



Management of the flora of the Mt Read RAP

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INTRODUCTION

The Mt Read area is acknowledged as being of great botanical and scientific importance due to the occurrence of particularly unusual and interesting vegetation communities, some of which may have been on the site since the last glaciation. In recognition of the values of the vegetation, the area has been chosen by the Working Group for Forest Conservation (WGFC) as a 'RAP' (Recommended Area for Protection). Of all the 170 or so RAPs identified, the Mt Read RAP is considered by the WGFC to be botanically one of the most important.

Most of the Mt Read area is covered by existing mining leases: ML 7M/91 covers the Henty Gold Mine, while ML 33M/89 is associated with the Rosebery silver-lead-zinc mine.

There is a need to acknowledge the importance of the vegetation and have in place some means of ensuring protection for the rare communities, while at the same time also acknowledging the existence of the Mining Leases and the existing contractual rights of the lessees. With this in mind, the Department has produced this report which sets out the existing rights and obligations of lessees; outlines the issues involved; and includes a management regime based on maps of the individual vegetation communities of the area.

Management aims will be achieved on ML 7M/91 by using the existing controls, which are more than adequate for this purpose. On ML 33M/89 the lessee has agreed to the addition of lease conditions which ensure that due regard will be given to the vegetation when planning and executing surface exploration works.

Acknowledgements

Vegetation maps of the area were commissioned by RGC Ltd over part of ML 7M/91, and by the Department of Mines of ML 33M/89. Both studies were undertaken by Mr M. J. Peterson. The results of the vegetation surveys are included here and form the basis of the 'Management Zones' outlined in this document.

CURRENT TENURE

The Mt Read RAP is almost entirely covered by Mining Leases ML 33M/89, held by Pasminco Australia Ltd, and ML 7M/91 held by Renison Goldfields Consolidated (Tasmania) Ltd and Little River Resources Pty Ltd. A small portion of the RAP remains as unallocated Crown Land, part of which is held under Exploration Licence EL 11/85 by Arimco Mining Pty Ltd. Current tenure is shown in Figure 2.

EXISTING RIGHTS

A mining lease is a contract entered into between the lessee and the Crown. The lessee gains a number of rights in return for a set of obligations. In simplified terms, the lessee is entitled to extract a mineral ore from the earth, in accordance with various environmental and safety conditions, in return for paying rent and royalties to the Crown for this privilege.

A mining lease may be revoked by the Crown (using Section 91 of the *Mining Act 1929* which provides for land to be resumed for a public purpose) but the lessee is entitled to claim compensation for this action, as the Crown, has in effect, broken the contract.

ACCESS

Lessees are entitled to restrict access to their leases and may prohibit entry to persons who do not have a right of entry under the *Mining Act 1929* or some other Act. Trespassers on leases can be prosecuted. Persons with a right of entry under the *Mining Act 1929* include the Mines Inspectors and any officer authorised by the Director of Mines, together with such assistants as are considered necessary. Officers from the Department of Environment and Planning also have a right of entry.

VISITORS

Lessees are, in general terms, responsible for the safety of visitors on a lease. Lessees may incur liability in respect of injuries to visitors on their leases when such injuries are sustained in circumstances which constitute a breach of a "duty of care" owed to those visitors. A lessee has a duty to take reasonable care to prevent injury to persons in a proximate relationship to him. In particular, a lessee has a duty to protect visitors to his lease from dangers of which he is aware or ought to be aware.

An exact definition of "duty of care" is difficult to ascertain, as each case will be different.

It should also be noted that lessees are not automatically liable for any injury sustained by any visitor; liability will only arise where the injury results from a breach of a duty of care.

PERMISSION TO VISIT LEASES

Permission for entry (even on foot) to either lease must be sought from the relevant Mine Manager. Visitors to ML 7M/91 (Henty, RGC) should contact Mr G. Jardine [telephone (004) 71 6565]; visitors to ML 33M/89 (Rosebery, Pasminco) (i.e. the Lake Johnston area) should contact Mr T. Coombe [telephone (004) 73 1104]. Visitors may be authorised to visit leases by the Mine Manager, or by a person designated by the Manager to give that authority.

EXISTING CONTROLS

ML 7M/91

This lease is held over the Henty Gold Mine. Conditions in both the Mining Lease (issued by the Department of Mines) and Licence to Operate Scheduled Premises (issued by the Department of Environment and Planning) require approval to be sought before exploration activities are undertaken in the Mt Read RAP.

