A Great Western Tiers National Park

- an extended proposal

Great Western Tiers National Park Campaign

Australian Conservation Foundation

Tasmanian Conservation Trust

The Wilderness Society

September 1995

Preamble

The Great Western Tiers National Park Campaign has begun a process of consultation with the Tasmanian Aboriginal community on issues surrounding the cultural and natural heritage in the region of the Great Western Tiers. This National Park Proposal should be seen as part of this wider ongoing process.

Acknowledgements

This work has been prepared by Laurie Goldsworthy with assistance from Rodney Braithwaite, Bob Brown, Kim Cooper-White, Beth Gibbings, Deborah Hunter, Laurene Kelly, Sandy Leighton and Darlene Mansell.

Special thanks to Jamie Kirkpatrick, Tony Moscal and Michael Askey-Doran for their excellent study of the botanical values of the eastern part of the Great Western Tiers, which made this extended proposal possible.

Published by:

Tasmanian Conservation Trust Inc
102 Bathurst St
Hobart 7000
Australia

ISBN 0 947291 03 2

Printed on 100% Recycled Paper

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1. Overview

1.1 Introduction

The Great Western Tiers are the forested escarpment of Tasmania's Central Plateau. This document describes in some detail the concept of a Great Western Tiers National Park, which takes in the whole Great Western Tiers escarpment and significant parts of the adjoining Central Plateau. The Park has great biological diversity and cultural significance. The total area is 98,677 hectares, which comprises about 43,000 hectares of escarpment and lowland forest and about 55,000 hectares of adjoining plateau. About 20,000 hectares is currently designated as forest for logging.

1.2 Historical Perspective

A proposal for a Great Western Tiers National Park was published in 1990 (The Western Tiers Interest Group et al, January 1990). That proposal included the forests between Lake Mackenzie Road in the west (Western Bluff) and the Poatina Highway in the east. This will be referred to as the ***Western Region***. The Tasmanian Department of Parks, Wildlife and Heritage (June 1990) recommended that most of the Western Region be included in the World Heritage Area. The Wilderness Society (December 1993) has also recommended that most of this Western Region be included in the World Heritage area. Much of the original National Park proposal is presented in Appendix B, with some revisions and additions.

1.3 Extensions

In 1993 The Western Tiers Campaign published a draft Management Plan for the Great Western Tiers National Park (Western Tiers Campaign, May 1993). It was recommended therein that the National Park be extended to include the far eastern end of the Great Western Tiers. This will be referred to as the ***Eastern Region*** and is described in detail in following sections.

Further important additions to the National Park since the original proposal in 1990 are about 29,500 ha of the Central Plateau World Heritage area, Devils Gullet State Reserve, Wet Cave Reserve, about 900 hectares adjacent to Dogs Head Hill, about 400 hectares of lowland and footslope forest between the Meander River and Sales Rivulet, and about 1100 hectares on top of the Cluan Tiers.

The Park includes most of the State Forest on the escarpment and extends up onto the plateau. The plateau included in the Western Region is on the World Heritage list. The plateau included in the Eastern Region is not on the World Heritage list.

Overall, the Park extends from the Lake Mackenzie Road, southwest of Western Bluff to the north eastern edge of Lake Sorell. Quamby Bluff, Warners Sugarloaf and Archers Sugarloaf are included. Outliers include Dogs Head Hill, Kubla Khan Cave Reserve, King Solomons Cave Reserve, Wet Cave Reserve and the top of the Cluan Tiers.

The boundaries are illustrated in Map 1.

A detailed boundary description is given in Appendix A.

1.4 PLUC Recommendations

The Tasmanian Public Land Use Commission (PLUC) (1995) has recommended that all the Forest Reserves and State Reserves on the escarpment should be amalgamated under one management authority as a Western Tiers National Park. These are: Devils Gullet State Reserve, Marakoopa Caves State Reserve, Liffey Falls State Reserve, Meander Forest Reserve, Liffey Forest Reserve and Drys Bluff Forest Reserve. It was also suggested that areas of State Forest which are assigned reservation status and parts of the Central Plateau could be added to the National Park. The PLUC proposal is illustrated in Map 2. These recommendations are all subsumed in the Great Western Tiers National Park described herein.

The present document has been submitted as part of the Great Western Tiers National Park Campaign's response to the Public Land Use Commission's Land Classification Inquiry.

1.5 Escarpment and Plateau

The release of the present document is timely, with major land use decisions being undertaken at a State and Federal level. The Great Western Tiers has "fallen through the cracks" on too many occasions. For example, it has been placed astride two Nature Conservation Regions, despite the fact it is a clearly delineable bio-geographic unit. **The value of the escarpment and plateau is as a whole in an earth science sense, a biological sense and a landscape sense. This proposal deliberately places the escarpment in its proper context with the plateau above. The two are parts of a continuum which needs to be protected in its entirety.** If forestry is allowed to continue unchecked then the integrity of the Central Plateau (and parts of the World Heritage Area) will be forever compromised.

The calls for the ***Western Region*** to become a National Park received widespread support at the local, national and international level. Despite this support and its international obligations the Federal Government has seriously failed to meet its obligations to protect this area. A failure to protect the forests of the oustanding region documented in this proposal will represent a fundamental failure of the Commonwealth Forest Policy.

1.6. Eastern Region:

All the escarpment and footslope State Forest between Cathcart Bluff and Parson and Clerk Mountain are included, as well as the continuations of these forests onto the Central Plateau west and south of Parson and Clerk Mountain, including Flash Charlies Marsh and Christmas Marshes. Also included are the Millers Bluff/Mt Franklin area, the alpine/subalpine plateau bounded by Arthurs Lake to the south and the Poatina Highway to the west, and Mother Lords Plains.

The total area of the Eastern Region is about 38,600 hectares.

1.6.1. Millers Bluff/Mt Franklin Massif

The Millers Bluff/Mt Franklin area includes Stevensons Lookout, Henrys Bluff, Millers Bluff, Molly Yorks Night Cap, Priests Marshes, Lagoon Plain, Mt Franklin, Cradle Hill and Wild Hops Hill, Mountain Creek, and Scrubby Den Rivulet. It is part of the Isis River and Lake River catchments. Escarpment forests extend beyond.

The area is virtually surrounded by escarpment and the Park includes most of the escarpment forests and all of the area above the escarpment, both forest and alpine grassland.

This important region, of some 15,500ha in extent, represents the far southeastern extent of the Great Western Tiers and has significant wilderness value.

The connection between this region and the western escarpment has been compromised by logging between Parson and Clerk Mountain and Machlanachan Sugarloaf. This connecting region is to be managed as a restoration zone, as defined in TWIG et al (1990).

1.6.2. Alpine area north of Arthurs Lake -Tumbledown Creek/Gunns Lake

Alpine areas of high conservation value adjoin the escarpment of the Eastern Region but do not yet have the protection of World Heritage status afforded to the western Central Plateau. The area north of Arthurs Lake includes the Sandbanks Tier, Starvegut Hill, Buchanan Creek, Tumbledown Creek, Allison Marshes, Gunns Marsh, Gunns Lake and Little Lake. It has been suggested that this area be called the Tumbledown Wilderness.

1.6.3. Mother Lords Plains

Mother Lords Plains is an alpine area partially included in the Central Plateau World Heritage Area. The major portion, which is under HEC tenure, is not included in the World Heritage Area. The Mother Lords Plains are contiguous with the escarpment and with the alpine area north of Arthurs Lake. Also included is the heavily forested top of Catchcart Bluff.

1.7 Northern Plateau Extension

The northern portion of the Central Plateau World Heritage area is included in the Great Western Tiers National Park. Although this plateau has World Heritage status, its management plan falls short of the protection which would be offered by National Park status.

The escarpment is systemically related to the Central Plateau, both biologically and geologically.

There is a strong public identification of this northern plateau with the Great Western Tiers, and daywalks up the Tiers onto the plateau are popular. For rational management of visitor access, it is logical for the Great Western Tiers National Park boundary to encompass those parts of the plateau which are readily accessed by daywalks up the Tiers.

It is logical that the whole upper catchments of the streams which flow down the Tiers be included in the Park. Thus, the upper catchments of Lobster Rivulet, the Dalebrook, Western Creek, Meander River, Liffey River, Brumbys Creek and Westons Rivulet are included in the Park.

These catchments do not cover the whole area accessed by daywalks. Thus, the Park also takes in the plateau above Western Bluff, the Gun Lagoon Creek catchment, Devils Gullet State Reserve, Lake Explorer, Lake Lucy Long, Lake Nameless, Lake Ironstone, the whole Mt Ironstone massif, Lake Furmage, First Bar Lake, Second Bar Lake, the top of the Wild Dog Tier, Pine Lake, Whitehorse Creek catchment, Breton Rivulet catchment and the whole of Mother Lords Plains.

The total area of this northern plateau is about 29,500 hectares

This area is shown approximately on Map 1.

2. Conservation Values

The Great Western Tiers are the most prominent and accessible natural feature of northern Tasmania, comprising forested slopes, sandstone cliffs, spectacular dolerite cliffs and boulder fields, deeply incised gorges and a multitude of streams, waterfalls, springs and swamps. They dominate the landscape, being visible from an area of at least a quarter of a million hectares.

Of importance are the steep climatic gradients, low to high altitude vegetation sequences, relationship to the Central Plateau and diversity of topography, aspect and geology.

Extensive oldgrowth forests on the slopes and benches are very important as native animal habitat. Suitable habitat is present for all Tasmanian native mammals.

The flatter areas (benches) are important intermediate altitude refuges for plant and animal species which migrate, over thousands of years, up or down the escarpment due to climate change. The perched swamps are each a unique experiment in ecosystem development and are likely to contain valuable fossil records in the deep mud.

The vegetation of the Tiers includes many communities of wet eucalypt forest, dry eucalypt forest, rainforest and subalpine forest, as well as shrublands, sphagnum peatlands, sandstone cliff communities and montane grassland.

The dry eucalypt communities have very high value, because of the poor reservation of this type in the region.

Beautiful stands of King Billy Pine and Pencil Pine are found in the gorges and other sites sheltered from fire. These stands represent the eastern limit of these species and are of very high conservation value.

The Mole Creek end of the escarpment is one of Australia's most renowned karst areas, especially for the beauty and variety of the natural cave decorations.

The Tiers are important for the maintenance of adjoining wilderness around Mt Ironstone and the Wild Dog Tier. Significant wilderness exists within the Park south of Millers Bluff and on Mt Ironstone.

The conservation values are presented in more detail in the following sections:

2.1. Eastern Region

2.1.1. Flora

Kirkpatrick, Moscal and Askey-Doran have recently published a study of the flora of the eastern region (April 1994) which partly overlaps previous studies of the western region (Kirkpatrick et al , 1986, 1987, 1988). This study covers the forests of the escarpment and extends onto the Central Plateau over areas proposed for inclusion in the eastern region of the Park. This approach illustrates the integral nature of the alpine/subalpine environment of the plateau and the forests of its escarpment. The variety of plant communities in close biological connection is a superlative feature of the Great Western Tiers.

The 27 plant communities identified in the recent study Kirkpatrick et al (1994) add to the 28 wet forest communities, 3 callidendrous rainforest communities, other rainforest communities (athrotaxis, sphagnum, riverine), sandstone cliff communities and dry forest communities already identified in previous studies (see Appendix B Section B.2).

The 27 plant communities identified in the recent study, most of which lie in the eastern region, include:

Triglochin procera - Isoetes gunni aquatic herbfield

Eucalyptus pauciflora - Cyathodes parvifolia open forest

Helichrysum hookeri - Pultenacea juniperina alpine shrubland

Richea acerosa - Restio australis alpine heath

Eucalyptus coccifera - Richea scoparia scrub

Orites acicularis - Cryptandra alpina alpine heath

Pentachondra pumila - Pernettya tasmanica grassy mat heath/bolster heath

Orites acicularis/Richea scoparia - Grevillea australis heath

Eucalyptus coccifera/E. urnigera - Cyathodes parvilfola open scrub

Orites revoluta - Richea acerosa open scrub

Eucalyptus coccifera/E. archeri - Orites revoluta open scrub

Orites revoluta - Richea scoparia heath

Nothofagus cunninghamii - Olearia pinifolia open/closed scrub

Nothofagus cunninghamii - Tasmannia lanceolata closed forest

(Eucalyptus delegatensis)/Leptospermum lanigerum - Tasmannia lanceolata open forest

Euvalyptus delegatensis - Poa gunnii open forest

Myriophyllum variifolium - Villarsia reniformis aquatic herbfield

Eucalyptus delegatensis - Bedfordia salicina open forest

Eucalyptus delegatensis - Hakea lissosperma open forest

Eucalyptus dalrympleana - Aceana novae-zelandiae open forest

Eucalyptus delegatensis - Dicksonia antarctica open forest

Eucalyptus delegatensis - Nothofagus cunninghamii open forest

Nothofagus cunninghamii - Atherosperma moschatum closed forest

Eucalyptus viminalis - Notelaea ligustrina open forest

Eucalyptus obliqua - Olearia argophylla open forest

Eucalyptus obliqua - Bedfordia salicina open forest

Eucalyptus amygdalina - E. viminalis open forest

7 wet forest communities (AM0, AM1, DAL00, DAL10, DEL0111, VIM0011, VIM0101) were identified in the eastern region. These communities are described in Appendix B.

Kirkpatrick et al (1994) describe the vegetation in general terms:

"The most extensive major vegetation types within the Great Western Tiers National Estate listing are Eucalyptus delegatensis forest..., the eastern alpine complex...., Eucalyptus coccifera forest..., inland grassy forest dominated by Eucalyptus amygdalina..., Eucalyptus delegatensis tall forest..., Eucalyptus amygdalina tall forest....The eastern alpine complex is the most concentrated in the listing of any of these vegetation types..., followed by Eucalyptus coccifera forest..., Eucalyptus amygdalina tall forest...., Eucalyptus delegatensis forest..., inland grassy forest... and Eucalyptus delegatensis tall forest..."

"....the plateau is largely covered by Eucalyptus coccifera scrub/forest and alpine vegetation with some small areas of Athrotaxis cupressoides woodland, Eucalyptus delegatensis forest and E. pauciflora forest....The alpine vegetation largely consists of heath on well-drained rocky sites, bolster heath, short alpine herbfield or sedgeland on poorly-drained sites and tussock grassland on moderately to well-drained sites with deep soils. The deeper soils are most common in treeless valleys below the climatic treeline, which is situated at approximately 1350m. E. pauciflora and E. coccifera intergrade with the latter species occurring at higher altitudes, and usually forming the treeline. However, on steep slopes, especially where cliffs are prominent above the treeline, E. delegatensis is the treeline species. In

general, E. delegatensis forest tends to occur on more sheltered and less frosty sites than either of E. pauciflora or E. coccifera-dominated communities. Athrotaxis cupressoides woodland is restricted to places, such as block streams and Sphagnum bogs, that are protected from fire....Eucalyptus gunnii woodland/forest is found on the margins of poorly drained flats in the E. coccifera zone....."

