE, have provided location information and management advice for the leek orchids.

SUMMARY

The Friends of Knocklofty Bushcare Group [FOKL] , in association with Hobart City Council, have successfully gained funding for vegetation management with a focus of encouraging the conservation of threatened species.

Vegetation management at Knocklofty has been undertaken with a focus on public amenity and nature conservation since the publication of a Management Plan in 1983. In the past decade the creation of the HCC Bushcrew has provided specialist skills for native vegetation management. In recent times the formation of the Friends of Knocklofty has added impetus to the work and helped galvanise the local community. The development of a Fire Management Plan in 1998 has further influenced priorities for vegetation management on the reserve.

This Vegetation Management Plan describes the findings of a botanical survey and brings together previous survey information. It includes species data and plant community information. The status of threatened species and extent of major environmental weed infestations has been documented. The report identifies priorities for management mindful of the need for a co-ordinated approach with the Fire Management Plan. A review of Eastern Barred Bandicoots and Swift Parrots, two nationally significant fauna species, is also included. Detailed information is included of native plantings and their success over the past 6 years, propagation rates of locally collected species and a visitor survey - all undertaken by Friends of Knocklofty.

This document includes a prescriptive labour costed 3-year action plan for the Friends of Knocklofty Bushcare Group and Hobart City Council as they work towards the restoration of the bushland values of Knocklofty Reserve [Appendix 6]. This is intended for regular use for documenting and monitoring the implementation of the plan. It is recognised that the plan is a guideline and can be adjusted to suit the opportunities, the conditions and other external factors such as wildfire. It is expected that additional details will be added to the plan as each year approaches and modifications made depending upon available resources. However it is anticipated that this plan will provide the impetus to keep up with a schedule.

Recommendations are provided and work programs detailed for two Greencorps Projects.

CONTENTS

List of Tables

List of Figures

1. INTRODUCTION

Knocklofty Reserve (126 ha) is owned and managed by Hobart City Council. It is located above West Hobart and is significant for its proximity to the CBD and the currently maintained connection of bushland that exists with the foothills of Mount Wellington (Figure 1). The main hill - Knocklofty is a dolerite knoll that is almost entirely covered in forest, which varies in composition and structure according to aspect. The lower slopes of the eastern face are formed on Triassic sandstone that has been the target of early (19th Century) quarrying. There are numerous small and moderate sized borrow pits along with some much larger quarries that have had a more recent history - although none of these occur within the reserve proper. Significant areas of cleared land on the eastern face of Knocklofty were developed for pasture and used for grazing.

The *Knocklofty Reserve - Development and Management Plan* was prepared in 1983. Since that time and partly as a consequence of the plan there has been development of a carpark, walking tracks, lookouts and access controls that have considerably enhanced the recreational experience of visitors. General landscaping, the development of frog dams, extensive tree planting and weed management have *also* contributed significantly to the aesthetic and natural values of the reserve.

Knocklofty Reserve is an important educational resource and is used by local schools and for scientific research [1].

Knocklofty Reserve is important for the rich diversity of flora and fauna including a number of threatened species. Management of the bushlands to limit degrading processes and to increase biological diversity is a principal aim in the *Vegetation Management Plan.*

1.1 VEGETATION MANAGEMENT ON KNOCKLOFTY RESERVE

Vegetation management has been taking place throughout the recent history of Knocklofty Reserve. Little is known of the pre-European activities but it is not unreasonable to assume that the site was subject to periodic Aboriginal burning. Since European settlement management has included timber cutting, grazing, clearing, and quarrying. Significant areas have naturally revegetated, and it is these areas that have experienced major weed infestations. Since the publication of a Management Plan in 1983 [2] there has been a more focused approach on vegetation management with specific objectives that include: rehabilitation of old quarry sites and other areas of past disturbance, weed (especially gorse) management and revegetation through tree planting.

Over the past 10 years there has been an increase in vegetation management activity with an increase in available resources. Labour sources include Bushcare volunteers – the 'Friends of Knocklofty Bushcare Group [FOKL]' plus local school groups and the Bushcrew - staff of Hobart *City* Council. The management plan focused almost solely on gorse control as the principle vegetation management objective for which it recommended trialing a range of techniques but included

[1] There are currently two research projects being undertaken by students of Prof Jamie Kirkpatrick, Geography Department, University of Tasmania.
[2] Knocklofty Reserve – Development and Management Plan – D.R.Brown - July 1983

replanting with native species as one option. Early plantings however were not limited to species native to the area or even to Tasmania and included various mainland species of eucalypt that are an unusual sight within a relatively natural bush setting.

A *Fire Management Plan*[3] adopted two years ago by The Council has redirected much of the attention of the Bushcrew and has refocussed priorities for weed management. It is a highly prescriptive plan that has subdivided the Reserve into a number of Management Units for which each *of* which has been prescribed a burning regime. The plan runs for 15 years and is broken down into five three year burning periods. Management Units are prescribed for one to three burns during the period of the plan. A key component of the plan is the co-ordination of burning with weed control. Fire can be used as a tool for weed management, but its neglectful use can exacerbate existing weed problems. Recent Bushcrew activities have been focused on pre-fire weed suppression and on maintenance of firebreaks.

The Vegetation Management Plan incorporates recent mapping information that includes: weed distribution, threatened plant species locations and threatened fauna habitat. The management planning is based on the Fire Management Units. Following comments given during the course of this project on the original Fire Management Plan, modifications have been made to some boundaries. These include incorporating part of K20[4] into K13, and subdividing the remainder into four reflecting the differing fire management needs. The clear map overlays enclosed in the cover wallet of this report show the Fire Management Units used in this Management Plan. They can be used in relation to the figures within the report.

The plan summarises previous planting sites and other vegetation management activities. It also identifies approximately 140 management sites across the reserve. For each site it:

- identifies existing weeds and their extent,
- recommends a method of weed control,
- identifies sites for replanting,
- selects planting mixes for each site,
- estimates the time taken to complete the work, and
- recommends timing for the activity.

The plan also:

- establishes a program that is co-ordinated with the Fire Management Plan. This has taken into account alterations made to the plan following recommendations made previously.
- identifies responsibility between HCC Bushcrew, FOKL inc CVA and Contractors for each of action identified for more than 140 management sites.
- Identifies two possible Greencorps projects
- recommends a monitoring program for select threatened species.
- provides species lists for replanting projects

[3] Knocklofty Reserve / McRobies Gully Fire Management Plan – AVK Env. Mngt. & Urban Bushland Management 1998
[4] That part identified as K20a (Appendix 5)

FIGURE 1 - KNOCKLOFTY RESERVE

2. BIOLOGICAL VALUES OF KNOCKLOFTY RESERVE

Hobart Council maintains a Reserves database that includes summary information on each reserve plus a species list - see Appendix 1.

2.1 VEGETATION

Knocklofty Reserve includes a number of forest communities that have been mapped (Figure 2). The boundaries between some communities can be sharp such as where they follow changes in soil type. Others can be quite diffuse where other factors such as a gradual change in moisture availability are a significant influence. Plant communities often overlap or show co-dominance across these boundaries.