"Along the (western) *scarp of the Great Western Tiers a narrow belt of Nothofagus cunninghamii scrub/rainforest, interspersed with small areas of Athrotaxis selaginoides rainforest in fire-protected niches, is found on the upper parts of the blockstream below the plateau. E. delegatensis forest is found below this zone, with some small areas of Eucalyptus archeri scrub/forest on shelves. Tall E. delegatensis forest is found below this zone. This vegetation type usually has a broad-leaved shrub or rainforest understory. On the drier aspects of the lower slopes E. obliqua becomes shorter, has a schleromorphic understory, and is often mixed with E. viminalis and E. amygdalina. Within the tall forest belt, rainforest is common in valleys and on south-facing slopes. Where the rainforest has been burned, a seral community dominated by Acacia dealbata is found."*

"The eastern scarp of the Great Western Tiers receives considerably less precipitation for any particular altitude than the (western) *scarp. Consequently, rainforest and tall eucalypt forest are less common, the typical altitudinal sequence being from E. amygdalina inland grassy forest on the dry lower slopes to E. delegatensis forest on the upper slopes."*

Kirkpatrick et al (1994) describe the conservation status of the plant communities:

"The low altitude forests on the interface between wet and dry schlerophyll are the most significant for nature conservation in the unreserved part of the area, with the exception of the grassy forest dominated by E. amigdalina and E. viminalis which occurs in the driest lowland parts of the study area.."

"The most important areas for community conservation in the study area are the treeless subalpine grasslands and wetlands south of Sandbank Tier and Millers Bluff...."

Kirkpatrick et al (1994) describe the flora:

"..The 511 native higher plant species observed in the area constitute almost a third of the native flora of the State, including approximately the same proportion of the Tasmanian endemic plant species...."

Kirkpatrick et al (1994) describe the conservation status of the higher plant species:

"The nationally rare and threatened higher plant taxa found in the study area are concentrated in the alpine/subalpine environments. The most significant species is the nationally vulnerable annual, parasitic herb, Euphrasia scabra...."

"Pernettya lanceolata is also vulnerable at a national level....."

"Epilobium willisii, Viola cunninghamii, Phebalium montanum and Pimelea pygmaea are nationally rare plants with centres of distribution within the alpine areas of the eastern Central Plateau. Eucalyptus archeri and Epacris acuminata are nationally rare species found in the forests of the study area. Only the former species has its centre of distribution on the eastern Central Plateau. Carex raleighii, Danthonia nitens and Festuca plebeia are nationally rare species of montane grassy ecosystems."

"Only a few of the higher plant taxa found in the eastern part of the study area are thought to be unreserved in Tasmania. These are Epilobium billardieranum ssp. hydrophilum, Agrostis australiensis, Veronica serpyllifolia, Carex capillacea and Juncus revolutus. These are found in the (eastern) part of the study area, which is one of the driest subalpine areas in the State. They are predominantly species of grassy ecosystems."

"Most of the rare taxa found in the study area are reserved, and not nationally rare and threatened, but are regarded as rare in Tasmania....Most of the species have the centre of distribution in the alpine and subalpine zones of the Central Plateau. The relative fertility and low rainfall of this area makes it distinct within Tasmania....The most significant of these species is Amphibromus macrorhinus, which is considered to be endangered on a statewide basis. It occurs on an island studded, species rich wetland of high biological and geomorphological importance on Lagoon Plain, north of Lake Sorell.'

2.1.2. Fauna

The Eastern Region extends the diversity of habitats offered by the Western Region, as evidenced in 2.1.1 Flora.

The Millers Bluff area is important habitat for Bettongs. (Driessen et al 1990)

Richardson (1990) identified the catchments of the Great Lake, Arthurs Lake and Lake Sorell as areas of high zoological conservation value with respect to aquatic fauna in those lakes. The fauna included native fish (*paragalaxias eleotroides, paragalaxias dissimilis, galaxias tanycephalus, paragalaxias mesotes* and *galaxias auratus),* crustaceans *(onchotelson brevicaudatus, onchotelson spatulatus, uramphisopus pearsoni, mesacanthotelson setosus* and *paranaspides lacustris)* and molluscs (*glacidorbis pawpela* and *ancylastrum cumingianus).*

Podger et al (1990) identified the Gunns Lake area as containing rare and endangered fauna (and flora).

The Great Western Tiers are a stronghold for the White Goshawk, which is classed as rare and its habitat threatened. The Great Western Tiers are also a stronghold for the Tasmanian Wedge Tailed Eagle, which is classed as vulnerable to extinction.

2.1.3. Wilderness

The Australian Wilderness Inventory (Lesslie et al 1988) identified a significant wilderness area on the Millers Bluff/Mt Franklin massif and in the Tumbledown Creek/Sandbanks Tier area.

2.1.4. Cultural

The area has a very significant Aboriginal cultural resource. It has a number of very significant and important Aboriginal sites, including prominent sites in the vicinity of the lakes and the various sandstone cliff rock shelters. The full extent of Aboriginal sites is not restricted to those areas. They are located through the entire landscape.

Any future management structure must include the views of local Aborigines and the Tasmanian Aboriginal Land Council in terms of the management of the Aboriginal cultural resource and may also need to include consultation with local Aborigines and the Tasmanian Aboriginal Centre with regard to Aboriginal rights to the land.

The Tasmanian Aboriginal Land Council will provide any information on the significance of the Aboriginal cultural resource.

2.2. Western Region

The conservation values of the Western Region as presented in TWIG et al (1990), with some revisions, is given in Appendix B.

2.3 Northern Plateau

The botany of the World Heritage plateau included in the Park are partly described in Kirkpatrick et al (1994). The eastern alpine complex identified in that study extends to the west of Great Lake.

The northern edge of the Central Plateau encompased by the Park contains a large part of the highest altiude areas on the Central Plateau, which is tilted from north to south. Two surfaces (Davies 1959) have been identified in this area, the Higher Plateau Surface (1190 m - 1340 m) which comprises the majority of the area, and the High Monadnocks (1340 m - 1610 m) which in the proposed park are the Mt Ironstone Massif, the Wild Dog Tier and the Sandbanks Tier Massif.

The Central Plateau terrain is of outstanding geological and geomorphological significance. While the National Park does not contain all the terrain it contains extensive areas of both the erosional and

depositional glaciated landscape, a legacy of the last glaciation, as well as areas subjected to peri-glacial processes. This glacial legacy, particulaly the lakes and tarns in the southwest of the National Park, was one of the major reasons for the World Heritage listing of the Central Plateau. The Plateau and escarpment edge have been identified as containing a number of individual earth science features of conservation significance eg the slab topples near Nells Bluff, Lake Explorer, Lake Nameless patterned ground, block glacis at Pine Lake and the ice spillover area associated with Lobster Rivulet (Dixon 1991).

The Central Plateau contains the largest contiguous area of treeless high country in Australia (Kirkpatrick 1983). Levels of endemicity and local endemicity are very high (Kirkpatrick and Brown 1984a, b). The vegetation has been classified into a series of communities by various authors eg Jackson (1972) and Kirkpatrick and Dickenson (1984a). Jackson (1972) describes idealised communities on the Central Plateau by altitude and rainfall. The diversity and fragility of much of this vegetation has meant that fire and erosion have had a major impact in the last 100 years (Kirkpatrick and Dickinson 1984b). A new and ominous threat has appeared with the discovery of a cold tolerant *Phytophthora* which is attacking a number of species (including Pencil Pine) near Pine Lake.

The Northern Plateau Region contains some of the most significant stands of conifers remaining on the eastern half of the Plateau.

Despite the bleak and often inhospitable conditions prevailing on the Central Plateau, several mammals are reasonably abundant there. Amongst the grazing mammals the Bennetts wallaby is often seen, particularly in the early morning and later afternoon, and the presence of wombats, which are mainly nocturnal, can be detected from their square-shaped faecal pellets. The eastern quoll and Tasmanian devil, two of Tasmania's unique marsupial carnivores, occur on the Plateau. The eastern quoll's diet includes insects, fruit, small mammals and birds. Crayfish are a common dietary item on the Plateau.

Small mammals such as native rats and marsupial mice are more common in the forests on the Tiers than on the Plateau. This is also the case for the arboreal species such as the brushtail possum, ringtail possum and pygmy possum. However, they all can be found on the Plateau in small pockets of suitable habitat.

The platypus is found in many of the numerous lakes which occur throughout the Plateau. Its footprints can sometimes be seen in the snow where it has moved overland from one lake to another.

The northern plateau is well endowed with Lakes and Tarns. These are home to a significant vertebrate and invertebrate fauna. This area contains populations of the rare galaxid *Paragalaxias julianus*. This species is confined to the Central Plateau. The area is a major stronghold for the Tasmanian mountain shrimp *Anaspides tasmaniae,* a species of great evolutionary significance.

The international and national significance of this area, and its vulnerability, should be translated into an appropriate level of reservation and management, that is National Park status or better.

3. Threats to Conservation Values

Kirkpatrick et al (1994) describe the threats to National Estate values:

"The forests of the study area lie largely within areas available for logging. Large parts of these forests, especially at lower altitudes, have been selectively logged in the past and clearfell coupes are scattered along the upper slopes of the Tiers. Clearfelling severely reduces the naturalness of the forest, and can lead to the introduction of exotic plant species....."

"Four wheel drives and bulldozers have damaged limited areas in the south of the study area. Unfortunately, the four wheel drive damage has been concentrated in the grasslands, which have a relatively high conservation significance."

"....The remaining areas of rainforest dominated by Diselma archeri and Michrocachrys tetragona are threatened by fires lit on roads and adjacent farmland."

"Populations of wild goats and deer have become established on the Tiers. If these populations grow they may threaten some elements of the flora and vegetation."

3.1 Visitor Management

The number of walkers using the Tiers and adjoining plateau is likely to increase. Strategies will need to be adopted to protect the Park. The Western Tiers Campaign (1993) put forward a management plan for the Western Region, which is the part of the Park likely to receive the greatest visitation. This Management Plan complements the Track Management Strategy of the Parks and Wildlife. Service. The general strategy is to develop a few areas so they can cope with larger numbers of users and to promote those areas, while leaving most of the tracks and caves unpublicised.

3.2 Restoration Zones

Some areas of the Park have been degraded by logging, off-road vehicles and arson. It will be necessary to monitor these areas and undertake restoration work. The main areas for restoration are detailed in Appendix A.

The Western Tiers Campaign (1993) also proposed the closure of a number of access roads to improve the remoteness of some areas.

4. Bio Regional Analysis and Adjacent Land Use

The Great Western Tiers are biologically important in their own right and as part of a larger bio-region. They lie at the north and eastern extreme of Nature Conservation Region 8 and also lie partly in Nature Conservation regions 4A and 4B.

4.1. Upper Boundary

The Central Plateau World Heritage Area adjoins most of the upper boundary of the Western Region and is partly included in the Park. This alpine area is of great natural diversity and significant wilderness value. No activities should be allowed in this area which do not maintain or indeed improve the natural values. The proper management of the Great Western Tiers as a National Park will add to and protect the values of these adjoining wild places.

Closure of the Lake Field 4wd track would greatly improve the integrity of this area.

The extension of the Walls of Jerusalem National Park across the plateau to meet the Great Western Tiers National Park is recommended.

About 4,000 to 5,000 hectares of apparently wild country exists between the Great Lake and Arthurs Lake. It stretches approximately from Tods Corner in the south to Starvegut Hill in the north. Much of this area is over 1200 metres altitude. It lies just outside the area studied by Kirkpatrick et al (1994). It is likely to be of high conservation value and should be investigated with a view to eventual inclusion in the Park. Most of this area is in the Central Plateau Protected Area and some is under HEC tenure.

4.2. The South Eastern End

The escarpment extends beyond the south east extreme of the Park. Beyond Mt Franklin lies the Tunbridge Tier. The Crown forest on the eastern face of the Tunbridge Tier is a Recommended Area for Protection (RAP) and should be managed for secure conservation of its dry eucalypt forest. Beyond the Tunbridge Tier lies private land and then a further RAP on Table Mountain.

The escarpment forests on the western side of the Lake River above Regents Plain should be assessed for their conservation value.

It is recommended that the escarpment forests outside the Park be left intact to at least maintain biological connections between the Park and other parts of the State.

4.3. The Western End

The escarpment continues beyond Western Bluff to the upper Mersey Valley. This region has high conservation value in its own right and connects the Great Western Tiers with the forests of western Tasmania.

Dogs Head Hill forms part of a connection between the western end of the Great Western Tiers, Mt Roland and the Gog Range, although this connection is threatened by logging.

4.4. Lower Boundary

The lower boundary is mostly adjoined by privately owned land with some State Forest. This adjoining land consists of native forest, eucalypt plantation and cleared land.

The cooperation of adjoining land managers will be sought to minimise any adverse impacts of their activities on Park values.

In some instances, adjacent land managers may choose to extend the conservation management offered by the Park. This may include leaving intact any privately owned footslope forests which are in good condition or protection of karst lying under private land.

It is recommended that the Park be extended underground to take in the valuable karst at the western end which lies under private land. This would add continuity to the management of the Park and its outliers. The Mole/Lobster system would benefit greatly (see section B.7.2). The underground National Park concept has a precedent in New South Wales.

The Warners Creek Dam clearance site should be actively restored and considered for eventual inclusion in the Park.

5. Land Tenure

Most of the Park was State Forest. HEC land and Crown Land has been included. A suitable arrangement for the management of the HEC land for secure conservation and access for the owners and other Park users will be negotiated. In addition, some private land in the Drys Bluff area (241 hectares owned by the Australian Bush Heritage Fund) has been included, on the assumption that National Park status would satisfy the conservation objectives of the owners and that a suitable arrangement could be made regarding the ownership of the land.

5.1. Eastern Region

5.1.1. State Forest

All the escarpment forests are State Forest. A small area of "Deferred" State Forest lies on the plateau around Flash Charlies Marsh. The whole of the Millers Bluff/Mt Franklin massif is State Forest. Much of the Sandbanks Tier and the plateau to the east is a Timber Reserve.

5.1.2. HEC Land

Mother Lords Plains and a substantial area of plateau around Gunns Lake are under HEC tenure.

5.1.3. CPPA

The plateau south of Sandbanks Tier is part of the Central Plateau Protected Area.

5.2 Western Region

The Western Region is primarily State Forest with the exception of the various State Reserves. Much of the western end is "deferred" State Forest. Four Forest Reserves are included.

5.3 Northern Plateau

This region is mostly in the Central Plateau Protected Area with small portions in a central Plateau Conservation Area. Devils Gullet is a State Reserve.

6. Conservation Tenure

6.1. Eastern Region

6.1.1. National Estate

All of the eastern region is on the Register of the National Estate. The National Estate boundaries actually extend beyond the Park boundary onto private land. (see 4.2)

6.1.2. RAPS

Two Recommended Areas for Protection lie within the Eastern Region. They are the Millers Bluff RAP and the Mountain Creek RAP.

6.1.3. World Heritage

WTC (1993) recommended the addition of eastern alpine areas to the Central Plateau World Heritage Area.

6.2. Western Region

Most of the Western Region is on the Register of the National Estate, on the Interim list, or nominated. Drys Bluff Forest Reserve, Liffey Forest Reserve, Meander Forest Reserve and Marakoopa Cave State Reserve are on the World Heritage list. All the adjoining plateau in the Western Region is on the World Heritage list, apart from the Mother Lords Plains.