Plant communities each provide a distinct habitat for the flora and fauna that they support. Vegetation maps are therefore useful tools for identifying significant habitats and for directing species selection in revegetation planning.

Forest communities have been assessed at Statewide and regional level for conservation significance. Some communities are important because they are considered threatened by land use change or are now rare. Others are important because they are not well represented in the State Reserve system and so their conservation is not secure. These assessments, undertaken for the Regional Forest Agreement (RFA) [5] and associated RFA Private Reserve Program [6] have been used here. Table 1 lists all communities and identifies their significance. An overall assessment that also includes local significance has been applied. The principles of assessment are explained elsewhere [7] but have been updated to incorporate the bioregional assessments.

[5] PLUC 1996
[6] CARSAG 2000
[7] North 2000

Table 1 - Forest Communities and their conservation priorities on Knocklofty Reserve

Community	Statewide Conservation Significance [2]	Regional Priority Southeast Bioegion [3]	Conservation Priority [4]
DRY-gVIM		23	Critical
DRY-gAM DRY-hAM	vulnerable	25	Critical
DRY-gOV	endangered	28	Critical
DRY-gPUL DRY-shPUL		1	Non-priority
DRY-gGLOB	vulnerable	16	Urgent
DRY-shOB		1	Non-priority
WET-GLOB	vulnerable	16	Urgent
WET-OB		2	Non-priority

[1]- DRY represents a dry sclerophyll forest, WET - wet eucalypt forest. The first letter code in lower case after the hyphen describes the structure, thus g=grassy, h=heathy, sh=shrubby. This is followed by the first syllable of the dominant eucalypt, thus AM=*E.amygdalina,* PUL=*E.pulchella,* VIM=*E.viminalis,* OV=*E.ovata,* OB=*E.obliqua,* GLOB=*E.globulus.* So DRY-hAM = Heathy *Eucalyptus amygdalina* dry sclerophyll forest.

[2]- This identifies rare and threatened communities as ascribed to the equivalent RFA forest mapping units [8]

[3] - The RFA Private Reserve Program gives communities a score of 1-28 to assist with reserve selection [9]

[4] - Developed for Hobart Council - significance in descending order - 'critical', 'urgent', 'important', non-priority' with updates incorporating changes to Bioregional boundaries

[8] PLUC 1996
[9] CARSAG2000

FIGURE 2 - FOREST COMMUNITIES ON KNOCKLOFTY RESERVE

2.2 NATIVE FLORA

Knocklofty Reserve supports a high diversity of vascular plant species - so far 286 have been recorded that are made up of: 182 dicotyledons, 95 monocotyledons, 1 conifer and 7 ferns. 18 species are endemic to Tasmania, 55 are naturalised exotics (weeds and garden escapes) and 9 species are considered to be of conservation significance. The full species list is included in Appendix 1. This data base is available in electronic form for updating of newly discovered species.

Several species are considered significant by way of their presence on schedules of the Tasmanian *Threatened Species protection Act 1995* and the Commonwealth *Endangered Species Protection Act 1992* [10]. Current information on their distribution is given in Table 2. Figure 3 shows their approximate locations.

Knocklofty Reserve is particularly significant for being the only known location anywhere for a plant species - the Knocklofty Leek Orchid (*Prasophyllum perangustum*). First collected from Knocklofty in 1936 and then again in 1939, there were no subsequent records until 1993, in the season following a bushfire, when it was discovered from two localities on the crest of Knocklofty[11]. Despite regular subsequent searches no additional confirmed records have been made [12]. Knocklofty Reserve is also important for a second orchid species - the Tapered Leek Orchid (*Prasophyllum apoxychilum*). Also promoted by fire this is another very rare species only known from three locations - Taranna on the Tasman Peninsula, near Murdunna on the Forestier Peninsula and on Knocklofty from where it has been collected from two sites in 1993 and 1996.

Another threatened species that responds to fire is Spur Velleia (*Velleia paradoxa*). This was first discovered on Knocklofty in 1995, where it is located on the very northern tip of the reserve at Mt Stuart. It appeared following a grass fire and subsequently declined in numbers as more vigorous tussock grasses closed it out. A prescribed burn of the site took place in winter 2000.

The localised plant of Drumstick Heath (*Epacris virgata* 'Kettering') is unusual. Although the known location is just outside the reserve the population may include additional plants within the reserve given its proximity. However the existing plant occurs on a bulldozed firebreak and no additional plants have been encountered despite searches. There is a large population in Tolosa Park, Glenorchy less than 3 km distant.

[10] The schedules of which are incorporated into the *Environment Protection and Biodiversity Conservation Act 1999*.
[11] Jones *et al* 1999.
[12] Hans Wapstra pers com.

Table 2 - Rare and Threatened Plant Species on Knocklofty Reserve

Species	Cons. Status	Mngt Unit	Population	Notes
Knocklofty Leek Orchid (*Prasophyllum perangustum*)	E r	K12	Possibly 2 populations - no data on size	Last seen 1993 following 1992 fire
Tapered Leek Orchid (*Prasophyllum apoxychilum*)	E	K10, K12	2 populations – no data on size	Last seen 1993 following 1992 fire and again in 1996.
Drumstick Heath (*Epacris virgata* 'Kettering')	e	Mc5	Single plant outside reserve	Occupying bulldozed track margin just outside reserve
Spur Velleia (*Velleia paradoxa*)	v	K1	C 20 plants in 2000. Several hundred in 1996	Population first identified following fire in 1994
Cut-leaved New Holland Daisy (*Vittadinia muelleri*)	r	nr K3	c20	Ledge above Giblin St quarry
		K28		Near Reservoir
		K28	50	Forest Rd bus stop access
Tall Wallaby Grass (*Rytidosperma procerum*)	r	K6, K10, K12, K15, K19, K22, K24, K25	Recorded from 12 sites. Likely to be many more sites.	Widespread on both dolerite and sandstone. Included in recent plantings
Rodway's Saw-sedge(*Gahnia rodwayi*)	r	Mc5	Potential habitat exists in reserve proper	Occupying bulldozed track margin just outside reserve
Tasmanian Peppercress (*Lepidium pseudotasmanicum*)	r	K1	12 plants beside steps. 2 at car park plus hundreds of seedlings	Mt Stuart lookout
		K28	Recorded in 1996, not relocated in 2000	Reservoir
Ploughshare Wattle (*Acacia gunnii*)	r3	K14		Plants bagged for seed collection. 2 plants located in planned burn area
		K15	Approx 20+ Supplemented by 16 plants used in recent plantings	Scattered at low densities in the vicinity of 'reflecting pond' and throughout the unit.
		K26		Population burnt in 1999

E – Nationally endangered [13]

V – Nationally vulnerable

[13] Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

e – endangered in Tasmania [14]

v – vulnerable

r – rare

r3 – species with small and/or localised populations wherever they occur in Tasmania [15]

[14] Tasmanian *Threatened Species Protection Act 1995*
[15] Flora Advisory Committee 1994

FIGURE 3 - THREATENED FLORA SPECIES ON KNOCKLOFTY RESERVE

2.3 NATIVE FAUNA

No systematic survey has been undertaken of fauna on Knocklofty, although there are various anecdotal records from the area.

Two threatened fauna are known to use habitat on Knocklofty. These include the Eastern Barred Bandicoot (*Perameles gunnii*) and the Swift Parrot (*Lathamus discolor*).

2.3.1 Eastern Barred-bandicoot (Perameles gunnii)

The Eastern Barred Bandicoot (*Perameles gunnii*) is currently listed as nationally **vulnerable** [16] although it is currently not listed in Tasmanian threatened species legislation.

A consultancy to assess the extent of bandicoot habitat and provide management advice has been undertaken [17]. The report provided for that study is included in Appendix 2. The main findings from that study were that evidence of bandicoot activity is widespread on Knocklofty Reserve with particular concentrations associated with dense grassy understoreys in forest and woodlands dominated by *E.pulchella* (DRY-gPUL) and *E.amygdalina* (DRY-gAM). Bandicoot activity is also high in areas of rank exotic grass in Management Unit K20c and native grassland making up K20b. The significance of Eastern Barred Bandicoot presence in native grassland is emphasised. Comments on weed control suggest there is no impediment to gorse management, blackberry and bracken control as long as the rank character of the associated exotic grass in the near vicinity is maintained to provide alternate cover. Where a larger infestation of gorse was observed across the boundaries of Management Units K14 and K20c recommendations are made to provide an alternate source of cover whilst the gorse is being treated.

Comments on fire management and the need for a mosaic burning are consistent with the prescriptions of the *Fire Management Plan*[18]. A preference is given for frequent burning of Unit K20b to maintain the grassy character of the vegetation and prevent it reverting to forest.

In the report [19] recommendations are made to undertake further work to incorporate some baseline data on bandicoot activity and species composition and biology into reserve management. This information could be used for monitoring the health of the Eastern Barred Bandicoot (*P.gunnii*) population on the Reserve over the long term. It would also help differentiate whether the distribution of bandicoot activity and thus habitat preference can be attributed to Eastern Barred Bandicoot (*P.gunnii*) rather than the Southern Brown Bandicoot (*Isoodon obesulus*) a species that is generally more secure is of less conservation significance.

A trapping proposal (attached to Appendix 2) has been prepared and will be implemented in Spring 2001.

[16] Schedule 1 of the Commonwealth *Endangered Species Protection Act* 1992
[17] Mallick 1999
[18] AVK Env. Mngt. & Urban Bushland Management 1998
[19] Mallick 1999

2.3.2 Swift Parrot (Lathamus discolor)

The Swift Parrot (*Lathamus discolor*) is protected by State and Commonwealth threatened species legislation on schedules of which[20] it is listed as **endangered.**

The following notes follow discussions with Raymond Brereton of the Parks & Wildlife Service who has for many years undertaken research on the biology and conservation of the Swift Parrot. Following a request from the NHT Knocklofty Project Committee a survey was undertaken of Knocklofty Reserve during the flowering period (early summer 1999-2000) of Blue Gum (*Eucalyptus globulus*) its preferred natural nectar source. The reserve was also assessed for potential nesting habitat and consideration given to tree planting priorities.

Blue Gums (*E.globulus*) on Knocklofty Reserve are being sourced for nectar when in flower with larger specimens on deeper soils providing the optimum resource. Foraging birds were recorded from flowering trees in Management Units K18, K19 and K20c. Over several repeated visits in November 1999, 5 adult birds and 1 juvenile were recorded. It should be recognised that birds are wide ranging and opportunistic. Birds have been recorded regularly foraging up to 5km from nest sites. They will target good flowering trees over a wide range to ensure their foraging requirements are met. The origins and numbers of birds recorded foraging on Knocklofty is therefore likely to vary.

The inclusion of Blue Gums (*E.globulus*) in planting mixes is recommended for gullies and lower slopes and areas on dolerite. This species has been used extensively in tree planting projects including the upper catchment of Salvator Rosa Glen and around the main car park at the top of Forest Road.

The use of fire management should attempt to avoid the burning of all stands of Blue Gum (*E.globulus*) at any one time which is achieved by the mosaic pattern adopted for the fire management plan.

Mature eucalypts, mainly White Peppermint (*Eucalyptus pulchella*) growing on the crest and south trending ridge from the summit of Knocklofty (Management Units K10, K211, K12, K17 and K18) include old growth values with a moderate density of tree hollows that are potentially suitable for Swift Parrot (*L.discolor*) nesting. Although nesting was not observed, locating nests is an extremely difficult task, and current or future use by Swift Parrots (*L.discolor*) can therefore be considered a distinct possibility. It is recommended that further survey is undertaken during a 'good year' when Blue Gums (*E.globulus*) are flowering and Swift Parrots are foraging of potential nesting habitat to try to locate any nest sites.

[20] Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.* Tasmanian *Threatened Species Protection Act 1995*

FIGURE 4 - SWIFT PARROT SIGHTINGS AND OBSERVED HABITAT ON KNOCKLOFTY RESERVE

2.4 WEEDS

The management history of areas within and around Knocklofty have provided conditions that have allowed for weed infestations. Much of the sites cleared and quarried in the past have been recolonised by a select flora that includes a subset of the original native species plus a number of weeds. Elsewhere localised disturbances associated with track construction and bushfires have contributed further to the spread of weed populations. The most notable and characteristic environmental weed is Gorse (*Ulex europaeus*) which affects more than half of the reserve with every Management Unit having some form of gorse management requirements. Figure 5 indicates the distribution of Gorse and provides an indication of the level of infestation observed. Figure 6 shows other environmental weeds. The full list of environmental weeds occurring in Knocklofty Reserve is listed in Table 3. Some areas of Gorse infestation have changed little in two decades when comparing the distribution shown to that given in the Management Plan[21], which shows a constant distribution for the previous 35 years. Although some boundaries do appear to have shifted little, there are area on the eastern slopes and smaller scattered infestations that are in areas not previously mapped, either because they were overlooked or more likely represent new infestations. Notable examples include Mt Stuart (K1 and K2) and scattered infestations within Management Units K9, K10 and K12. The implication from site observation and conclusions made in the Management Plan [22] is that gorse is able to extend its range and density in areas following fire. Consequently there is a need to incorporate a cohesive link between fire management and weed management. Pre and post fire weed management is clearly prescribed in the Fire Management Plan[23].

Weed management has been undertaken in a non systematic way for many years with the targeting of certain species such as Pine (*Pinus radiata*) and Pampas Grass (*Cortaderia* spp.) being effective. The extent of Gorse (*U.europaeus*) and Broom (*Cytisus scoparius*) have also been reduced in the area around the top of Forest Road and more recently in Management Units K15, K18, K19, K20a, K20b, K20c, K15, K24 and K25.