Three Recommended Areas for Protection are the Dogs Head Hill RAP, the Jackeys Creek RAP and the Poatina RAP.

6.3 Northern Plateau

This region is all inscribed on the World Heritage Register and the National Estate Register.

6.4 Category 1 Reserves

It is proposed that identified key sites for biodiversity conservation, eg sphagnum sites and other fragile plant communities together with all identified wilderness areas should be managed as IUCN Category 1 Reserves within the National Park.

*It should be noted that all these RAPs may be put into a tenure that would allow mining and other land uses which are not compatible with conservation of biodiversity.

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Appendix A: Detailed Boundary Descriptions

A.1 Western Region

Tasmanian Lands Department 1:25000 series maps were used for the western region boundary definition. These included:

Liena, Sheet 4239, Edition 1, 1982

Gog, Sheet 4440, Edition 1, 1981

Mole Creek, Sheet 4439, Edition 1, 1981

Lake Mackenzie, Sheet 4438, Edition 2, 1984

Quamby Bluff, Sheet 4638, Edition 2, 1987

Breona, Sheet 4637, Edition 1, 1982

Liffey, Sheet 4838, Edition 1, 1982

Poatina, Sheet 4837, Edition 1, 1982

Starting at a point 41808800 where the Lake Mackenzie Road meets the Central Plateau Protected Area (CPPA) boundary. Follows the top side of the Lake Mackenzie Road to a point 36609275 then follows road generally west to a point 35909295; from there generally north down ridge to the Mersey Forest Road at 35709490; continues down ridge to Mill Creek at 35409525 then follows Mill Creek a short distance to Mersey River at 35359520; then follows Mersey River to Croesus Cave State Reserve boundary at 35109640; follows River (Reserve boundary) to end of Reserve boundary at 35209775; proceeds generally east to intersection with State Forest boundary at 35509770; from here follows State Forest boundary generally north to intersection with King Solomons Cave State Reserve boundary at 36309965; follows King Solomons Cave State Reserve boundary generally north then east then south back to intersection with State Forest boundary at 37059870; then follows State Forest boundary to a point 41009780; then goes generally south to a point 40859705 at intersection with Marakoopa Cave State Reserve; follows Reserve boundary generally east then south to intersection with State Forest boundary at 41959615; follows State Forest boundary generally north to a point 44009810; then in a straight line east to intersection with State Forest boundary at 45409800; then follows State Forest boundary to intersection with Baldocks Cave State Reserve boundary at 45209660; follows Reserve boundary east to 45609660; follows Reserve boundary south to 45409570; then west to intersection with State Forest boundary at 45059580; follows State Forest boundary generally south and west to intersection with private land boundary at 43459430; then south to 43409405; then east to State Forest block at 44609385; follows State Forest and Tenure boundary to intersection with Crown Land block no 1121 at 46459375; then follows Crown Land/private land boundary round blocks 1124, 1121 and 1123 to intersection with Westmoreland Falls Waterfall Reserve at 48659245; follows Reserve and private land boundary generally east to 49959220; then follows Crown Land/private land boundary around Crown Land Block nos 994, 995 and 996 to intersection with State Forest boundary at 51809075; then follows State Forest boundary generally east and south to the intersection with Dale Brook at 55458685; then generally east to Dale Brook Road at 55908680 on the 600m contour; then follows 600m contour to unnamed creek at 57958665; then follows creek north to 500m contour at 57708690; then follows 500m contour to intersection with private land at 58808770; then follows private land/State Forest boundary to a point 64208515 including Crown Land Block 1115; from point 64208515 in a straight line to intersection with 750m contour at 64008500; then follows 750m contour generally west to intersection with Mother Cummings Rivulet at 61258425 and from there in a straight line to the Smoko Creek at 60808370; then follows Smoko Creek to junction with Mother Cummings Rivulet; then follows Mother Cummings Rivulet to junction with Meander River; then follows Meander River to the northeast corner of private land block 1346; then follows the private land boundary generally south then east to Sales

Rivulet; then follows Sales Rivulet generally south to the 710m contour at 64907934; then following contour to intersection with Bessels Road at 67407888; then in a straight line generally northeast to intersection of Dunning Rivulet and private land block at 67757920; follows private land boundary east then north to a point where private land boundary intersects with Old Transmission Line Track at 67908220 then follows Track generally north and north-east to intersection with 410m contour (approximate full supply level for the proposed Meander Dam); around contour to a point 68408420; crosses Meander River to 410m contour at 68208420; follows contour to intersection with private land boundary at 67158505; follows private land boundary around Archers Sugarloaf to Meander River at 69258715; follows Meander River to intersection with Crown Land block at 6908815; follows Crown Land boundary to intersection with State Forest boundary at 69708775; then follows State Forest boundary around Pats Saddle and Quamby Bluff to intersection with 650m contour at 72908850; then along 650m contour to State Forest boundary at 74059000; then south to intersection with Quamby Bluff Forest Reserve boundary at 7402589700; then follows Forest Reserve boundary to intersection with State Forest boundary at 76258630; then follows private land boundary to intersection between private land block 1390 and Crown Land block 1389 at point 75558450 (nb: the purchase of this private land block as an addition to the Park would be highly desirable);(the area includes Crown Land block 1389 but excludes all private land in Jackeys Marsh);from point 75558450 generally south to 75508425; then generally east along private land boundary to intersection with Lake Highway at a point 77258370; then follows the Liffey Forest Reserve boundary, initially north along the Lake Highway to 77658405; then follows lower Reserve boundary to Liffey Falls State Reserve (includes the Liffey Falls State Reserve); from a point 81708400 follows private land boundary of block 0045 to the Liffey River then follows Liffey River generally east to the boundary of private land block 0049 then follows private land boundary generally east then south to a point 90057235 at intersection with HEC Land boundary; then follows HEC Land/private land boundary to intersection with transmission line at 94507160; then in a straight line to a point 94006980 on the HEC land/State Forest boundary; follows boundary to intersection with escarpment edge at 91106935; follows escarpment edge to a point 88407050; crosses Poatina Highway and rejoins escarpment edge at a point at 87757095; follows escarpment edge to CPPA boundary at 87407180; then follows CPPA western boundary to intersection with HEC boundary at 86207440; rejoins CPPA boundary at 84457480; then follows around Timber Reserve boundary then follows CPPA boundary to start at 41808800.

The adjoining area of plateau shown on Map 1 adds to the region defined above.

Outliers

Two outlier State Reserves are included in the area. One is the small addition to the Baldocks Cave State Reserve, block number 1170. The other is the Kubla Khan Cave State Reserve.

A further outlier is the Dogs Head Hill area (1164 hectares):

Starting at a point 428017 follows the private land boundary generally west and north to the intersection with the Mersey River at a point 4200348; then follows the Mersey River generally south-west to the base of Standard Hill at 3630027 then follows the ridge generaly south east to 416003 then in a straight line to the beginning at 428017. This area is contiguous with the Mt Roland Protected Area.

The Cluan Tiers outlier generally follows the southern and eastern private land boundary between Cobblers Creek and Myrtle Creek then skirts north of Cobblers Hill, taking the upper catchments of Myrtle Creek and Eden Rivulet, including the large wet area west of Cobblers Hill. The area is about 1100ha.

Restoration Areas

The Restoration Areas, where substantial forestry operations have occurred relatively recently, are located on the ridge around Dalebrook Road, beside the Meander Falls Road just above the 500m contour, on the high bench around Bessels Road, on the lower southeastern slopes of Warners Sugarloaf,

in the corridor between Warners Sugarloaf and the main escarpment, the top of the Cluan Tiers and the high bench just north of Brumbys Creek.

A further area for restoration is the quarry on the Stone Hut Track access road.

A.2 Eastern Region

The boundaries for this region are not as precisely defined as for the Western Region. Further refinement may be necessary. They have been derived from Lands Department 1:100,000 maps which include:

Meander, Sheet 8214, 1988

South Esk, Sheet 8314, 1978

Lake Sorell, Sheet 8313, 1978

From the intersection of the HEC land/State Forest boundaries at a point 940698 on the Western Region boundary, the boundary follows the State Forest boundary generally south east to a point 211395 south east of Mt Franklin then in a straight line generally west to 199396 then follows the State Forest/private land boundary generally north to 090500 then in a straight line to 103535 at the base of Stevensons Lookout then follows the State Forest boundary generally north then west to the intersection of the State Forest boundary with the Lake River Road at 069555 then in a straight line north west to the 800m contour at 064565 then follows th 800m contour to the intersection with the stream at 010549 then follows the stream up to the private land boundary at 006553 then follows the private land/state forest boundary to the HEC land boundary at 985560 then west along the HEC boundary to the shore of Arthurs Lake at 968560 then follows the shore of Arthurs Lake generally west to Scotch Bobs Creek at 917586 then follows up the creek to the tributary at 884596 then follows the tributary up to the intersection with the Poatina Road at 874595 then follows the Poatina Road generally north to the intersection with Flexmore Creek at 865652 then follows down the creek to the shore of Great Lake then follows the shore of the Great Lake to the CPPA boundary at 817693 then follows the CPPA/HEC boundary generally west then northeast to the corner of the Timber Reserve at 862744 then follows the Timber Reserve boundary to the top of the escarpment at 862747 then follows the escarpment generally southeast to the HEC/State Forest boundary at 912694 then down the HEC State Forest boundary to the beginning at 940698.

Restoration Areas

The corridor between Parson and Clerk Mountain and Maclanachans Sugarloaf has been logged recently and is important for maintaining the biological connection to the Millers Bluff area. An included area north of Stevensons Lookout has been logged recently. The Cradle Hill Conservation area needs restoration. Substantial logging has also occurred recently on the north face of the escarpment in the Little Creek/Abrahams Creek catchments.

The road from the north of Lake Sorell leading north onto the plateau should be closed at the Park boundary. Restoration work needs to be done on the subalpine grasslands damaged by 4wd vehicles.

The purchase of the embedded private land blocks near Mountain Creek and near Christmas Marshes is highly desirable.

Appendix B: Conservation Values of the Western Region

B.1. Aboriginal Heritage

The area has a very significant Aboriginal cultural resource. It has a number of very significant and important Aboriginal sites, including prominent sites in the vicinity of the lakes and the various sandstone cliff rock shelters. The full extent of Aboriginal sites is not restricted to those areas. They are located through the entire landscape.

Any future management structure must include the views of local Aborigines and the Tasmanian Aboriginal Land Council in terms of the management of the Aboriginal cultural resource and may also need to include consultation with local Aborigines and the Tasmanian Aboriginal Centre with regard to Aboriginal rights to the land.

The Tasmanian Aboriginal Land Council will provide any information on the significance of the Aboriginal cultural resource.

B.2. Vegetation

B.2.1. Introduction

The forest communities range from dry, open sclerophyll forest through various successional stages to tall wet eucalypt forest, closed rainforest and subalpine and alpine forest communities. The forests on the Great Western Tiers are a mosaic of age classes and communities with a relatively small patch size. This is largely a reflection of a varied fire history with intensity modified by aspect and topography. Most of the eucalypt forest is uneven-aged.

The impact of early logging has been to modify forest structure and favour the rain forest species on the wet sites. The retention of many mature trees in logged areas, together with uncut stands of previously inaccessible forest has ensured the maintenance of oldgrowth habitat on the Great Western Tiers

The presence of larger areas of natural regrowth of many age classes will ensure the maintenance of the eucalypt component for the foreseeable future.

The vegetation of the Great Western Tiers escarpment has been described in general by Jackson (1972) :

"At the base of the scarp the eucalypt savannah forests of the Midlands Graben consist of open communities of Eucalyptus pauciflora - E. viminalis or E. pauciflora - E. rubida in drier areas (Jackson 1965). Soma savannah of E. ovata or E. rodwayii occur where the drainage is poor in the winter. The ground vegetation of these savannahs is a tussock grassland of Poa billardieri. Themeda australis and Lomandra longifolia may predominate on clayey soils. Corridor forests of E. viminalis - Acacia melanoxylon occur on stream courses, and dry sclerophyll forests occur on low hills of sandy or lateritic soils."

"On the lower slopes of the scarp the open savannah is replaced by dry sclerophyll forests of the same tree species. These forests increase in density and height as the rainfall increases.

On areas of deep soil and sufficient moisture the ash species E. obliqua may replace the peppermint species E. pauciflora or E. amygdalina partially or completely as the dominant. The macrantherous species E. viminalis, E. rubida or E. ovata remain as associate species. Above 300m altitude these species are replaced by E. dalrympleana as the associate with E. obliqua. Due to increasing rainfall there is a structural transition from dry sclerophyll forest, with low and medium shrub layers of Epacridaceae and Leguminosae, to wet sclerophyll, with well developed tall shrub layers of Olearia argophylla and Pomaderris apetala."

"On the wetter northern and western slopes where the annual rainfall exceeds 1250mm, the climax is a rainforest of Nothofagus cunninghamii - Atherosperma moschatum. This climax is attained only in areas

topographically protected from high fire incidence (Jackson 1968). Because of the fairly regular disturbance by fire, most areas carry "Mixed" forest (Gilbert 1958), with a stratum of eucalypts over a substratum of rainforest and wet sclerophyll shrub species such as Acacia dealbata, Prostanthera lasianthos and Olearia argophylla. Near the upper lip of the scarp face (c.1000m) water availability is greatly increased by the "fog drip" or "cloud stripping" effect of the vegetation on the cloud base so prevalent around the plateau rim. Under these conditions a dwarf "elfin" rainforest or thicket of Nothofagus occurs. Nothofagus cunninghamii extends around the rim of the Western Tiers...."

"Above 450m the subalpine species become increasingly evident. E. obliqua is replaced by E. delegatensis. The E. delegatensis - E. dalrympleanea forest extends up the slope to altitudes of about 1000m or slightly higher in sheltered situations.....over much of its range E. delegatensis is growing on a relict solifluction sorted mantle. This surface is covered in many places with large dolerite boulders, though there is commonly a deep yellow-brown soil on solifluction deposits (cf. alpine humus soil) beneath, with a shallow water table. The smaller shrubs have difficulty reaching this reliable supply of water in the summer and the shrub layer is scattered and more xeromorphic on the upper slopes. Bedfordia salicina, Oleria viscosa, O. phlogopappa and Cyathodes parvifolia predominate. With increasing and more reliable precipitation near the cloud base the sub-alpine shrub belt increases in density. Around 910m dense shrubberies of Hakea lissosperma, Orites diversifolia, Lomatia polymorpha and Telopea truncata occur as a fire-determined deflection state of the climax Nothafagus thicket ..... Where fire is frequent enough to maintain eucalypts, an open woodland overstory of E. coccifera - E. gunnii or E. archerii occurs."

"At altitudes exceeding 1000m exposure to glazing winds and snow limits tree and shrub forms and only the specialised alpine communities are found. Well-drained areas are occupied by a proteaceous - epacridaceous closed heath or shrubland; while those areas receiving a high precipitation but obtaining some topographic protection from the wind, carry dwarf coniferous forest or coniferous shrubbery. Poorly drained areas carry a complex mosaic of herbfield, bog and bolster moor communities. Cold air drainage "basins" carry tussock grassland, sedgeland or bog communities...."