[21] Brown 1983
[22] Brown 1983
[23] AVK Env. Mngt. & Urban Bushland Management 1998

Table 3 - Environmental Weeds on Knocklofty Reserve

Weed Species	Distribution	Notes
Gorse (*Ulex europaeus*)	Widespread, occurring in all Management Units and major infestations in K1, K2, K3, K4, K5, K6, K7, K8, K9, K13, K14, K15, K18, K20a, K20d, K21, K22, K23, K24, K25, K26,	Major concentrations on southern, eastern and northern lower slopes off Knocklofty
English Broom (*Cytisus scoparius*)	Mostly localised infestations in K15, K20c, K20d, K20e, K23, K24, K25, K27, K28	Less widespread than 20 years ago partly due to control and partly due to the extension of native forest cover
Canary Broom (*Genista monspessulana*)	K15	Part of an mixed weed stand above Knocklofty Terrace
Cotoneaster sp	K15	Part of an mixed weed stand above Knocklofty Terrace
Willow (*Salix X rubens*)	K15, K20e	Mature infestations that have expanded as far as they are likely
Boneseed (*Chrysanthemoides monilifera*)	K1, K4, K5, K7, K14, K15, K20d	The major infestation on eastern slopes of Knocklofty has extended its range following fire events. Previously unmapped from northern slopes of Mt Stuart
Spanish Heath (*Erica lusitanica*)	Local populations in K6, K9, K12, K20c and larger infestation within transmission line easement	Previously unmapped, slashing of the transmission line easement may be a significant factor in spreading its range
Euryops abrotanifolius	K4, K5	A garden escape (daisy) that is co-existent with Boneseed at one site
Blackberry (*Rubus fruticosus*)	K15, K20c, K20d, K20e,	Includes several large and dense patches. Several are confined to old borrow pits but some have the potential to spread along drainage lines
Pampas Grass (*Cortaderia selloana and C.jubata*)	?	Control program has all but eliminated this although continues to re-appear as spot infestations.
Parrots Feather (*Myriophyllum aquaticum*)	K15	Dominates a periodically inundated small quarry. This is a serious weed that threatens waterways. Weeds Officer has been consulted.

FIGURE 5 - GORSE ON KNOCKLOFTY RESERVE

FIGURE 6 - OTHER ENVIRONMENTAL WEEDS ON KNOCKLOFTY RESERVE

2.4.1 Gorse Spider Mite

In recognition of the long term nature of any gorse control program at Knocklofty a method of biological control has also been considered to support physical management. Gorse Spider Mite

Two small batches representing two races of Gorse Spider Mite (*Tetranychus lintearius*) were released in Knocklofty Reserve on December 23 1999. Gorse Spider Mite is a recognised biological control agent, first released in Tasmania in Spring 1998.

Current knowledge of the effects of the Spider Mite [24] are that it seems to significantly reduce the vigour of plants. Rarely are they killed, however growth and flowering (and thus seeding) are significantly (> 50 %) reduced. Thus the effect of its release is intended to act as a holding process to reduce the rate of gorse spread until all sites can be targeted for management. The mite population increases until it covers the entire plant within a protective webbing. The tiny insects feed through sucking mouth parts similar to aphids. Affected plants have a bleached or bronzed appearance. By the following spring populations usually build up to sufficient numbers for spreading into adjacent plants. It is at this time that land managers should be collecting and releasing the insects to new sites.

Several Gorse plants have been selected as hosts. These are located above Knocklofty Terrace in Management Unit K15 [25]. By Spring of 2000 the population had extended so that the original pant and surrounding individuals were significantly affected by the mite. An inspection in Winter 2001 indicated that spread of the mite had stalled with little evidence of further activity.

If the Spider Mite is successful at establishing a population then they will be ready for release into appropriate sites in late Spring 2001. Likely release sites are the Giblin Street Quarry, and other heavy gorse infestations on private property that neighbour the reserve.

The long term planning by the state Government is to establish a number of different biological control agents which work together to significantly reduce plant vigour and spread. However, they are not expected to eradicate gorse. Native plant species should be able to compete more successfully with gorse and traditional control measures should be more easily and successfully implemented.

Other biological control methods are being currently researched and tested prior to their release. Some of these may be suited to Knocklofty and could be investigated in the future. Advice can be sought from :

John Ireson, Tasmanian Institute of Agricultural Research, DPIWE

Ph 62336821. Email: John.Ireson@dpiwe.tas.gov.au

[24] Based on 10 years of post release observation in New Zealand and one year in Tasmania following extensive testing, TIAR Biological Control Pamphlet No. 5, 1999
[25] Knocklofty Reserve and McRobies Gully Fire Management Plan 1998

2.5 Frog Dams

There are several borrow pits and quarries that retain water for most of the year except during drought periods. In addition there is an old farm dam that has been restored and redesigned as part of a program of improving the suitability of the site for frog habitat. Landscaping of the site has included the planting of appropriate species including *Poa labillardierei* and *Juncus spp.* Additional species that occur in similar habitat nearby have also been considered for future planting.

The rehabilitation of wetlands throughout the reserve forms a prominent focus of community activities.

3. VEGETATION MANAGEMENT

The Knocklofty Reserve Development and Management Plan [26] included a number of recommendations for vegetation management. Although the principles adopted in that plan are consistent with this plan some of the methodologies recommended are not consistent with contemporary land management practises.

> "It is proposed to manage Knocklofty Reserve in a manner which maintains its natural bushland character in the long term, whilst providing for a range of passive recreational activities"[27].

Specific recommendations that relate to vegetation management included recommendations to undertake properly evaluated gorse control, and that disturbed areas be rehabilitated to forest or native grassland [28].

Specific recommendations relating to fuel hazard reduction have been superseded in some instances with the adoption of a Fire Management Plan [29]. The active encouragement of *Allocasuarina* stands[30] and the use of non-native species in Zone M Unit K28 of this report) is considered inappropriate. Neither proposals have been actively implemented.

3.1 ACTIVITIES 1990-1998

This period included a number of groups undertaking particular tasks loosely co-ordinated by the Parks & Recreation Department of Hobart City Council. The Management Plan provided the general principles that were followed in decision making. Hobart Council Bushcrew have worked throughout the reserve although they have concentrated vegetation management to particular sites for which they have maintained responsibility for maintenance. The main area of management has been Units K21, K27, K28 that have included significant areas of Gorse control and Willow clearance with planting above the Salvator Road entrance. An area locally known as the 'Sandy Spit' was also mulched and planted.

Local Primary Schools including Lansdowne Crescent, Goulbourn St and Mt Stuart undertook occasional tree planting tasks in Management Units K20b and K20c.

Mount Stewart Bushcare Group was briefly convened for one year (1997) but failed to gain sufficient local interest to continue. Some local weed management (mainly Gorse) was implemented around Mt Stuart Lookout (Unit K2).

Friends of Knocklofty Bushcare Group, formed in 1992 by a group of local residents, has been involved in an active program of select weeding and replanting of various sites on Knocklofty on the mid and lower slopes adjacent to West Hobart. Work was concentrated Around Units K15, K19, K20c, K20d, K20e, K24, K25 and K28. Since 1995, the HCC has provided a co-ordination role for FOKL and other bushcare groups in the Hobart area, and has supplied tools for weeding and seedlings and materials for the plantings.

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[26] Brown 1983
[27] p3, Brown 1983
[28] Recommendations xii and xiii
[29] AVK Env. Mngt. & Urban Bushland Management 1998
[30] Appendix6, Brown 1983

FIGURE 7 - VEGETATION MANAGEMENT UNITS ON KNOCKLOFTY RESERVE

Documentation of all plantings implemented since 1995 along with an assessment of the success rates has been compiled[31] and is included with this report in Appendix 3.

3.2 Activities 1999 on

The development of a Fire Management Plan for Knocklofty Reserve followed by the instigation of the Vegetation Management Project funded by the Natural Heritage Trust has allowed for a more strategic approach to be adopted to vegetation management across the Reserve.

Co-ordination of management within the reserve has been linked to the Management Units developed for the Fire Management Plan. The use of fire as a management tool is recognised in co-ordinating its implementation with weed management. Adoption of the Fire Management Plan for Knocklofty has directed the thrust of management undertaken by the Hobart City Council Bushcrew. Their energies have focused on maintenance of fire trails, firebreaks and pre and post fire weed suppression.

The implementation of the NHT funded Vegetation Management Project has provided an increase in resources to employ the Conservation Volunteers of Australia (CVA) with a focus on habitat rehabilitation and restoration. Some of these resources are also being directed towards Contract labour to undertake specialist weed control on dangerous and inaccessible sites not suited to a volunteer program. Bushcare volunteers (FOKL) have continued to co-ordinate their work with this program. They will also inherit sites planted by CVA for ongoing maintenance.

3.2.1 Developing a work plan

The weed infestations, rehabilitation sites and planting sites have been sub-divided into itemised Management Units. The purpose of this is to assist with programming and reviewing a work schedule. Figure 7 identifies the location of each Management Site. For each Management Site previous and future work has been identified. The schedule has been implemented for the 2000 planting season which has allowed for modifications to be made to time estimates as well as priorities. Appendix 4 summarises planting achievements for 2000[32].

140 Management Sites have been identified. The required tasks at each site are listed in Appendix 6. Work undertaken in 2000-1 is identified along with work proposed for 2001-2. A work plan for 2002-3 will be based on what is outstanding from this plan and will include on-going maintenance and additional plantings on previously prepared and planted Management Sites.

The principle for prioritising work is influenced significantly by the timing within the Fire Management Plan. Areas identified for burning in the short term require pre and post fire weeding as recommended in the Fire Management Plan. This work has been allocated to the HCC Bushcrew. Weed infested sites not scheduled for burning within the 15 year period of the plan have in most cases been identified for earlier attention.

[31] Bruce Champion, Friends of Knocklofty Bushcare Group
[32] Tony Ault, Friends of Knocklofty Bushcare Group

An ambitious planting program has been scheduled by the Friends of Knocklofty for the 2001 planting season. Appendix 8 details the seedling list, with a total of over 7000 plants, for the 22 prepared sites[33]. This has directed the thrust of activities for 2000-2001 year towards site preparation.

The balance of weed infestations that are not associated with future planting sites, nor for impending pre-fire weed suppression remain outstanding. Some of these could be packaged with trackwork and possibly minor plantings into programs for Greencorp. In addition there are some areas of significant gorse infestation that would be best allocated to professional management through experienced Contractors.

Hobart Council Bushcrew

The main focus of work undertaken by the Bushcrew is directed by the program of the Fire Management Plan. In addition to maintenance of firebreaks, their work involves pre and post fire weed suppression. The Bushcrew has undertaken significant work in and around many of the entrances and should continue to take responsibility for maintaining and further enhancing these areas. Units include: K1, K2, K20d, K21, K26, K27, K28 and the upper carpark area.

There are significant weed problems associated with the transmission line easements. As these areas are not scheduled for burning in the Fire Management Plan, it would be necessary to undertake some targeted weed management within these areas at some stage.

Table 4 summarises the work for a pre fire weed suppression by the Bushcrew over the forthcoming burning period. It is recommended this is used by the crew to record actual time spent to feedback and improve work load predictions.

Friends of Knocklofty Bushcare Group (FOKL)

The energies of this group have been very much concentrated around the slopes above West Hobart where disturbance has been greatest. Past works have given a sense of ownership of these areas to the volunteers. Significant input has been directed toward rehabilitating quarries, restoring wetlands including the re-establishment of a series of ponds within the open grassy area in K20c. Four existing ponds have been deepened or extended and other areas are being modified to retain water. The old farm dam, now called The Frog Dam, has been enlarged and provided with a permanent water supply. The perimeter has been fenced and will be extensively planted with a suitable mix of wetland seedlings over the next two years.

Major Gorse and Broom infestations have been tackled and tree planting and maintenance has been implemented for several years. Works have been concentrated in Management Units K15, K19, K20b,K20d, K25. The responsibility for ongoing works and maintenance covering these units should fall with the group.

To assist in selecting seedlings hardy enough for planting in the Reserve, particularly under the present drought conditions, FOKL members carried out a Seedling Take survey of all plantings on the Reserve between 1995 and 1999. The results of this survey are reported in Appendix 3. Of the 4919 seedlings planted, 61% have survived. Prickly Box (*Bursaria spinosa*), with 97% survival of the 116 planted is

[33] Tony Ault, Friends of Knocklofty Bushcare Group

particularly hardy. Other species, widely planted in numbers greater than 100 individuals, that are considered to have achieved a moderately high survival rate (65-80%) include: Silver wattle (*Acacia dealbata*), Banksia (*Banksia marginata*), Blue Flax Lily (*Dianella revoluta*), Black Peppermint (*E. amygdalina*), Blue Gum (*E.globulus*), White Gum (*E.viminalis*), Sagg (*Lomandra longifolia*) and Tussock Grass (*Poa labillardierei*). Several species showed poor success rates including *Boronia pilosa,* White Peppermint (*E. pulchella*), Scaly Buttons (*Leptorhynchos squamatus*), Grey Everlasting (*Ozothamnus obcordatus*) and New Holland Daisy (*Vittadinia muelleri*).

During the first year of NHT funding in 2000, 2749 seedlings were planted on ten sites. Seven of these were sites prepared for planting under the NHT project plan. A Seedling Take count, completed in May 2001 gave an overall survival rate of 61% on all ten sites. However on the seven sites prepared under NHT project plan, a 71% survival rate was obtained despite drought conditions throughout the last 12 months. Details of these plantings are given in Appendix 4. The seven NHT project sites selected for planting were either wetter sites where run-off collects, such as gullies or under cliffs, or areas which had been heavily mulched and watered. Generally species from the Daisy (*Asteraceae*) family have achieved modest success and species that have previously had good survival rates, are so far surviving well. As would be expected Wattles generally succeed well. Additional species that have achieved good survival rates include rushes (*Juncus spp.*) and Hop Bush (*Dodonaea viscosa*).

Monitoring success rates does help identify species that can be relied upon. It also should improve future planning of desirable species if previous success rates are used to guide planting density. [eg] Previous planting's of *Ozothamnus obcordatus* suggest three times as many plants should be planted as can be expected to survive. It is worth noting however that sites vary and so success rates are likely to reflect site conditions as much as species composition.

As a result of a long standing involvement with the Australian Plant Society [APS] by one member, FOKL joined the APS as a community group member and during the year 2000 actively propagated seedlings from seeds and cuttings of plants grown on Knocklofty Reserve. In particular, good success was obtained in propagating 19 seedlings of the threatened *Acacia gunnii* from 60 seeds collected in Feb 2000. The list of seedlings grown and made ready for planting is reported in Appendix 5[34]. Most of the seedlings were planted by FOKL members during a workday in April 2001.