B.2.2. Rainforest

Kirkpatrick and Moscal (1986) and Duncan (1989) have identified a number of different callidendrous rainforest communities between Western Bluff and Drys Bluff. These are (after Jarman et al 1984):

C1. *Dicksonia antarctica - Polystichum proliferum* understoreys

(a) *Nothofagus cunninghamii - Atherosperma moschatum* over *Dicksonia antarctica*

(Low altitude Myrtle Rainforest)

(b) *Nothofagus cunninghamii - Atherosperma moschatum* over *Olearia argophylla - Dicksonia antarctica - Polystichum proliferum*

(Low altitude Myrtle/Musk Rainforest)

C2. Clear understories, sometimes with scattered shrubs

(a) *Nothofagus cunninghamii (- Leptospermum lanigerum)* over clear understory or *Telopea truncata* and/or *Tasmannia lanceolata*

(High altitude Myrtle/Lichen Rainforest)

Of these communities C1b and C2a were considered by Kirkpatrick and Moscal (1986), to be poorly reserved

B.2.3. Wet Eucalypt Forest

The wet eucalypt forests between Western Bluff and Drys Bluff have been described and analysed by Kirkpatrick and Moscal (1986), Kirkpatrick (1988) and Duncan (1989).

The dominant eucalypt species found generally followed those outlined by Jackson (1972). In addition, Duncan (1989) recorded the presence of *Eucalyptus regnans* dominated forest between the Lobster

Rivulet and Western Bluff at lower altitudes and Kirkpatrick and Moscal (1986) recorded *E. brookerana* on river flats south of Warners Sugarloaf.

Kirkpatrick et al (1988) established a floristic base for the identification of wet eucalypt forest communities and identified the Great Western Tiers as an extremely important area for the reservation of wet eucalypt forest. They recommended the area for reservation to cover 10 communities. This was more than for any other location in the state. Communities identified were:

E. amygdalina - Monotoca glauca - Pomaderris apetala - Dicksonia antarctica wet sclerophyll/mixed forest (AM0)

E. amygdalina - E. viminalis - Lomandra longifolia wet sclerophyll forest (AM1)

E. brookerana/E. obliqua - Bedfordia salicina wet sclerophyll forest (BR11)

E. coccifera - Orites revoluta - Olearia phlogopappa subalpine mixed forest (COC00) ("the centre of its distribution is the Western Tiers")

E. dalrympleana/E. delegatensis - Lomatia tinctoria wet sclerophyll forest (DAL00)

E. dalrympleana - Tasmannia lanceolata - Dicksonia antarctica mixed forest (DAL10)

E. delegatensis - Bedfordia salicina - Lomatia tinctoria wet sclerophyll forest (DEL0000)

E. delegatensis - Acacia melanoxylon - Bedfordia salicina wet sclerophyll forest (DEL0001)

E. delegatensis - Olearia phlogopappa - Olearia viscosa subalpine wet sclerophyll forest (DEL0010)

E. delegatensis - Telopea truncata subalpine wet sclerophyll forest (DEL0011)

E. delegatensis/E. viminalis - Acacia melanoxylon wet sclerophyll forest (DEL0100)

E. delegatensis/E. obliqua - Acaena novae - zelandiae wet sclerophyll forest (DEL0101)

E. delegatensis - Atherosperma moschatum - Olearia argophylla wet sclerophyll/mixed forest (DEL0110)

E. delegatensis - Zieria arborescens - Hydrocotyle sibthorpthioides wet sclerophyll/mixed forest (DEL0111)

E. delegatensis - Nothofagus cunninghamii - Grammitis billiardieri mixed forest (DEL1000)

E. delegatensis - Nothofagus cunninghamii - Gahnia grandis mixed forest (DEL1001)

E. delegatensis - Telopea truncata - Pittosporum bicolor subalpine mixed forest (DEL1100)

E. delegatensis - Hakea lissosperma - Monotoca glauca subalpine mixed forest (DEL1110)

E. obliqua - Olearia lirata - Pultenaea juniperina wet sclerophyll forest (OB010)

E. obliqua -Acacia dealbata - Olearia argophylla wet sclerophyll forest (OB0110)

E. obliqua - Malaleuca squarrosa - Monotoca glauca wet sclerophyll forest (OB0111)

E. obliqua - Nothofagus cunninghamii - Polystichum proliferum - Hymenophyllum flabellatum mixed forest (OB1000)

E. obliqua - Nothofagus cunninghamii - Monotoca glauca mixed forest (OB101)

E. ovata - Acacia dealbata - Pomaderris apetala wet sclerophyll forest (OV01)

E. regnans- Atherosperma moschatum - Acacia dealbata - Olearia argophylla wet sclerophyll/mixed forest (REG101)

E. viminalis - Bedfordia salicina - Pultenaea juniperina wet sclerophyll forest (VIM0011)

E. viminalis - Acacia dealbata - Pomaderris apetala wet sclerophyll forest (VIM0100)

E. viminalis - Acacia dealbata - Dicksonia antarctica wet sclerophyll forest (VIM0101)

E. viminalis - Nothofagus cunninghamii - Atherosperma moschatum - Dicksonia antarctica mixed forest (VIM111)

The communities selected for optimum reservation on the Great Western Tiers were AM0, AM1, COC00, DAL00, DEL0001, DEL0010, DEL0100, DEL0111, VIM0011, VIM111.

B.2.4. Dry Eucalypt Forest

The dry eucalypt forests are largely confined to the low altitude forests west of Projection Bluff, notably on Warners and Archers Sugarloaf and the lower slopes of Quamby Bluff, the forests between Drys Bluff and the Poatina Hwy and most of the Eastern Region.

Dry eucalypt forests from the area between Drys Bluff and Western Bluff are described in Kirkpatrick and Moscal (1986) and identified in Duncan (1989). These studies found dry eucalypt forests dominated by *E. obliqua, E. delegatensis, E. viminalis* and *E. amygdalina*.

Cadman (pers comm 1989) reports the presence of *E. rodwayi* dominated forest at low altitudes in Jackeys Marsh. Recently a small population of *E. pauciflora* has also been discovered.

Kirkpatrick and Moscal (1986) divided the *E. obliqua* dry forests into two groupings. The most frequent species in the first group were *E. obliqua, E. viminalis, E. amygdalina, Banksia marginata, Acrotriche serrulata, Tetratheca pilosa, Pultenaea juniperina, Lomatia tinctoria, Lomandra longifolia, Diplarrhena, bracken, Pteridium esculentum* and *Viola sieberana*. The most frequent species in the second grouping were *E. obliqua, Pultenaea juniperina, Lomatia tinctoria* and *Pteridium esculentum*.

The *E. delegatensis* dry forests occur mainly above about 650m. Kirkpatrick and Moscal (1986) divided these forests into two groupings. The most frequent species in the first group were *E. delegatensis, Bedfordia salicina, Cyathodes parvifolia, Lomatia tinctoria, Senecio linearifolius, Pteridium esculentum, Dianella tasmanica* and *Ranunculus lappaceus*. The most frequent species in the second group were *E. delegatensis, Acacia melanoxylon, Bedfordia salicina, Olearia viscosa, Lomatia tinctoria, Pultenaea juniperina, Pteridium esculentum* and *Microsorium diversifolium*.

The *E. delegatensis* dry forests on the high benches are considered transitional between dry sclerophyll and wet sclerophyll.

Dogs Head Hill is fine example of low altitude dry sclerophyll forest on karst.

B.2.5. Subalpine Forests and Shrub Lands

The cloud forests of the Great Western Tiers described by Jackson (1972) have been found to contain a very rich lichen flora (Moscal pers comm 1989).

Duncan (1989), regarding the vegetation of the Marakoopa Cave State Reserve and the non-allocated Crown land to the east, states:

"Vascular species diversity and endemic species richness tended to increase with altitude, reaching a maximum in subalpine and alpine communities. Low altitude and high altitude rainforests were rich in epiphytic species, bryophytes and lichens. The subalpine forest and scrub and the montane grassland were characterised by particularly interesting species associations, with xerophytic species (eg. Cyathodes spp., Pultenaea juniperina, Richea spp.) co-occuring with rainforest species (eg. Pittosporum bicolor, Nothofagus cunninghamii) which benefitted from orographic stripping of moisture from clouds."

Brown (1988), identified the gorges and high altitude forests of the Great Western Tiers as containing small disjunct, but widely dispersed populations of *Athrotaxis selaginoides* (King Billy Pine). The sites identified include Lobster Rivulet, Western Creek, "Little Gorge", a high bench below Mother Cummings Peak, Mother Cummings Rivulet, Smoko Creek, below Meander Falls, Staggs Creek, Sales Rivulet, Dunning Rivulet, Burnies Creek, Quamby Bluff and Brumbys Creek. Recently a population has been found on Projection Bluff. These populations are almost certainly post glacial relics.

Kirkpatrick and Moscal (1986) recommended the active conservation of the Dunning Rivulet Gorge as it contains *Athrotaxis selaginoides* and *Athrotaxis cupressoides* (Pencil Pine) and the rare hybrid between

these species *Athrotaxis laxifolia*, as do the Meander Gorge, the Western Creek Gorge and the Lobster Gorge.

The Lobster Gorge and the Dunning Rivulet Gorge contain the greatest expanses of *Athrotaxis cupressoides* forest which extends over a length of about 1.5km in both cases.

The Great Western Tiers escarpment is directly adjacent to the Central Plateau which is the largest contiguous area of alpine vegetation in Australia. Small pockets of alpine vegetation extend off the plateau and down onto exposed high ledges and benches.

In addition to this is the small alpine plateau present on Quamby Bluff. Kirkpatrick and Moscal (1986) noted: "Quamby Bluff is of particular scientific interest as an outlier of the Central Plateau alpine environment. Many of the scrub quadrats contained unreserved or poorly reserved species..."

B.2.6. Sphagnum Peatlands

Sphagnum peatlands occur in small pockets at various altitudes on the Great Western Tiers where drainage and soil conditions are suitable. A fairly substantial bog is found at low altitude in Jackeys Marsh and a sphagnum bog occurs on a high bench west of the Lobster Rivulet. Whinam et al (1989) have identified the rainforest - sphagnum mire on the sandstone shelf below Mother Cummings Peak as important and recommended its reservation:

"..Rainforest - Sphagnum mires

Nothofagus cunninghamii, Gahnia grandis and Phyllocladus aspleniifolius are the distinguishing species of the poorly reserved rainforest - Sphagnum community. This is usually found primarily at lower altitudes than the communities listed above, and is typified by peatlands in the west (Little Fisher River, Mother Cummings Peak) and north-west (Netherby Plains). In this community Sphagnum can occur in mats with emergent rainforest species, or as small discrete patches on a humic layer below a rainforest canopy."

"..Mother Cummings Peak

This mire is important for conservation purposes because it is a good example of the poorly reserved rainforest - Sphagnum mire, combined with its smooth surface morphology. It also represents the sandstone shelf geomorphological niche. There are some potential hydrological problems created by the bulldozing of a road upslope from the mire, but these have been mitigated by subsequent action by the Forestry Commission."

This swamp has *Athrotaxis selaginoides* associated with it.

B.2.7. Sandstone Cliff Vegetation

The sandstone cliffs of the Great Western Tiers between Billop Bluff and Mother Cummings Peak are a major and imposing geological feature. They provide an extremely rich and diverse variety of habitats.

Kirkpatrick and Moscal (1986) identified the vegetation of the cliffs as quite distinct:

"Group 9 consists of quadrats associated with the shallow soils of sandstone cliffs and their environs. The Quadrats are floristically very distinct with high constancies of the shrubs Gaultheria hispida, Monotoca glauca, Aristotelia peduncularis and Epacris impressa, the graminoid, Dianella tasmanica, the fern, Blechnum chambersii, and the herbs, Stylidium graminifolium and Galium australe. The vegetation type represented by the quadrats in this group has not been recorded in the literature. Although Martin (1940) noted the distinctiveness of the vegetation of the sandstone shelves at the same altitude on Mt. Wellington, there are substantial differences in floristics and dominance between the two areas as well as some significant floristic communalities. The conservation status of this particular vegetation type is unknown. However, the 40% of quadrats with unreserved or poorly reserved species suggests that it may be poor."

Coates (1988) produced a thesis based on studies of cliffs contained within the National Park. This included a detailed description of the geomorphology and vegetation of the cliffs. Coates further stressed the high conservation status of the cliff vegetation:

"Despite their imposing appearance, the sandstone cliffs of the Western Tiers support vegetation which is highly vulnerable to disturbance. Forestry operations and the associated threat of fire and weed invasion (Kirkpatrick and Moscal 1986) as well as removal of the canopy cover, which provides the necessary shade for fern communities, at present threaten the existing plant communities. Sandstone shelves recorded by Martin (1940) on Mt Wellington have since been burnt, with little recovery of the vegetation other than some crevice species. Furthermore, increased recreational use, such as rock climbing, can only degrade the cliff flora."

"The protection of cliff vegetation from these activities is long overdue in Tasmania. The Jackeys Marsh-Quamby Bluff area is included on the Register of the National Estate which, although not providing protection, does serve to accentuate the cultural and botanical values of features such as the cliffs. Kirkpatrick and Moscal (1986) reported that 40% of the sandstone cliff quadrats in their survey contained unreserved or poorly-reserved species. These species, including Deyeuxia accedens (poorly reserved, endemic) and Poa jugicola (possibly endemic and unreserved) were both recorded on the cliffs during this survey. The vegetation type has not been previously recorded in the literature other than by Kirkpatrick and Moscal (1986), and its reservation status is unknown. The relatively rich flora of these cliffs is unparalleled by sandstone cliffs in the drier parts of the state and there is an urgent need for their conservation."

B.2.8. Grassland

Duncan (1988) recorded the presence of a montane grassland within the Marakoopa Cave State Reserve. The area is important for a number of grassland species most notable of which is *Poa jugicola*, a species almost certainly confined to the Western Tiers region, and *Deyeuxia accedens*.

B.2.9 Riparian Vegetation between Warners and Archers Sugarloaf

Kirkpatrick and Moscal (1986) state:

"Group 12 consists of three quadrats located in lowland riverine vegetation along the Meander River and Jackeys Creek. These quadrats have a fascinating species mix including highland species, such as Podocarpus lawrencii and Athrotaxis cupprossoides, wet forest species, such as Nothofagus cunninghamii, Phebalium squameum, Tasmannia lanceolata, Notelaea ligustrina and Monotoca glauca, dry forest species, such as Exocarpus cupressiformis, Banksia marginata and Bossiaea riparia, and characteristically riverine species, such as Epacris exserta and Leptospermum lanigerum. The nearest analogue to this fascinating community that is recorded in the literature is the riverine vegetation of the middle Douglas River (Duncan 1983). There seems little likelihood that the type of riverine vegetation found in the study area will be found to occur within the present State Reserve system. The best possibility would be within the Alum Cliffs State Reserve. All quadrats in this group contain unreserved plant species. The riverine community is particularly susceptible to severe transformation as a result of the invasion of exotic shrubs and trees, which can always find moist, bare ground for establishment. Thus, it is extremely important to maintain catchments free of the most deleterious of the introduced taxa, such as Ulex, Salix and Rubus, if such communities are to be maintained."