A recent focus has been the planting of seedlings to form a protective habitat for the Eastern Barred Bandicoot in areas of observed activity, where the protective environment of gorse has or will be removed.

The Bushcare group has also been active in fostering community interest in Knocklofty Reserve. A video of activities by the group has been produced. A booklet for Primary Schools entitled “Bringing the Frogs back to Knocklofty” has been distributed to the three local schools. A pamphlet on the Industrial History of Knocklofty Reserve is being prepared for general release, and this report will be made available to the State Library and various educational establishments.

A User Survey was also carried out by FOKL members. A summary of the survey findings are given in Appendix 7[35]. The main conclusions were that local residents

[34] Tony Ault, Friends of Knocklofty Bushcare Group
35

mostly used the reserve for walking and exercising their dogs. There was great support for the objectives of the NHT project, a keen interest in wetland expansion, and requests for more tracks and native plants.

Future expansion to the group would allow for additional areas to be taken on. If the reformation of a Bushcare group based in Mt Stuart were to occur they could similarly take responsibility for units K1 and K2.

Conservation Volunteers of Australia (CVA)

Some of the labour undertaken during this programme has been provided by the CVA (ex ATCV) and financed by the NHT project budget. Their efforts support the work carried out by FOKL and have provided the additional resources needed to keep to the programme timetable. In recognition of the voluntary role of this group it is essential they are provided with a well balanced work load that provides variety and interest. In 2001, most of the seedlings will be planted by volunteers.

Greencorps

There are significant areas of weed infestation on Knocklofty that fall outside the areas of focus by the volunteers and are not scheduled for burning for considerable time and so are unlikely to be tackled by the Bushcrew. This is a significant opportunity for upgrading and repairing some of the existing walking tracks. Two projects that stand out include developing a more trafficable route around the eastern face of Knocklofty and providing an eastern access to the summit that would double as a management boundary between units K12 and K18.

These projects would be suited to a Greencorps team. Table 5 provides two suggested programs that could be organised to be implemented from 2001-2002.

Contractors

Some of the major gorse infestations on the slopes of Knocklofty, in particular parts of units K18, K24, K23 within the reserve and several on private property including K5, K7(part), K8, K13(part) and K14 include such significant infestations as to not be suitable for volunteers or Greencorps. Much of this work could only be achieved through contract labour. Several of these can be co-ordinated with Fire Management weed suppression being undertaken by the Bushcrew. However adjacent private land and units not scheduled for a burn for considerable time could be targeted in this way. This approach is being trialed in Mngt Unit 55 in K18.

3.2.2 Transmission Line Easements

Knocklofty Reserve is traversed by two transmission lines that predominantly share a single easement that follows a route over the crest of the hill before diverging into West Hobart and South Hobart. The transmission lines are owned and managed by Aurora who also take responsibility for the management of vegetation within the easements.

The Fire Management Plan excludes activities from the easements due to the hazard of heat and smoke to the transmission lines. Vegetation management along the easements is therefore not scheduled within that plan.

The condition of the vegetation within the easements, in places is badly infested with woody weeds including Gorse and Spanish Heath. The management regime of

slashing vegetation beneath the transmission lines is likely to exacerbate the existing weed problems. The easements also act as corridors for the spread of these weeds as the lack of canopy provides more favourable conditions for shrubs to consolidate their hold.

Management of the easements should incorporate an approach that aims to minimise intervention. Arbitrary slashing of young trees and tall shrubs should be replaced by a targeted approach that selects only species that are likely to threaten the transmission line - eg eucalypt and possibly acacia saplings These should be cut and the stumps treated with herbicide. In this way return visits would be less frequent and involve less disturbance. Aurora should also be approached for support in tackling the woody weeds. Also weed management of adjacent Fire Management Units should extend the work into the easements.

Table 4 - Weed Management for Hobart Council Bushcrew

Completed Weed Management by Hobart Council Bushcrew

1999-2000				
Site no.	**Mngt Unit**	**Weed Species**	**Notes**	**Team days**
1	K1	Gorse, Boneseed, Grevillea	pre-fire weeding	6
39	K15	Pampas		0.5
51	K16	Gorse	pre-fire weeding	6
96	K21	Gorse	Pre-fire weeding	5
97	K21	Gorse	Pre-fire weeding	0.2
98	K21	Gorse	Pre-fire undertaken in 1999	20

2000-2001				
Site no.	**Mngt Unit**	**Weed Species**	**Notes**	**Team days**
12	K1	Gorse, Boneseed	post-fire weeding	2
3	K2	Gorse	pre-fire weeding	5
11	K6	Gorse	pre-fire weeding	2
12	K6	Gorse	localised patches, pre-fire weeding, search and treat scattered infestations	2
14	K6	Gorse	pre-fire weeding	3
23	K11	Gorse	scattered along vehicle track margins	0.5
23	K17	Gorse	scattered along vehicle track margins	0.5
95	K21	Gorse	Exclude fire above track in short term to protect Banksias.	2
99	K22	Gorse, Blackberry, Hawthorn, Broom	pre-fire weeding. Search up slope for additional infestations	5-10
116	K25	Gorse	pre-fire weeding	5
89	K20a	Gorse	pre-fire weeding	5
108	K24	Broom	Rehabilitated quarry. Gorse cut and poisoned by ATCV in Feb 2001. Follow up spraying	0.5

109	K24	Grassy mix, Gorse	Gorse cut and poisoned by ATCV in Feb 2001. Follow up spraying	0.5

Proposed Weed Management for Hobart Council Bushcrew

2001-2002				
Site no.	**Mngt Unit**	**Weed Species**	**Notes**	**Team days**
12	K1	Gorse, Boneseed	post-fire weeding. Check state of *Velleia paradoxa*	1
	K9	Gorse , Erica	post fire weeding	2
24	K12	Gorse	density fades to nothing upslope. Trackwork	10
25	K12	Gorse	search and destroy K12 for gorse and Erica	5
26	K12	Gorse	pre-fire weeding	0.5
27	K12	Gorse	pre-fire weeding	1
31	K12	Gorse	pre-fire weeding	0.5
106107	K24	Gorse	Spray where possible	1-2
112	K25	Gorse, Broom	Pre-fire weeding	2
113	K25	Gorse	small quarry. Pre-fire weeding	2
114	K25	Gorse	Spray small regen plants. Cut and paste others	1
117	K25	Gorse	Gorse cut and poisoned by ATCV in Feb 2001. Follow up spraying needed - Bushcrew	0.5
118	K25	Gorse	Gorse cut and poisoned by ATCV in Feb 2001. Follow up spraying needed - Bushcrew . Includes powerline easement and below	2
119	K26	herbaceous	Spray dense grass in preparation for tree planting	1
	K26	Gorse	Postfire weeding across all of K26	2
120	K27	Broom	Dead end track. Close off or erect sign or construct footrack	2-5
121	K27	Gorse	Firebreak, Undertake spraying at least 8 weeks prior to slashing firebreak	0.5
123, 124	K28	herbaceous	Hand weeding	1
125	K28	Gorse, Broom		1
138	Forest Rd	Gorse	roadside - offer to replace with natives	1