B.2.9. Other Important Species

Kirkpatrick and Moscal (1986) state:

"The areas that deserve the most attention on the part of authorities concerned with conservation are those containing populations of Epacris exserta and Pernettya lanceolata, as the available information suggests that both these species are in danger and that the study area is the best location for efforts directed towards their preservation. The study area may also be one of the best locations for preservation of the important Tasmanian gene pool of Glycine latrobeana."

Harwood and Edwards (1988) identified *Glycine latrobeana* and *Pomaderris phylicifolia* on Warners Sugarloaf.

Kirkpatrick and Moscal (1986) identified a number of areas of extremely high conservation significance outside the Jackeys Marsh - Quamby Bluff area:*"..populations of Pernettya lanceolata, Deyeuxia accedens, Deyeuxia benthamiana* and the new *Poa* species*, ..."*

Duncan (1989) identified a number of poorly conserved species in the Marakoopa Cave State Reserve and on the adjoining non- allocated Crown land. These were *Pterostylis decurva, Pimelea cinerea, Hymenthera dentata, Asplenium trichomanes, Drapetes tasmanicus* and probably *Pernettya lanceolata.*

B.3. Fauna

B.3.1. Introduction

The bio-geographical importance of the Great Western Tiers in relation to Tasmanian native fauna should not be underestimated. The diversity of habitats is special. Suitable habitat for all species of native mammals is currently found in the area. (Statham 1981, Kelly and Hunt 1989)

The geographical location of the Great Western Tiers combined with the diversity of microclimates, steep climate gradients, low to high altitude vegetation sequences, diverse topography and proximity to the Central Plateau are most significant. It may be argued that the Great Western Tiers can serve as a central gene pool for all species of Tasmanian native mammals. The region is presently connected to most other parts of Tasmania through habitat which is suitable for the dispersal of most species of native mammal.

B.3.2. Mammals

Excluding Homo sapiens there are 35 species of land mammals native to Tasmania. The Great Western Tiers area is unique in Tasmania with its diversity of fauna, probably containing all 35 species up until recent times.

Extensive oldgrowth forests provide habitat for dependant species.

The Thylacine has been positively identified and recorded as inhabiting the area in the past, but the only evidence of present occupation is some reported sightings.

Two other species have not been positively identified in the area recently, these being the Forester Kangaroo and the Broad-toothed Rat.

Thylacinidae and Dasyurids

1.*Thylacine* (Tasmanian Tiger) - endangered, wholly protected

Once a common inhabitant, reported sightings in recent years are the only evidence of presence..

2.*Sarcophillus harrisi* (Tasmanian Devil) - common, wholly protected

Found throughout the Great Western Tiers at all altitudes, including the Plateau. Very important role of preventing potential spread of disease from rotting animal matter, through their carrion feeding nature.The sudden decline in Dasyurid spp numbers in recent years, attributed to Trichonella spirosis, indicates the vulnerability of our native animals in the longer term.

3.*Dasyurus maculatus* (Spotted Tailed Quoll) - common to sparse, wholly protected, inhabitant throughout the Great Western Tiers.

The distribution of this quoll has been greatly reduced, particularly on the east coast of mainland Australia, where it is becoming so thinly distributed that it will be unable to survive. Tasmania is considered its stronghold.

4.*Dasyurus viverrinus* (Eastern Quoll) - locally common in Tasmania; rare, possibly extinct in mainland Australia, inhabitant throughout the Great Western Tiers.

5.*Antechinus swainsonii swainsonii* (Tas sub species) (Dusky Antechinus, Marsupial Mouse) - abundant in suitable habitat, wholly protected, inhabitant throughout the Great Western Tiers.

6.*Antechinus minimus minimus* (Tas sub species) (Swamp Antechinus, Little Marsupial Mouse) - rare, wholly protected, threatened by destruction of its limited preferred habitat, particularly by too frequent burning.

7.*Smithopsis leucopos leucopus* (White Footed Dunnart) - wholly protected.

"Probably occur in Great Western Tiers" (Statham 1981)

8.*Ornithorhynchus anatis* (Platypus) - common but vulnerable, wholly protected, distributed throughout the Great Western Tiers from high altitude tarns on the plateau to lowland streams.

9.*Tachyglossus aculeatus* (Echidna) - common, secure, wholly protected, widespread throughout the Great Western Tiers.

10.*Isoodon obesulus* (Southern Brown Bandicoot) - common in suitable habitat, wholly protected, widespread throughout the Great Western Tiers, preferring scrubby habitats or areas of low ground cover.

11.*Parameles gunii* (Eastern Barred Bandicoot) - locally common (north and eastern Tas), wholly protected, widespread throughout the Great Western Tiers, particularly at lower altitude where habitat forest borders pastureland and extending into open pastureland.

12.*Vombatus ursinus tasmaniensis* (Tas sub species) (Common Wombat) - common in suitable habitat, partly protected, found throughout the Great Western Tiers, its main habitat being the forested lowland to mountainous areas.

13.*Trichosurus vulpecula* (Brush Tail Possum) - abundant, partly protected, widespread throughout the Great Western Tiers

14.*Pseudocheirus peregrinus* (Ringtail Possum) - common, wholly protected, found throughout the Great Western Tiers.

15.*Petaurus Breviceps* (Sugar Glider) - common, wholly protected, found throughout the Great Western Tiers.

16.*Cercartetus nanus* (Eastern Pygmy Possum) - threatened, wholly protected, found throughout the Great Western Tiers.

17.*Cercartetus lepidus* (Little Pygmy Possum) - status unknown, wholly protected, found throughout the Great Western Tiers.

18.*Macropus giganteus* (Forester Kangaroo) - wholly protected

Ideal suitable habitat is found throughout the Great Western Tiers. Reports of their habitation in the Jackeys Marsh/Meander area have not been confirmed by Parks, Wildlife and Heritage.

19.*Macropus rufogriseus* (Red Necked Wallaby) - locally abundant, partly protected, found throughout the Great Western Tiers.

20.*Thylogale billardierii* (Tasmanian Pademelon, Rufous Wallaby) - abundant, partly protected, found throughout the Great Western Tiers.

21.*Bettongia gaimard*i (Tasmanian Bettong) - wholly protected, is known to inhabit some areas of the Great Western Tiers.

Bettongs are considered the most threatened known species of mammal next to the Thylacine in Tasmania at present. Local high density populations have been seen to diminish rapidly. Their near relative from the mainland is nearly extinct. About 90% of the Bettong habitat is on private land being developed for pasture or with forestry operations underway. Their known western range is adjacent to Western Bluff in the south east Mt Roland area.

22.*Potorous tridactylus* (Potoroo) - common in remaining habitat areas, wholly protected, found throughout the Great Western Tiers.

There are 8 species of native bats in Tasmania, listed below. All species have been found in the Caveside/South Mole Creek area of the Great Western Tiers (Taylor et al 1986). Apart from this work little is known about these species.

23.*Nyctophilus timoriensis* (Greater Long Eared Bat) - uncommon, wholly protected.

24.*Nyctophilus geoffroyi* (Lesser Long Eared Bat) - common, wholly protected.

25.*Chalinolobus gouldii* (Goulds Wattled Bat) - uncommon, wholly protected.

26.*Chalinolobus morio* (Chocolate Wattled Bat) - common, wholly protected.

27.*Falsistrellis tasmaniensis* (Tasmanian Pipistrelle) - uncommon, wholly protected.

28.*Eptesicus regulus* (King River Eptesicus) - common, wholly protected.

29.*Eptesicus vulturnus* (Little Forest Eptesicus) - common, wholly protected.

30.*Eptesicus sagittulla* (Large Forest Eptesicus) - common, wholly protected.

There are five species of native rats in Tasmania, listed below. Some have very restricted habitat. Mastacomys fuscus (Broad-toothed Rat), for example, depends on areas of wet scrub/sedgeland which have been protected from fire for long periods.

There is not a lot known about any of the five species. Suitable habitats for all five species exist in the Great Western Tiers.

31.*Hydromys chrysogaster* (Water Rat) - common, partly protected.

A local survey in the Great Western Tiers found numbers diminished in most areas due to over-exploitation in the past.

32.*Pseudomys higgins*i (Long-tailed Mouse (Rat)) -common in limited habitat, wholly protected.

This species is endemic to Tasmania. They inhabit the wetter rainforest areas of the Great Western Tiers, for example, Westmoreland Falls area.

33.*Pseudomys novaehollandiae* (New Holland Mouse) - common, wholly protected.

34.*Mastacomys fuscus* (Broad-toothed Rat) - uncommon, wholly protected.

This species is considered vulnerable with insecure status. Nearest recorded location of this species was by Dr Bob Green, Queen Victoria Museum, in 1973 at Maggs Mt in the Cradle Mt area. No attempt to locate this species in the Great Western Tiers has been recorded though suitable habitat exists there.

35.*Rattus lutreolus* (Swamp Rat) - common, wholly protected.

B.3.3. Birds

Owing to the great number of different habitat types encountered, the region is rich in avifauna (birds), in both species diversity and population density.

As can be expected in an area with such habitat diversity in a relatively compact region, there is much overlap with regard to species types found in the various habitat forms. This makes for a good cross section of species breeding in the area and for the production of offspring from a strong gene pool. The richly forested slopes act as a large corridor, enabling juveniles to freely disperse and offering shelter and food requirements as these individuals seek out suitable unoccupied areas in which to take up residence.

Overall, the Great Western Tiers are home to 70 species of birds, of which 55 species are permanent breeding residents and 15 species are migrant. Of the migrant species, 13 rely on the area as a breeding ground.

Of the species total, 18 are endemic or of subspecific status.

The Great Western Tiers are considered a breeding stronghold for the vulnerable White (Grey) Goshawk (Mooney, pers comm).

A complete list of known bird species for the Great Western Tiers is given below. These are all positive sightings by two local naturalists, who independently arrived at almost the same list for the Liffey and Jackeys Marsh valleys. The exception was the Brown Quail.

(Species marked with an asterisk are Endemic or of Subspecific status.)

Resident Breeding Species

Spotted Pardalote	*Pardalotus punctatus*
Yellow Rumped Thornbill	*Acanthiza chrysorrhoa*
Brown Thornbill	*Acanthiza pusilla*
Tasmanian Thornbill	*Acanthiza ewingii* *
Superb Blue Fairy Wren	*Malurus cyaneus*
Scrub Tit	*Sericornis magnus* *
White Browed Scrub Wren	*Sericornis frontalis humilis* *
Field Wren	*Sericornis fuliginosus*
Grey Fantail	*Rhipidura fuliginosa*
Grey Breasted Silvereye	*Zosterops lateralis* *
Beautiful Firetail	*Emblema bella*
Dusky Robin	*Melanodryas vittata* *
Flame Robin	*Petroica phoenicea*
Scarlet Robin	*Petroica multicolor*
Pink Robin	*Petroica rodinogaster*
Golden Whistler	*Pachycephala pectoralis*
Olive Whistler	*Pachycephala olivacea*
Grey Shrike Thrush	*Colluricincla harmonica*
Yellow Wattle Bird	*Anthochaera paradoxa* *
Little Wattle Bird	*Anthochaera chrysoptera*
New Holland Honeyeater	*Phylidonyris novaehollandiae*
Crescent Honeyeater	*Phylidonyris pyrrhoptera*
Eastern Spinebill	*Acanthorhynchus tenuirostris*
Yellow Throated Honeyeater	*Lichenostomus flavicollis* *
Black Headed Honeyeater	*Melithreptus affinis* *
Strong Billed Honeyeater	*Melithreptus validirostris* *
Noisy miner	*Manorina melanocephala*
Whites Thrush	*Zoothera lunulata*
Brush Bronzewing	*Phaps elegans*
Common Bronzewing	*Phaps chalcoptera*
Spotted Quail Thrush	*Cinclosoma punctatum*
Brown Quail	*Coturnix Ypsilophora*
Grey Currawong	*Strepera versicolor arguta* *
Black Currawong	*Strepera fuliginosa* *
Richards Pipit	*Anthus novaezeelandie*
Laughing Kookaburra	*Dacelo gigas*
Forest Raven	*Corvus tasmanicus*
Butcher Bird	*Cracticus torquatus*
Australian Magpie	*Gymnorina tibicen*
Lewins Rail	*Rallus pectoralis*
Tasmanian Native Hen	*Gallinula mortierii* *
Yellow Tailed Black Cockatoo	*Calyptorhynchus funereus*
Ground Parrot	*Pezoporus wallicus*
Green Rosella	*Platycercus caledonicus* *
Eastern Rosella	*Platycercus eximius diemenensis* *
Southern Boobook	*Ninox novaezeelandiae leucopsis*
Masked Owl	*Tyto novaehollandiae castanops* *

Tawny Frogmouth	*Podargus Strigoides*
Owlet Nightjar	*Aegotheles cristatus*
White (Grey) Goshawk	*Accipiter novaehollandiae*
Brown Goshawk	*Accipiter fasciatus*
Collared Sparrowhawk	*Accipiter cirrhocephalus*
Brown Falcon	*Falco berigora tasmanica* *
Peregrine Falcon	*Falco peregrinnus macropus*
Wedge Tailed Eagle	*Aquila audax fleayi* *

Breeding Migrants

Striated Pardalote	*Pardalotus striatus*
Dusky Woodswallow	*Artamus cyanopteris*
Tree Martin	*Cecropis nigricans*
Welcome Swallow	*Nirundo neoxena*
Satin Flycatcher	*Myiagra cyanoleuca*
Pallid Cuckoo	*Cuculus pallidus*
Fantailed Cuckoo	*Cuculus pyrrhophanus*
Shining Bronze Cuckoo	*Chrysococcyx lucidus plagosus*
Horsfields Bronze Cuckoo	*Chrysococcyx basalis*
Swift Parrot	*Lathamus discolor**
Musk Lorikeet	*Glossopsitta concinna*
Black Faced Cuckoo Shrike	*Coracina novaehollandiae*
Swamp Harrier	*Circus aeruginosus gouldi*

Non Breeding Migrants

Spine Tailed Swift	*Hirundapus caudacutus*
Japanese Snipe	*Gallinago hardwickii*

B.3.4. Fish

Native fish which would probably be found in the streams which form part of the Mersey system (for example the Lobster Rivulet) include *Galaxias maculatus*, *Galaxias truttaceus* and *Prototroctes maraena* (Australian Greyling).

Gadopsis marmoraties (River Blackfish), which is endangered on the mainland has been found by Inland Fisheries in the upper reaches of the Meander River. They are also present in the Liffey River. This species needs tree cover and snags to survive.

B.3.5. Reptiles

The list of species given below may be incomplete. Because of the large array of habitat types to be found on the Great Western Tiers it is probable that other lizard species are present in small pockets. The most likely candidates are the Tussock Skink (*Leiolopisma entrecasteauxii*), Whites Skink (*Ergenia whitii*) and the Mountain Dragon (*Amphibolurus diemensis*).

Lizards

1. *Leiolopisma metallicum* (Metallic Skink)

- Extremely abundant throughout the Great Western Tiers, from the foothills to the Central Plateau.

2. *Leiolopisma ocellatum* (Ocellated Skink)

- Endemic to Tasmania. Generally restricted to rocky habitats.Common on the Central Plateau but generally only encountered on the scree slopes of the Great Western Tiers at around 700m elevation. Food as for L. metallicum.

3. *Leiolopisma pretiosum*

- Endemic to Tasmania. Extremely abundant on the Great Western Tiers, mainly in forested areas. Food as for L. metallicum.

4. *Tiliqua casuarinae* (Slender Bluetongue) - Uncommon, patchy distribution.

5. *Tiliqua nigrolutea* (Blotched Bluetongue)

- Common in wet and dry eucalypt forest throughout the Great Western Tiers.

6. *Drysdalia coronoides* (White Lipped Whip Snake)

- Found throughout the Great Western Tiers from foothills to Central Plateau in all habitat types. Locally very abundant in rocky, grassy areas.

7. *Austrelaps superbus* (Lowlands Copperhead)

- Possibly absent from the area. Appears to favour low lying, open country. High population densities form around marshes, lagoons, dams and river flood plains where their principle food, frogs, are abundant.

8. *Notechis ater* (Tiger Snake)

- Abundant throughout the Great Western Tiers in all habitat types.

B.3.6. Invertebrates

As far as the authors are aware there has been no comprehensive survey of the invertebrate fauna of the Great Western Tiers.

Observational information (Mesibov and Cadman, pers comm 1989) suggests that the Great Western Tiers is a very important refugium for a number of relict groups, notably *Onychophorans* (Velvet Worms). All the species in this group of ancient animals are included in the IUCN Red Data Book of rare and endangered animals and conservation measures proposed are for control and monitoring of collection of these animals and encouragement of research including the maintaining of captive populations. These animals are found in large rotting logs on the forest floor.

Another invertebrate species of great scientific interest is *Tettigarcta tomentosa* (Hairy Cicada). This species is considered a living fossil and is morphologically almost identical to 40 million year old Texan fossils. This species is considered threatened. (Fry and Robinson 1986) A large population of this species has been found in the Bowmans Creek catchment. (Cadman, pers comm)

The upper parts of the catchments of the Great Western Tiers that do not contain trout, because of waterfalls and rapids, contain large populations of the relict species *Anaspides tasmaniae* (Mountain Shrimp). This species is also listed in the IUCN Red Data Book. This species inspired one of Tasmanias early naturalists to write, as quoted by Frederick R. Schram (Crustacea, Oxford University Press, 1986):

"However, I especially want to 'thank' the Crustacea, for being such a compelling, fascinating group that some days I can hardly wait to get to work in the morning to find out more about them. Geoffrey Smith expressed it well of syncarids in A Naturalist in Tasmania (Clarendon Press, 1909):

Goethe somewhere remarks that the most insignificant natural object is, as it were, a window through which we look into infinity. And certainly when I first saw the Mountain Shrimp walking quietly about in its crystal-clear habitations, as if nothing of any great consequence had happened since its ancestors walked in a sea peopled with strange reptiles, by a shore on which none but cold-blooded creatures splashed among the rank forests of fern-like trees, before ever bird flew or youngling was suckled with milk, for me time was annihilated and the imposing kingdom of man shrunk indeed to a little measure."

Mesibov (pers comm, 1989) considers the Great Western Tiers an ideal locality for the study of Velvet Worms because they are found within a very narrow altitudinal range. The same is probably true of other rare and unusual species.

Numerous species of butterfly are found in the area, the most notable being *Neosenica leprea leprea* (Leprea Brown). Other butterfly species found in the area include *Hesperiidae sp.*, *Graphium macleayanum* (Macleay Swallowtail), *Heteronympha banksii* (Common Brown), *Heteronympha*

penolope panope (Shouldered Brown, alpine variety), *Vanessa kershowi* (Painted Lady), *Vanessa itea* (Australian Admiral), *Oreixenica spp*., *Lycaenidae spp*.(Blues, Coppers).

The Land Mollusc (*Caryodes dufresnii*) is known to occur in the area.

Higgs (1994) studied the predatory litter beetles on Warners Sugarloaf. The beetles found are listed in table B.1:

B.3.7. Cave Fauna

The following description of the cave invertebrate fauna appears in Hunter (1983).

"The Mole Creek system is notable for the diversity of its fauna as well as the uniqueness of some of the species represented. To date invertebrate fauna described from the Mole Creek system known only from that locality include the isopod Styloniscus nichollsi Vandel, one species of Harvestman - Monoxyomma sp. n. and flies of the genus Spaerocera. Recorded occurrences of the pseudo scorpion Pseudotyrannochthonius typhlus Dartnall, and the beetle Tasmanotrechus cockerillii Moore indicate only one cave of occurrence outside the Mole Creek system, while more common species such as the Tasmanian Cave Spider Hickmania troglodytes Higg. and Pet., two cave crickets Micropathus cavernicola Rich. and Parvotettix goedei Rich. and the glow-worm Arachnocampa tasmaniensis Ferg. Additionally various specimens of the Acarina, Diploda, Chilopoda, Collembola and Diptera have been collected but are yet to be described."

A recent study of Kubla Khan Cave (Spate 1991) identified 71 invertebrate species.

A comparitively enormous, pale and apparently sightless form of the Tasmanian mountain shrimp, *Anaspides tasmaniae* (Eberhard et al, 1991), adapted to cave life, is found in several of the caves. Three forms of pale spiders which appear to live on clay banks within the caves and spin no webs are to be found. (D.Hunter, pers. comm*)*

In addition to the expected invertebrate fauna of the karst system, Glowworms have been found in a small sandstone cave straddling Bowmans Creek (Cadman, pers comm).

Table B.1 Predatory litter beetles on Warners Sugarloaf. (after Higgs (1994))

Family	Sub Family/Tribe	Genus/species	
Staphylinidae	Staphylininae	*Quedius* sp 1,2,3	≤8mm, winged, highly mobile, specialised predator
	Euasthetinae	*Protopristus* sp 1	≤1mm, blind, deep litter resident, wingless, probably preys on mites
	Proteininae	*Anepius koebelei*	Gondwanic affinities, 3.5mm, wingless
		Austrorhysus sp1	
	Paederinae	*Hypercomma* sp 1	highly mobile and specialised predator, ≤ 5mm
	Oxytelinae	*Anotylus* sp 1,2	primarily saprophytes, living on dead & decaying plant material
	Osoriinae	*Osorius* sp 1	saprophyte
	Osoriinae	*Holotrochus* sp 1	saprophyte
	Osoriinae	*Holotrochus "*sp 4*"*	saprophyte, new Tasmanian record, previously found in mid-northern NSW, 3.5mm, deep litter resident with fossorial tibiae
	Scaphidiinae	*Scaphisoma* sp 1,2	saprophyte, though some feed on slime moulds
	Aleocharinae	sp 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	mainly free living, highly mobile specialised predators, large, ≤6mm
Pselaphidae (predatory on minute invertebrates incl. Collembola)	Euplectini	*Euplectops* sp 1, 2, 3	all winged
	Brachyglutini	*Rybaxis parvidens* *Rybaxis* sp 1, 2, 3 *Eupines* sp 1	
	Pselaphini	*Pselaphaulax bryophilus* *Pselaphaulax* sp 1 *Tyromorphus auricomus* *T. auricomus grp* sp 1	
Scymaenidae (probably mite predators)		*Euconnus clarus* *Euconnus* sp 1, 2, 3 *Euconnus* sp 4 cf *abundans* *Euconnus* sp 5, 6, 7, 8, 9	

B.4. Landscape

The whole area is highly visible from fore, middle and background views. The visual catchment for the area is very large, of the order of a quarter of a million hectares.

The Great Western Tiers forms the major landscape backdrop to towns and communities from Mole Creek in the west to Hagley in the north and Longford in the east. The area is the major scenic viewfield of Deloraine.

The area is also seen from within the World Heritage Area and major walking destinations outside the WHA, for example Mt Roland and the Alum Cliffs State Reserve.

The area is seen from major tourist roads, the Mole Creek Rd, the Mersey Valley Rd, the Bass Hwy, Midlands Hwy and scenic view points on these roads. In addition the area is seen from the minor tourist roads traversing the base of the Tiers. There are spectacular views from the Lake Highway and Poatina Highway which ascend the Tiers. (The top of the Tiers on the two highways are the highest major road altitudes in Tasmania - Lake Highway at Pine Lake 1210m and Poatina Highway at Starvegut Hill 1185m.)

The Longford Council has zoned the area south of the Liffey River as a scenic buffer area.

Landscape description

Colour: The area is a mosaic of greens and green/blues reflecting the differences between vegetation communities. Particularily apparent is the contrast between rainforest, eucalypt, silver wattle forest and cleared land, the wattle forest in some years providing a magnificent golden floral display, giving a sharp colour contrast. The brown/yellow sandstone and grey dolerite cliff bands also provide colour diversity.

Form: The area is aptly named the Great Western Tiers with steep slopes and benches. The sandstone cliffs are a very dominant landscape feature on the slopes between Mother Cummings peak and Drys Bluff. The steep slopes are dissected by a number of highly visible gorges. The whole length is capped by the imposing grey, columnally jointed dolerite cliffs. The form is complemented by an outlier montain, Quamby Bluff, and the foothills, Warners Sugarloaf and Archers Sugarloaf.

Texture: Textural diversity is provided by the differing age classes of vegetation, the eucalypt overstorey on the older forest sites and the textural contrast provided by the sandstone and dolerite cliffs and the cleared land.

The Tiers are snow capped in winter with drifts lingering into late spring or summer in places.

B.5. Hydrology

The Great Western Tiers contain a multitude of streams. There are about 32 named streams and about 150 unnamed streams apparent within the Western Region on Lands Department 1:25000 maps. There are many small streams both permanent and non permanent not shown on maps.

Of the total number of mapped streams in the Western Region, about 36 flow directly off the Central Plateau. Those streams which do not flow directly off the Plateau originate from springs or from runoff from the slopes of the escarpment. The swamps and lakes of the Central Plateau provide a most reliable source for the streams originating there, and may also be a source of the water emerging from the springs.

The springs are most frequent around the contacts between the major rock strata. Some areas contain a myriad of small streams originating from springs.

Most of the streams are subject to very high peak or storm flows. A combination of heavy rainfall and snowmelt can result in large surface flows through the forests.

The water from the streams and springs is greatly valued for its high purity by local domestic users. There are many individual domestic take off points within the State Forest or within a few kilometres of the State Forest boundary. Some community supply schemes also draw from the streams.

A number of swamps and bogs exist on poorly drained topographic benches.

B.6. Geology and Geomorphology

The oldest rocks in the immediate area are limestones of the Ordovician Gordon Group in the Mole Creek area. More than 1000m of limestone is present - variously oncolitic, cherty, coraline or micritic. The rock is often fossiliferous, abundandtly so on some horizons. Fossils include stromatolites, brachiopods, corals, bryozoa, gastropods, ostracodes, cephalopods and trilobites. The limestone was deposited in a generally shallow, marine environment (subtidal - supratidal)

Gordon Group limestone is overlain, apparently conformably, in several localities by Silurian sandstone and quartzite.

Folding during the Devonian has produced southeast - trending, gently plunging folds.

Rocks of the Parmeener Supergroup (Carboniferous - Triassic) uncomformably overlie the Ordovician and Silurian rocks, and this surface has some relief.

The Lower Parmeener Super Group has a thickness of upto 600m and outcrops fairly persistently on the lower slopes of the Tiers. It is predominantly marine, but contains two freshwater sequences. The rocks consist of conglomeratic sandstone, quartz sandstone, mudstone and occasional limestone. Erratics (of quartzite, schist and slate) occur, in profusion on some horizons. Carbonaceous shales (plant-bearing) occur higher in the sequence. These virtually flat-lying Permian rocks crop out on the middle to lower escarpment slopes in the form of benches, a result of differential erosion of the various rock units.

A system of sediments deposited under lacustrine or swamp conditions, the Upper Parmeener Supergroups, overlie the Lower Parmeener Supergroup with a conformable/transitional or disconformable contact where they occur at an altitude of 700m. They consist of up to 350m of quartz sandstone, "feldspathic" sandstone and shales. Cross-bedding may occur in the sandstones and plant fragments are common, particularly in the shales. Thin carbonaceous bands are common within the sandstones in the upper part of the sequence. These rocks generally form a pronounced bench and crop out distinctively as cliffs or steep slopes at the edge of this bench.

Jurassic dolerite is a very noticable feature of the Tasmanian landscape generally, and the Great Western Tiers in particular. The dolerite was emplaced as a liquid some 175 million years ago. It rose through the basement rocks into the Parmeener Supergroup rocks and now caps the Tiers/Central Plateau. It is a sill-like intrusion of the order of 300m thick, and is transgressive of the order of 350m stratigraphically. A "hornfelised" contact zone may be observed (up to 10m wide in shaly beds) in sediments adjacent to the dolerite.

The Central Plateau horst was upfaulted commencing about 65 million years ago. Possibly 0.5 to 3.5 km. of cover rock have been lost from the dolerite.

The dolerite has produced a steep escarpment characterised by high, joint-banded columns at the foot of which are talus slopes. Talus and scree at the base of the scarp is up to 150m thick. The strongly developed, near-vertical joints in the dolerite (in addition to cooling features) are probably related to Tertiary fault systems.

Sloane (1986) described the Jurassic dolerite in some detail:

"JURASSIC DOLERITE. The Central Plateau..(is) underlain by Jurassic dolerite, which crops out as cliffs at the head of the upper escarpment slopes.....The overlying rocks have been subsequently removed by erosion and the exposed upper surface of the dolerite sheet has itself been eroded. Dolerite also caps Warners Sugarloaf. The position of the lower contact of the dolerite is often mantled by slope deposits, ...The base of the dolerite is approximately accordant at 1000m but at Warners Sugarloaf and on the eastern face of the Tiers the sill is more transgressive in nature and the lower contact is approximately between 700m and 600m.

DOLERITE SCREE. Scree slopes are found immediately at the base of the dolerite cliffs of the upper escarpment....They consist of accumulations of rock fragments up to six metres in diameter with little or no matrix. The dolerite rock fragments have been shed from the cliffs by processes involving ice wedging, frost action and gravity.

DOLERITE TALUS. Mass wasting of the dolerite escarpment of the Tiers ...has produced extensive deposits of dolerite talus. The talus consists of weathered and unweathered dolerite blocks in a yellow-brown to red-brown silty and clayey matrix....Some talus composed of angular blocks of quartz sandstone in a light grey sandy matrix is usually found close to the base of the Triassic sandstone scarps.

.....The scree and talus mantles may obscure the stepped slope profile of the upper escarpment as the deposits often overlie the benches formed by the Triassic sandstones and in some cases, the Permian rocks.

An interesting geomorphological feature of the Great Western Tiers is the deeply incised gorges.

Karst features have developed on the Ordovician limestone and the karst landscape is surrounded by topographically higher areas of non-carbonate rocks with surface drainage. Surface drainage from the surrounding slopes is responsible for much cave development when it enters limestone .The sediment load carried by such streams is also important.