122	K28	Grasses, Broom, Gorse	Hand weeding	1

Proposed Weed Management for Hobart Council Bushcrew

2002-2003				
Site no.	**Mngt Unit**	**Weed Species**	**Notes**	**Team days**
13	K6	Gorse	pre-fire weeding	5
10	K6	Gorse	prefire weeding, Post-fire weeding before planting	10
34	K14	Boneseed	pre-fire weeding	0.5
137	K14	Gorse	Pre-fire weeding	2
52	K17	Gorse	pre-fire weeding	2
89	K20a	Gorse	post-fire weeding	1
	K21	Gorse	post-fire weeding across whole unit	5
	K22	Gorse	post-fire weeding across whole unit	2
102	K23	Gorse	Dense infestation next to easement	1
106	K24	Gorse	pre-fire weeding. Spray where able to safely	1
107	K24	Gorse	pre-fire weeding. Spray where able to safely	1
130	HEC	Gorse, Pampas	Powerline easement between 17 & 18	5
37	K15	Gorse, Boneseed, Crack Willow, Parrots Feather	Gorse Spider Mite released Dec 1999, rehab wetland, treat parrots feather, cut & paste willow	5
38	K15	Gorse, Broom, Canary Broom, Boneseed	Gorse Spider Mite released Dec 1999 area, cut and paste broom & boneseed	5
129	HEC	Gorse	Powerline easement units 10,11,12	1
131	HEC	Gorse	between easement and track adj unit 17	1
132	HEC	Erica	Power easement near Pole 20 - between 17 & 18	1
133	HEC	Gorse	Powerline easement between 23, 24 & 25	2
123, 124	K28	herbaceous	Hand weeding	1

Proposed Weed Management for Hobart Council Bushcrew

2003-2004				
Site no.	**Mngt Unit**	**Weed Species**	**Notes**	**Team days**
	K2	Gorse	Post-fire weeding	2
4	K3	Gorse	pre-fire weeding - cut and paste / spray	2
5	K3	Gorse	pre-fire weeding - cut and paste / spray	10
22	K11	Gorse	pre-fire weeding inc search all of unit	3
	K12	Gorse	Post-fire weeding	5
	K16	Gorse	pre-fire weeding	2
106	K24	Gorse	pre-fire weeding - cut and paste	10
107	K24	Gorse	pre-fire weeding - cut and paste	10
	K25	Gorse	Post-fire weeding	3
	K27	Gorse	Pre-fire weeding	2
123, 124	K28	herbaceous	Hand weeding	1

2004-2005				
Site no.	**Mngt Unit**	**Weed Species**	**Notes**	**Team days**
	K6	Gorse	Post fire weeding	5
	K14	Gorse	Post fire weeding	1
	K17	Gorse	Post fire weeding	1
100	K23	Gorse	search K23 and treat scattered infestations	10
101	K23	Gorse	Cut and paste	10
103	K23	Gorse, Broom, Blackberry	Cut and paste	10
105	K23	Gorse	search and treat scattered infestations upslope	20
	K24	Gorse	Post-fire weeding	5

Table 5 - Proposed Greencorps Program

Greencorps 1 - Season 2001-2002				
Management Unit	Management Sites	Activity	Timing	
4	6789	Weed control -Gorse, Boneseed, Euryops	4 weeks	
7	15, 16, 17, 18	Weed control -Gorse, Boneseed, Euryops	3 weeks	
10	20, 21	Weed Control - Gorse	1 week	
13	32, 33	Weed Control - Gorse	1 week	
20a	90	Weed Control - Gorse	1 week	
Track linking K4 to K20a		Reconstruct foot track. Earthworks, stonework inc. steps	4 weeks	
Track linking K4 to summit		Reconstruct foot track. Earthworks, stonework inc. steps	2 weeks	
This work is concentrated in the north east of the reserve. Additional activities could include the provision of seats along the track near K1 and at the junction of tracks near the cairn at K7/K10/K12				

Greencorps 2 - Season 2002-2003				
Management Unit	Management Sites	Activity	Timing	
18	53,56,57,58,59 +-	Weed control -Gorse	+-4 weeks	*
19	60	Erosion control and planting	1 week	
20d	79, 80	Weed Control - Gorse, Blackberry, Broom, Erica, Grevillea	2 weeks	
20d	77	Weed Control - Willow Broom, Blackberry, Gorse	3 weeks	
21	94	Gorse	2 weeks	
21	77	Poets Road entrance. Construct gateway, rationalise parking, tree and shrub planting	4 weeks	
18		Construct track along northern boundary to summit. Work includes step construction.	6 weeks	
This work improves access into and around the reserve from West Hobart.				

* - dependent on how much Contractors achieve in this a unit.

3.3 THREATENED SPECIES MANAGEMENT

Eastern Barred Bandicoot (*Perameles gunnii*)

It has been recommended (section 2.2) to undertake further survey to establish baseline data for monitoring future population changes. The details for monitoring would come out of this study.

Swift Parrot (*Lathamus discolor*)

Summer 2000/2001 resulted in almost no Blue Gum flowering and no breeding success. It has been recommended (section 2.2) that in the next good flowering year searches are undertaken of potential habitat to attempt to locate the presence of nesting birds. On observing significant Blue Gum flowering Friends of Knocklofty or staff of Hobart Council should contact:

Raymond Brereton, Threatened Species Zoologist, DPIWE

Ph 62333627. email rayb@postoffice.delm.tas.gov.au

Knocklofty Leek Orchid (*Prasophyllum perangustum*) and **Tapered Leek Orchid (*Prasophyllum apoxychilum*) -**

Advice for monitoring these species has been provided by Hans Wapstra and Richard Schahinger as part of the Threatened Orchid Recovery Program.

These orchids are known from localised sites within Mngt Units K10 and K12. Similar habitat also exists within Units K4, K6, K11, K17 and K18. Given the habit of flowering in the spring /early summer following a burn it is necessary that a line of communication is in place to ensure the Friends of Knocklofty are informed by Hobart Council of any burning or wildfires within these units. Searches should be encouraged in such an eventuality.

The known location of *P.perangustum* is confined to a very localised position near the crest of the hill. A local orchid enthusiast, Les Rubenach has committed to annual searches of the site.

Any observations by staff of volunteers of a leek orchid suspected to be either species should be followed up by immediate contact with:

Hans Wapstra, Resource Management and Conservation, DPIWE

Ph 62336311 or email hansw@postoffice.dpiwe.tas.gov.au

Weed management should be pursued throughout Management Units that could potentially support these leek orchids. The transmission line easement in the vicinity of the crest of Knocklofty should also be targeted for weed control.

Spur Velleia (*Velleia paradoxa*)

Population numbers of this species have been shown to fluctuate significantly since first being recorded following a grass fire in the early 1990s. In 1997 the population was estimated as several hundreds. By 2000 fewer than 20 plants were recorded. Since that time the site was burnt in autumn 2000. Given the species apparent positive fire response and its inability to compete with vigorous grass growth in the absence of fire, Unit K1 has been marked for burning on average every 5 years.