The precise extent to which Pleistocene glacial ice has affected the karst is uncertain, however ice descended the slopes of the Great Western Tiers at some stage and probably invaded the eastern margins of the Mole Creek karst during an early Pleistocene glaciation (Kiernan 1982, 1984). Glaciofluvial fans occur south of Mole Creek, and possible end moraines occur east of Westmoreland Creek.

The caves contain a great variety of deposits - including decorations contributing to the spectacular scenery of many of the caves. Karst is described in more detail in the next section.

B.7. Karst

B.7.1. Introduction

The term "karst" is a German word and can be defined as "a terrain with distinctive characteristics of relief and drainage arising from a higher degree of rock solubility in natural waters than is found elsewhere" (Jennings 1971). In practice, karst is normally confined to areas of limestone or dolomite bedrock. The prime significance of karst regions stems from the marked solubility of the carbonate rocks. The solubility results in the normal association of limestone regions with near waterless surface conditions. The paucity of surface water gives rise to a need for maximum information on groundwater resources (Smith 1977). On climatic grounds, one would expect streams in the Mole Creek area to be largely perennial; however, the Mersey River is the only one. All other streams lose sufficient water underground either to abandon reaches of their channels for periods of time or to have permanent underground courses over part of their length (Jennings 1967).

The Mole Creek karst is highly scenic with a variety of karst resources. The limestone belt measures some 26km east to west and up to 10km north to south, along the foot of the Great Western Tiers.

The presence of enormous deposits of limestone in the vicinity of Mole Creek and Chudleigh has been noted since the middle of last century. (Strzclecki 1845, Gould 1860,1861, Johnston 1888) Then, as now, the main interest in these high grade and freely accessible deposits was confined to the scenic beauty of the caves formed in them. (Jennings 1963)

The underground drainage system which has developed has resulted in the formation of cave systems which have been exploited as a tourist attraction and used by speleologists for study and recreation. The limestone areas in the Mole Creek valley represent wonderful examples of karst topography. The Mole Creek karst includes examples of all stages of karst development from youthful to senile.

There are several examples of breaches of surface drainage divides (Jennings 1963, Kiernan 1984, 1989) and other unusual or representative classic karst landforms.

A full understanding of the nature and management of the karst resources is best obtained by the study of the whole range of karst features in which the geomorphology and hydrology are intimately linked and of major importance (Smith 1977, Jennings 1967)

The maintenance of almost all karst resources, namely economic, scientific, educational and recreational, hinges upon the maintenance of natural water flow and chemistry. The karst environment is highly interactive and systemic (Kiernan 1988).

B.7.2. Systems

Mill Creek Area

Kiernan (1984) defines the Mill Creek topographic area as being about 16 sq km. It is drained by Kansas Creek, Vanishing Creek and Mill Creek and contains two large enclosed depressions (uvulas). Drainage resurges into the Mersey River. Altitude ranges in the area from 1,400m to 290m. Kiernan et al (1994) states is an excellent example of a major integrated karst hydrogeological system.

A number of dry valleys occur within the Mill Creek area karst, as do numerous sinkholes of the lower order, especially along the upper margin of the limestone contact, and two very large sinkholes of the higher order which feed Vanishing Creek (Rat Hole) and Croesus Cave. These uvulas are on the topographic bench (400m elevation) above the caves. Rat Hole has now been revealed to be extensive and utterly fundamental to the hydrological and geomorphological study of the western foothills of Western Bluff (Kiernan 1984).

Croesus is a major "restricted access" cave system 2km long, famous for its large and extensive gour pools (rim pools) and other elaborate decorations. The Croesus Cave State Reserve essentially encompasses only the entrances and first few hundred metres of Croesus Cave and Lynds Cave, which is also "restricted access" and over 1km long. The existing reserve does not include the caves' catchments.

Mill Cave (Tailender) is developed on two levels and is directly connected hydrologically with the Rat Hole. The cave contains important clastic deposits and fine speleothems including helictites which are virtually unparallelled elsewhere in Mole Creek for diversity and intricacy (Hunter pers comm).

There are several other caves and major discoveries have been made as recently as 1992 and 1993.

Water tracing has revealed two principal drainage systems; Kansas Creek directly into Lynds Cave and Vanishing Creek into Rat Hole (and Tailender). There is no stream to account for the largest Mill area cave, Croesus, which paradoxically contains the smallest stream. Also, the flow of this stream varies very little with the weather (while the others do), apart from one or two known floods. One implication is that Croesus might be fed by seepage and another is that part of the flow could come from a large body of water via a very restricted conduit. The rare floods may be caused by overspill through higher old routes. Some significant karst development may lie further than the known limits of this and other caves and may involve cave/s of nationally significant depth. (Kiernan et al 1994).

Many questions remain, but the significance of the karst developments is beyond question. There are strong genetic links between the 3 drainage (sub)systems in the Mill Creek area. Recent investigations suggest that interflow between systems under very high discharge conditions now seems inevitable (Kiernan et al 1994). The implication in case of surface disturbance by human activities is serious indeed. Soil stability and the maintenance of forest cover are critical, particularly for the maintenance of the unique gours of the Croesus streamway. The Mill Creek area is deserving of reservation in its own right. The recent discoveries and compilation of data are the evidence for the existence of a major integrated karst drainage system. The highest level of protective management is warranted for this very important complex (Kiernan et al 1994*)*.

Some speculation exists as to human impact on sites in the area - siltation and logging debris in caves and a recent collapse in Croesus, the cause of which is unclear. Recent studies compound evidence that past logging activity has led to water chemistry and sediment flux changes injurious to some of the caves and national estate values generally. (Kiernan et al 1994).

There has also been vandalism and pilfering in Croesus, but better gating and route definition within the cave ensure a better outlook. Overall, integrity of the karst landforms in the Mill area is good.

Loatta (King Solomon) Area.

This block contains Execution Pot and Long Drop (near Marakoopa Cave State Reserve) whose water travels via Lime Pit Cave to resurge above Liena township into the Mersey River. It also contains the tourist cave, King Solomons Cave, and some of its well decorated tributary caves nearby and its resurgence, Soda Creek Cave, an important recreational cave near Liena. Two actively-forming travertine cascades (calcium carbonate deposits outside caves at resurgences) exist at Little Trimmer Cave (in the dry valley below Execution Pot) and at a site 1 km to the north-east (Kiernan 1984).

Kubla Khan and Ghengis Khan Caves are contained within a State Reserve adjoining State Forest in the east of the Loatta Area. Kubla Khan is nationally famous and has over 2 km of passage. It is rated by John Dunkley (1983 pers comm), the then President of the Australian Speleological Federation (ASF), as being among the top 10 caves in the world by various criteria. Kubla Khan contains the largest stalagmite in the Southern Hemisphere (20m). Its neighbour, Ghengis Khan, is also a gated and "restricted access" cave, important for its speleothems, crystal formations and genetic relationship to Kubla Khan.

Marakoopa Cave State Reserve Area

This area extends from the escarpment at Western Bluff to 450m elevation. It contains the catchment of Gillam Creek down to 690m elevation, which feeds several caves downstream, and the majority of the forest catchment of Marakoopa Creek. The western extremity of the area is the catchment for the important vertical and decorated cave systems of Execution Pot and Long Drop. Kansas Creek, which drains into Lynds Cave ("Mill Creek Area"), also rises in this area.

The upper reaches of the Marakoopa Creek gully contains rich humus soil with *Nothofagus cunninghamii* up to about 20m high. This steep gully descends in a series of cascades over bedrock benches. Marakoopa Creek falls into the spectacular collapse doline of Devils Pot (105m deep). Adjacent to this formation is the large complex doline of Devils Earhole. A cave of the same name is located at the base

of the doline - a former inflow cave which contains the uncommon phenomenon known as oolites or cavepearls. The doline also harbours a small rainforest in its ideal microclimate, surrounded by dry sclerophyl forest above.

The significance of the Marakoopa cave system itself is well known. It is a system of major importance which extends far beyond the "tourist" section. It contains good decoration, gypsum formation and glow-worms. The upstream sections are well-known by recreational cavers and include a vertical entrance. There are many other caves in the area, including one of considerable significance discovered in 1984 only metres away from the picnic area (Kiernan 1984).

The Sassafras/Mayberry Divide Area

The area is deeply incised by dry valleys, most of which follow the strike of the limestone beds. There are large areas of unexposed rifts on the ridge top, numerous minor sinkholes on the divide, and at the foot of the Standard Hill a magnificent array of collapse sinkholes of the higher order (Jennings 1963) under which the Mayberry depression (polje) drains eastwards to Sassafras Creek. Recently formed minor dolines in a logged area near Prohibition Cave on adjoining private land clearly post-date the logging (Kiernan 1984). The scarcity of similar fresh sinkholes in the forested country suggests that their formation may have been accentuated by forestry activities.

There are probably more resurgences known along the Sassafras Creek than in any other single area of the Mole Creek karst. At least 20 are known. The largest of these is probably Sassafras Cave but another very large resurgence is just south east of the nose of Standard Hill, and is almost undoubtedly the main flow from the Mayberry Polje. Smaller examples are numerous, most being on the west side of Sassafras Creek. The inflow of My Cave, a well developed adventure cave resurges at Cyclops Cave, within the Baldocks Cave State Reserve.

Deep grikes in the limestone are very common on the divide, with some vertical solution pits and pipes 50mm or more in diameter.

Numerous caves are fed from the divide and catchment above Sassafras Valley, the most important being My Cave, Baldocks Cave, Sassafras Cave and Prohibition Cave. Several entrances, some vertical shafts, have been located by local speleologists, and are are being systematically explored, evaluated and mapped. Rift complexes, subterranean lakes and erratic speleothems are some of the features. Known caves have been extended recently beyond previously known extents, including a well developed complex. (Lichon, 1994).

Stream relationships and hydrology are uncertain between Prohibition Cave and the lower caves. There is speculation in caving circles of a "master cave system" awaiting discovery under the divide. (D.Hunter, pers. comm.)

A small area of presently private freehold land comprising the immediate catchment and environs of Prohibition and Depression caves warrant protection as "Underground National Park" under the private land as in the NSW model, and as proposed in an election promise by the last outgoing Tasmanian Labor Government.

Mole/Lobster Area

The catchment for arguably the most important karst drainage system in terms of the cave resource and hydrological significance is extensive. The water which sinks into Kellys Pot at around 550m near the boundary of State Forest and Crown Land is known to flow eastwards to the Wet Cave (Mole Creek) system under the Mole Creek/Lobster Rivulet surface divide via Herberts Pot (Jennings and James 1967). The other streamsink on Crown Land in that vicinity, Waterworks Cave, drains into the Mole Creek valley below, west of the surface divide. To the east, the water sinking at Westmoreland Cave (below the Falls) also flows to this system. The catchment on this side extends across Parsons Track near to the escarpment.

The entrances of Wet Cave and Honeycomb complex, the most frequented recreational caves in the Mole creek district, are contained in a 100 acre reserve (Wet Cave Reserve) was leased to the Meander Valley Council and sub-leased to a neighbouring farmer until recently and is now returned to the Crown.

Kiernan (1984) claims that the system of caves within the Mole Creek/Lobster Rivulet divide is of a complexity and scale without parallel in Australia. It includes one of the nations longest single caves, a double breach of a surface drainage divide, stream bifurcations and two system endemic invertebrate fauna species. The system resurgence is at Scotts Rising, 3 km south of the Mole Creek township.

Protection of the catchment for this system is vital.

Much of the Mole/Lobster system is under private land but most of the upper catchment for this very important system would be protected by the National Park. The greatest potential for protection of this system system lies either within the Local Government Act, through Council regulations, or better still by declaration of an "underground National Park". As proposed in Kiernan (1984), some grazing on existing cleared land above the underground National Park could be allowed

There exists much need for sensitive land management in other privately owned areas adjoining the Park to protect the karst.. This may be affected by declaration of Conservation Areas jointly managed by government and private owners under management plans. However, the Mole/Lobster system's significance demands underground National Park status.

Dogs Head Area

The Dogs Head hill itself is an example of a classic residual karst surface landform known as a "hum", possibly the only true hum in Australia (Kiernan 1984). It is roughly conical in form and rises about 270m above the Mersey River.

A number of sinkholes have developed upon the Hill and along the lowest point of the "windgap" between the Hill and Standard Hill. Examples include the collapse doline of the upper entrance to Union Cave on the northern side and alluvial streamsink dolines at the southern foot of Dogs Head Hill. Numerous rifts in the limestone bedrock occur upon the Hill, some of which lead to caves, including Moss Palace and Bone Rift. There are numerous soaks along the course of small streams which descend from Standard Hill, and there are three resurgences, the largest of which is Union Cave, at river level. Two smaller resurgences occur on the south side.

Union Cave is the major subsurface development - 490m of passage including helictites and two sumps. A major discovery was made on the southern side of Dogs Head in 1987 when local cavers found "Moss Palace", a rift cave which contains phytospeleothems, a rare combination of calcite and mosses (Lichon, 1992a&b). This formation is so well developed and fragile that preservation of the hum might well be justified on these grounds alone. Another more recent discovery (Bone Rift) contains extensive bone deposits which await evaluation.

Slopes of 20-45% on the northern side, up to 50% on the southern side and thin residual karst soils mitigate against logging activities on Dogs Head Hill and its catchment on Standard Tier and the windgap. The Dogs Head Hill outlier to the Park now includes the full catchment for the Dogs Head system and takes in an area of exceptional scenic value between the Standard Tier and the Mt Roland Protected Area. Logging operations north of the Mersey River, close to this area, threaten the scenic values and at the very least a streamside reserve of 500 metres should be left unlogged.

B.8. Climate

B.8.1. General

Coates (1988) contains a concise description of the local climate variables. This study was conducted for the area east of Mother Cummings but is generally applicable to the areas further west:

"Local records for the study area are not available.The nearest weather station is Deloraine and the nearest rainfall station is Meander."

"Weather conditions on the Western Tiers vary by comparison with the above places, due to increased elevation and steeper topography, and the frequent occurrence of mountain mists and fogs (Foresty Commission Tasmania 1984).Precipitation is higher and air temperatures are cooler. Numerical data are presented in Appendix 8 Climate Data

"Average annual precipitation at Meander is 1082mm. The area experiences its wettest period from May to September under the influence of the broad westerly wind band (Forestry Commission Tasmania 1984). Heavy rain may fall at any time throughout the year when it is associated with either a northeasterly or northwesterly air flows around a low pressure system near Bass Strait (Forestry Commission Tasmania 1984). During cold weather, precipitation may fall as snow."

"Over one hundred frosts occur each year (Forestry Commission Tasmania 1984) and below zero minimum temperatures are usual between May and September. Summer conditions are mild to warm although they may reach maxima of up to 35^{o}C (Forestry Commission Tasmania 1984)."

"The prevailing wind is from the northwest quarter and may bring fine or rainy weather to the area. Calm conditions are most common between April and June while strong winds associated with warm north westerlies are most frequent in spring and summer. Wind speed varies locally around the base of the cliffs, which are largely protected by the surrounding forest, or by the indented nature of the formation."

On the western end of the Tiers, the prevailing winds are more westerly to southwesterly than northwesterly.

The Tiers carry snow in winter with drifts lingering into late spring or summer in places. Summer snow on top is common.

During the record Tasmanian freeze in June 1983, the temperature on Drys Bluff fell to -15.3^{o}C.