Site monitoring of the population should be formalised. The Bushcrew, who are familiar with the plant and first located it should make annual visits to assess the population and undertake any weed management that poses an immediate threat to the population. An annual estimate of population and area of occupancy should be made.

Alterations to the burning regime may need to be considered if the population cannot be sustained. Given the wild fluctuations observed in recent years this may be difficult to assess. It is recommended that the Threatened Species Unit Botanist is informed of population trends and consulted for advice:

Naomi Lawrence, Threatened Species Unit, DPIWE

PH 62336692 or email naomi@postoffice.dpiwe.tas.gov.au

There would be considerable benefit in establishing a second population of Spur Velleia elsewhere on Knocklofty. The plant is quite attractive and would be well suited for growing in the entrance site at Forest Road - Mngt Site 122. Seed can be collected in mid summer and the plant easily propagated.

3.4 Revegetation Plan

Variation in species choice for replanting is recommended. This is intended to reflect site suitability and desired outcome. The Action Plan identifies the appropriate mix for each site. Note that all replanting sites are located on sandstone.

These proportions and compositions should be treated as a guide only. Species have been selected that are considered appropriate for propagation at the Council Nursery in Mornington. Additional species that are successfully propagated by the Friends of Knocklofty can be added and included where appropriate for specific sites. Availability will determine whether the mix can be matched accurately or not.

Tree / Shrub Mix 1	**Proportion**
Eucalyptus amygdalina	30%
Eucalyptus viminalis	10%
Banksia marginata	10%
Acacia dealbata	10%
Dodonaea viscosa	10%
Bursaria spinosa	10%
Ozothamnus obcordatus	10%
Daviesia ulicifolia	10%

Tree / Shrub Mix 2	**Proportion**
Eucalyptus ovata	40%
Acacia verticillata	30%
Leptospermum scoparium	30%

Tree / Shrub Mix 3	**Proportion**
Eucalyptus globulus	20%
Eucalyptus ovata	20%
Pomaderris apetala	20%
Acacia verticillata	20%
Leptospermum lanigerum	10%
Leptospermum scoparium	10%

Shrub Mix	**Proportion**
Acacia dealbata	10%
Bursaria spinosa	10%
Ozothamnus obcordatus	40%
Daviesia ulicifolia	20%
Leptospermum scoparium	10%
Dodonaea viscosa	10%

Low Shrub Mix	**Proportion**
Ozothamnus obcordatus	30%
Daviesia ulicifolia	30%
Aotus ericoides	40%

Shrub / Grass Mix	**Proportion**
Bursaria spinosa	1%
Ozothamnus obcordatus	1%
Daviesia ulicifolia	1%
Gahnia radula	7%
Poa rodwayi	30%
Poa labillardierei	10%
Rytidosperma procerum	30%
Lomandra longifolia	10%
Dianella revoluta	10%

Grass Mix 1	**Proportion**
Poa labillardierei	20%
Poa rodwayi	30%

Rytidosperma procerum	20%
Lomandra longifolia	20%
Dianella revoluta	10%

Grass Mix 2	**Proportion**
Poa labillardierei	70%
Juncus procerus	10%
Juncus pallidus	10%
Carex appressa	10%

Additional species that could be considered for Sites 81, 91 and 93 are two species not currently found on Knocklofty but occurring in similar habitat on private land and are both of conservation significance:

Currajong - *Asterotrichion discolor*. This is a small tree endemic to south east Tasmania that is confined to riverbanks and drainage lines.

Yellow Pimelea - *Pimelea flava*. An attractive shrub known from small populations in bushland above Pottery Road on private land. This also typically occurs in moist locations although it does not tolerate heavy shade[36].

Other rare and threatened species that should be propagated from local plants include:

Cut -leaved New Holland Daisy (*Vittadinia muelleri*), Spur Velleia *(Velleia paradoxa*) [37]. Both of these could be established in the formal beds at the entrances such as sites 72, 73, 122 and 123 include. Previously the Bushcrew have planted them on site

Tall Wallaby Grass (*Rytidosperma procerum*). This should be included in grass mixes if seeds can be collected for propagation. It is included in Grass Mix 1 above. The Friends of Knocklofty raised 233 plants from seed collected from site 110. These have been planted on site 72.

Ploughshare Wattle (*Acacia gunnii*). Limited to occasional plants in heathy communities on sandstone it is known to occur in Units K14, K15 and K26. The FOKL have had some success collecting seed and propagating plants. In 2000-01 the Friends of Knocklofty successfully raised nineteen seedlings from seed collected from Units K14 and K15. Of these 16 plants were planted in sites 35, 67, 72, and 93. Other sites that would be suited for planting with this species include 35 and 73.

[36] Cuttings were taken by FOKL in Nov 2000 to propagate for planting.
[37] Refer section 3.3

3.4.1 Monitoring

The Planting between 1995 and 2000 has been meticulously monitored by volunteers in the Friends of Knocklofty Bushcare Group (refer Appendices 3 & 4). This information has assisted with gauging the success of previous works and can be used to help direct future planting. It is important that this process is continued with for plantings identified in the current plan. Records should be kept by all groups undertaking planting and the information shared. [eg] The Bushcrew should document all plantings and should monitor and document success rates and then share the information with the Friends of Knocklofty Bushcare Group. For the long term success of revegetation program, groups should avoid working in isolation. This program does not detail the future planting schemes of the Bushcrew. Species selection by all groups should reflect the existing natural composition except where there has been a considered reason for introducing / re-introducing certain species (eg *Pimelea flave, Asterotrichion discolor* - refer above). Hobart Council Parks and Recreation Unit should take an active role in centralising all information and sharing it amongst the groups.

3.5 Review

This plan should be treated as a live document. The Friends of Knocklofty have an electronic version of the Vegetation management Plan (Appendix 6) and have the intention of keeping the record up to date. The plan should be reviewed in 2003 or at the completion of the project.

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APPENDIX 1

PLANT SPECIES LIST

FOR KNOCKLOFTY RESERVE

APPENDIX 2

EASTERN BARRED BANDICOOTS ON KNOCKLOFTY RESERVE

Stephen Mallick

Wildlife Biologist

APPENDIX 3

A REVIEW OF PLANTING UNDERTAKEN BETWEEN 1995 AND 1999 ON KNOCKLOFTY RESERVE

Bruce Champion

Friends of Knocklofty Bushcare Group

August 2000

APPENDIX 4

A REVIEW OF PLANTING FOR 2000

ON KNOCKLOFTY RESERVE

Tony Ault

Friends of Knocklofty Bushcare Group

February 2001

APPENDIX 5

SEED PROPAGATION STATUS

Tony Ault

Friends of Knocklofty Bushcare Group

April 2001

APPENDIX 6

VEGETATION MANAGEMENT PLAN FOR KNOCKLOFTY RESERVE 2000-2004

Note this is maintained as an Excel spreadsheet that could effectively be kept live with constant updates

APPENDIX 7

USER SURVEY

Friends of Knocklofty Bushcare Group

December 2000

APPENDIX 8

PLANTING LIST FOR ALL GROUPS IN 2001

Tony Ault

Friends of Knocklofty Bushcare Group

June 2001