B.8.2. Climate Gradients - Conservation Significance

Rapid climate change and the potential impact of this human generated problem has been the subject of considerable concern in the last few years. The likely problems created by this phenomenon are not confined to the obvious implications of rising oceans. Climate change may have a profound effect on many plant and animal species.

The diversity of microclimates and the steepness of climate gradients on the Great Western Tiers are two of the more important factors in determining the high conservation significance and the need for secure reservation of the escarpment. All of the escarpment has been mapped (Nix 1987) as having very steep climate gradients.

Professor Henry Nix, the leading expert on biological climate modelling in Australia, had this to say to the Lemonthyme and Southern Forests inquiry (Nix 1987):

"Any reservation of species and communities that has a currently restricted climatic range must include the provision for a climatic buffer to allow movement of species and communities. This is best achieved where current climatic gradients are very steep, allowing movement up a slope, or very broad where "erosion" at the edge will not eliminate the species or community....The slopes of the Western Tiers in the vicinity of Quamby Bluff which is at the junction of Eastern and Western climatic regions has refugia habitats containing species from both regions growing together (Kirkpatrick, 1986). It is likely that the Forth and Mersey valleys also contain refugia sites. In this context, the presence of low to high altitude vegetation sequences from approximately 300m-1400m in the Forth, 800m-1500m in the Mersey and 300m-1300m from Jackeys Marsh to the top of the Western Tiers escarpment, are of prime importance....".

Futher comment is supplied by Cullen and Kirkpatrick (1988):

"If the upward shift in vegetation-climate zones proceeds at a faster rate than species can migrate then these species are in danger of being restricted to relict patches stranded in a hostile environment. Slow-growing, poorly dispersed species such as A. Selaginoides and A. cupressoides are at a greater risk than tree species which can mature more rapidly or have long distance dispersal characteristics. Successful upslope migration of Athrotaxis species is most likely to occur where the temperature (altitudinal) gradient is steep and the distance to safe habitats is short. Steep altitudinal gradients occur throughout much o the Central Highlands and on the edge of the Central Plateau."

B.9. Recreation

B.9.1. Walking

The National Park area contains many valuable walking tracks and opportunities for untracked exploration. The tracks lead through the various vegetation types. The higher portions of many of these tracks offer outstanding views out over the plains to distant mountains and ocean, along the Tiers, down over the forested slopes and out to the dolerite cliffs, boulder fields and subalpine and alpine forest, scrub and heath. Many offer intimate experiences of mountain streams, streamside riparian vegetation and native conifers. Each track has its own special features.

The Western Bluff Track leads from Erks Loop to the summit of Western Bluff from where spectacular views can be obtained.

Devils Pot/Devils Earhole Track in the Marakoopa Cave State Reserve is a recently opened, restricted access walk up to some deep sinkholes.

The South Mole Creek Track was used by the HEC for access to Lake Mackenzie.

Marakoopa Forest Walk is a short nature trail.

Parsons Track leads via two distinct benches to a particularly beautiful small wet valley on the Plateau which gives a spectacular display of Richea scoparia in season. The track has two well kept huts. The upper hut (Haberles Hut) is an old trapper's hut of unusual design which has been renovated. An alternate route from the lower hut (Hills Hut) to the Plateau traverses a bench below the Plateau which has a spectacular Waratah display in season.

Sentinel Rock Track is an alternate route down from Haberles Hut which connects with Parsons Track. It follows a gorge through interesting Sphagnum and King Billy Pine.

Westmoreland Falls Track is one of the most beautiful short rainforest walks available anywhere.

Higgs Track climbs the side of Nells Bluff through rainforest and provides the most direct and well known access to the main alpine lakes in this region (Chudleigh Lakes).

The Western Creek Track leads through the deeply incised "Western Gorge" with stands of native conifers, providing a direct route to Lake Ironstone via Whitelys Hut.

Syds Track climbs quickly to the Plateau through the "Little Gorge" with a lovely area of Dwarf Myrtle and King Billy Pine forest and provides a direct route to Mt Ironstone.

The Mother Cummings Peak Track climbs from Westrope Road to a valley on the Plateau which connects readily with the track which climbs beside Mother Cummings Rivulet from the south. It also provides the best access to Mother Cummings Peak (northern peak).

A potential walk of some merit would be from the end of Westrope Road along the high bench below Mother Cummings Peak to connect with the unused logging road coming up from the south as far as the Sphagnum swamp (Scotts Road). This road could be allowed to regenerate into a walking track over time.

Scotts Track leads from the end of Scotts Road up the eastern side of Mother Cummings Summit (southern peak).

Mother Cummings Rivulet Track provides access to Cummings Mountain from the south via a sheltered rainforest gorge which is well known for its King Billy Pine.

The Smoko Creek Track leads to the Mt Ironstone trig point. An alternative route runs via Chasm Falls. Shute Falls are also accessible on the way.

Stumps Track is a steep old trappers track which leads off Smoko Creek Track to the Plateau through a "bearded" Myrtle forest. It also provides access to a coal seam under Bastion Bluff.

The Dell Track leads off Smoko Creek Track up onto Bastion Bluff via some small tarns.

Stone Hut Track leads past an old trappers shelter to Bastion Bluff or connects with the Cleft Rock Track.

The Bastion Cascades Track features rainforest, sandstone cliffs and spectacular waterfalls and is extremely rugged.

The Split Rock Track leads from the Apex Hut to Meander Falls via a subalpine plateau below Bastion Bluff. The Shower Cave Falls and the Cleft Rock Falls are accessible from this track. A side track leads up to Lake Meander through a mossy alpine valley below the lake.

The Meander Falls Track follows the Meander River through rainforest and is the best known walk in this area.

Dixons Track leads from the Meander Falls Track and follows Staggs Creek to the Plateau.

Staggs Track (Sales Lake Track) leads from the top end of Bessels Road and follows an old trappers track through spectacular dwarf Myrtle forest. It comes onto the Plateau at Sales Lake and provides quick access to Wild Dog Tier.

Johnsons Track also leads from the top end of Bessels Road to the Plateau. It is an old stock route.

Old Powerline Track provides quick access to Johnsons Crag. It features stonework hand laid by the transmission line builders.

Warners Track follows the old Lake Highway. It features old Native Pine bridges and spectacular hand laid stonework, and leads past Adams Peak to Pine Lake.

Fairy Glade Track leads from the Lake Highway to the summit of Quamby Bluff through very old Myrtle forest in the upper portions. It provides easier walking than the northern track which leads from Walking Track Road in Golden Valley.

A further track connects Jackeys Marsh with the summit of Quamby Bluff. This track leads through mixed forest containing some very large Eucalypts.

The Liffey River Track connects the Liffey Falls picnic area with the viewing spot on the Lake Highway just below the edge of the Plateau. It follows the Liffey River all the way.

The Liffey Bluff Track starts near the bottom of the Liffey River Track and provides a good long climb to the Plateau.

Liffey Falls from top picnic area

Liffey Falls to lower picnic area

The Drys Bluff Track is a very long and steep climb to the top of the Bluff from where the views are spectacular.

The Blackwood Creek Track leads from the end of Blackwood Creek Road to the Plateau, past some sandstone cliff overhangs.

The Bradys Lookout Track ascends to the Plateau from the Poatina Highway.

The Great Western Tiers have been traditionally enjoyed by European settlers as a means of access to the Central Plateau for recreation, fishing and trapping. Styant-Browne (1899) describes an excursion up Higgs Track:*"...After winding up the mountain for some distance the top was approached and the track became more steep and rocky, and at length a beautiful peep of scenery was seen from what is called "Nells Lookout". A halt was called and the scene duly admired and photographed, and then a short distance further on another peep of the mountains peaks tempted us to secure a picture of it. After a sharp pinch of a half a mile or so we at length landed on the summit, where a magnificent view of the surrounding country was obtained, though part of it was obscured by mist. The plains lay spread out like a map at our feet and the bright gleams of the sunshine resting on some parts, with the clouds casting grey shadows over others, was very beautiful; the scene stretching from Chudleigh and Deloraine to Port Sorell and Devonport in the far distance. The peculiarity of the Western Tiers is that when you get to the top about 3000 feet high, level plains extend for many miles, watered by lakes of various size, and out of these plains again spring other mountains...."*

Jetson (1989) describes early use of the Great Western Tiers for recreation and tourism:*"...access tracks up the front of the Tiers. Griffins Track was but one of many which were making the Plateau increasingly accessible to the tourist and angler. In 1894 the Deloraine and District Improvement Society mentioned two tracks, Scott and Dunhams and Warners Track from Jackeys Marsh. Along the latter, anglers could make a day trip from Great Lake. The Deloraine Group persevered with track improvement and by 1897 C.J.L. Smith and John Napper drove the first vehicle to the summit of the Western Tiers. Negotiations were under way for an accommodation house at the northern end of Great Lake to augment the hospitality of Don Brandum. Other tracks ascending the northern face of the Tiers were from Tubbs at Blackwood Creek to the Sandbanks on the north eastern end of the Great Lake, Parsons Track from Caveside and Higgs Track to Lake Lucy Long...Another past-time was photography and Ilford Dry Plates and Lantern Plates provided a variety of techniques for enthusiasts."*

B.9.2. Caving

Mole Creek is one of Australia's most renowned caving areas, especially so for the beauty and state of activity of its cave formations and also the density of subsurface developments over a fairly compact and accessible area. The caves of Mole Creek, because of less recreational pressure to date, are in extraordinarily better condition than mainland caves.

The most famous cave is Kubla Khan. Other famous caves exist within the National Park area, such as Croesus, Lynds, Execution Pot, Marakoopa, Devils Pot and Devils Earhole, Anastamosis, My Cave, and Baldocks. Other famous caves, which are outside the area but whose catchments are within the area, are Kellys Pot, Herberts Pot and most of the Eldorado/Wet Cave system.

The area offers a wide variety of challenges for cavers of varying degrees of proficiency. Hard, "sporty" caves such as Rat Hole and Soda Creek cave challenge the hardiest. Execution and the Devils system offer the pleasures of multiple-pitch vertical caving and photographers enjoy the delights of caves such as Croesus, Lynds and Marakoopa. Through trips are possible in some systems. Following both "Speleomania", the 1985 Biennial Conference of the Australian Speleological Federation (ASF), and "TasTrog" in 1993, over 200 delegates visited Mole Creek for recreational caving.

Of the nearly 100 known karst localities in Tasmania, Mole Creek is nationally recognised as the richest in major, highly decorated caves, from an ASF survey involving several hundred Australian cavers and speleologists, on the basis of both personal experience and repute (Kiernan 1984).

Educational groups, Scouts, Venturers and Rovers, and city adolescent groups on self esteem programmes are amongst cave resource users. The sport is gaining popularity.

New discoveries are still possible for those willing to undertake the necessary field reconnaisance involved.

The aesthetic values of the caves and the satisfaction of the physical achievements involved are heightened by the fact that the caves are contained in an area of considerable aesthetic value in itself.

B.10. Wilderness

A high quality wilderness core extends north on the Central Plateau to about Forty Lakes Peak/Lake Ironstone. This was assessed by Lesslie, Mackey and Shulmeister (1988) on the basis of four indicators - remoteness from settlement, remoteness from access, aesthetic naturalness and biophysical naturalness. Access to this northern wilderness is from Lake Mackenzie, Western Creek or the Meander Forest Reserve. Higgs Track, the Western Creek Track and Syds Track provide the quickest access. No further shortening of these tracks can be allowed. The remoteness and hence wilderness quality would be improved by blocking off the side roads leading from Westrope Road to Syds Track and the Western Creek Track, allowing them to regenerate into walking tracks over a long period.

Any roading onto the high bench between the Meander Forest Reserve and the top end of Bessels Road would erode the remoteness and hence wilderness quality of the area including core wilderness.

Much smaller wilderness areas, devoid of roads, occur south of Drys Bluff and Bradys Lookout.

Appendix C: Species Conservation Status in Eastern Region

(adapted from J.B. Kirkpatrick, A Moscal and M. Askey-Doran, *National Estate Values Of The Great Western Tiers, Tasmania-The Flora And Vegetation* Tasmanian Conservation Trust Inc., April 1994)

Species	Type	Status	Figure number (Kirkpatrick et al 1994)
Agrostis australiensis	Grass	r1u	2
Ajuga australis	Herb	r2	3
Amphibromus macrorhinus	Grass	e	7
Australopyrum velutinum	Grass	r2	7
Brachyscome nivalis var.alpina	Herb	r1	9
Carex raleighii	Sedge	r2R	11
Colobanthus affinis	P.herb	r2	12
Craspedia glauca var. gracilis	Herb	r2	13
Danthonia nitens	Grass	r2R	14
Deyeuxia brachyathera	Grass	r2	15
Epacris acuminata	Shrub	r2	19
Epacris petrophila	Shrub	r1	20
Epilobium billardierianum spp. hydrophilum	P.herb	uK	21
Epilobium willisii	P.herb	r2R	22
Eucalyptus archeri	Tree	r2R	23
Euphrasia scabra	A.herb	Ve	24
Festuca plebeia	Grass	r2R	25
Gaultheria depressa	Prshrb	r3	26
Isolepis montivarga	Rush	r2	29
Leucopogon stuartii	Shrub	r2	31
Myosotis australis	Herb	r2	33
Nertera depressa	Shrub	r2	35
Olearia phlogopappa var. subrepanda	Shrub	r2	36
Oreomyrrhis argentea	Herb	r1	37
Oreomyrrhis sessiliflora	Herb	r2	38
Pentapogon quadrifidus var. parviflorus	Grass	r2	39
Pernyetta lanceolata	Shrub	Vv	40
Pimelia pygmaea	Shrub	r1R	41
Poa costiniana	Grass	r2	42
Poa labillardieri var. acris	Grass	r2	43
Phebalium montanum	Tree	r2R	44
Stellaria multiflora	Aherb	r2	46
Stellaria palustris	Aherb	r2	47
Taraxacum aristum	Pherb	Rr2	48
Veronica nivea	Herb	r2	49
Veronica serpyllifolia	Herb	ur2	50
Viola cunninghamii	Herb	r2R	51

Wet Eucalypt Forest Communities	Status	Figure number (Kirkpatrick et al 1994)
DAL 00	Unreserved	55
DAL 10	Unreserved	56
VIM 0011	Unreserved	58
VIM 0101	Poorly Reserved	59

KEY

e = endangered in Tas.
v = vulnerable in Tas.
R = Rare nationally
U = Unreserved
PE= Tas only endemic with only 1 secure reserve
X = Extinct
K = rare threatened nationally - exact status unknown
r1 = rare in Tas. < 100 x 100km grid
r2 = " " < 20 (10x10km) grid
r3 = " " in very small populations.

Eucalypt. Community Key

DAL 00 *E. dalrympleana/ E. delegatensis - Lomatia tinctoria*
DAL 10 *E. dalrympleana - Tasmanian lanceolata - Dicksonia antartica*
VIM 0011 *E. viminalis - Bedfordia salicina- Pultenaea juniperina*
VIM 0101 *E. viminalis - Acacia dealbata - Pomaderris apetela*

Map 2 Public Land Use Commission
Western Tiers National Park Proposal