Clause 10 of Schedule 2 of the Mining Lease document reads:

"Any exploration activities causing ground disturbance in the area classified as Recommended Areas for Protection (RAPs) are to be referred to the Mineral

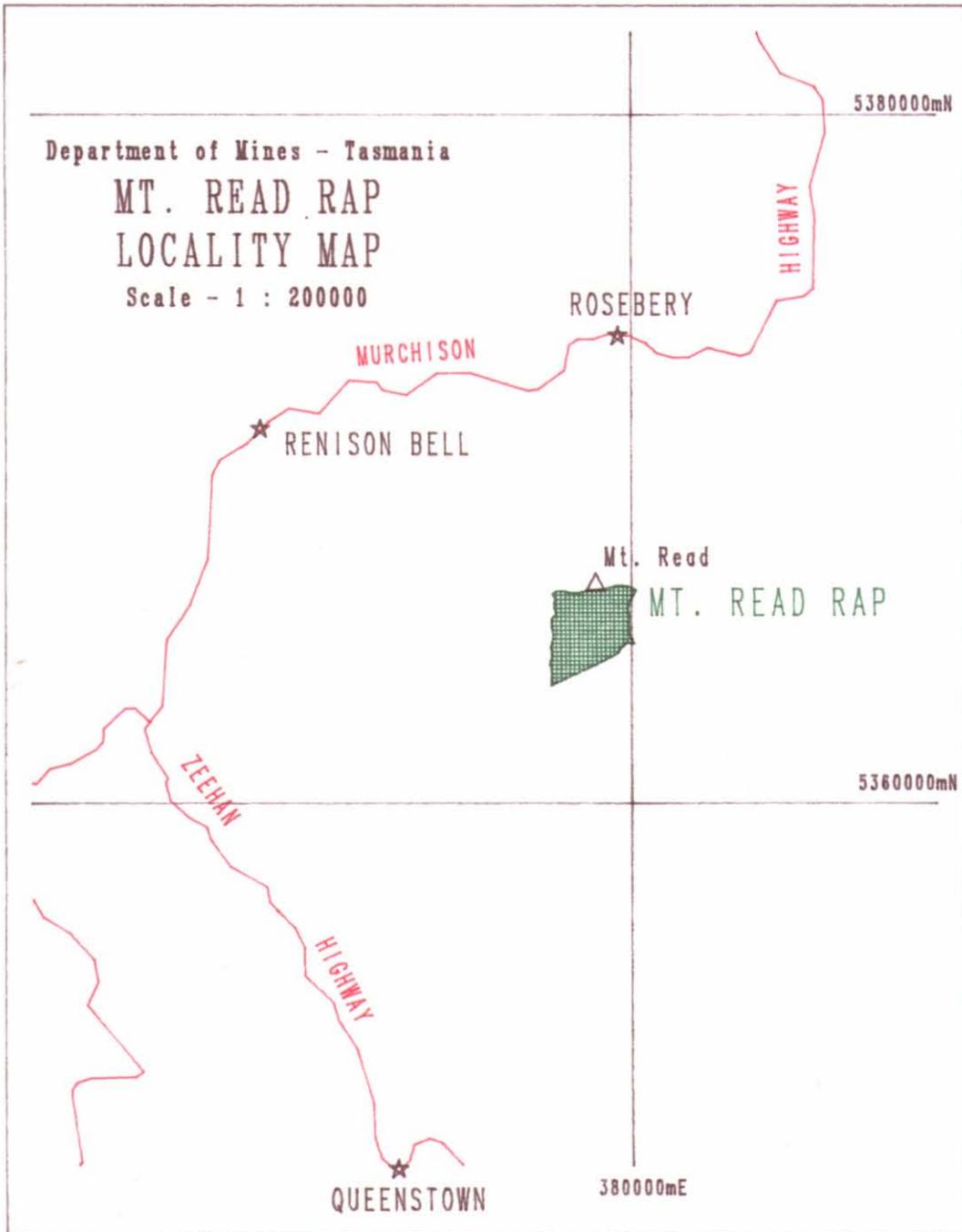


Figure 1

5 cm

Exploration Working Group, and will be subject to prior written approval before being undertaken”.

Condition G4 of the Licence to Operate Scheduled Premises (issued by the Department of Environment and Planning) reads:

“New exploration activities involving earthworks, drill pads or vehicular tracks within the Mt Read Recommended Area for Protection, as defined by the Working Group for Forest Conservation in ‘Recommended Areas for Protection of Rainforest, Wet Eucalypt and Dry Sclerophyll Forest in Tasmania’ (See Map 1 attached to this licence), must be referred to and approved by the Tasmanian Government’s Mineral Exploration Working Group. This does not include works associated with the exploration program currently being undertaken with the approval of the Department of Resources and Energy.”

At the time these two conditions were drafted, the “Mt Read RAP” covered much of the Dundas area; subsequently this large RAP was divided into a much smaller “Mt Read RAP”, with the remainder being known as the Dundas RAP. The aim of both these sets of conditions was to cover work in the large RAP (i.e. current Mt Read and Dundas RAPs combined).

ML 33M/89

This lease was granted on 2 October 1989. Lease conditions include the following:

- 17. The Department of Mines will be notified of proposed exploration works on the lease.
- 18. Exploration works will be planned so as to minimise environmental disturbance. Works will be in accordance with the Mineral Exploration Code of Practice.
- 19. In the Mt Read RAP area exploration works will be planned giving due regard to the vegetation map of this area provided by the Department of Mines, and all activities will be undertaken in such a way as to minimise impact on the important vegetation communities insofar as is prudent and feasible to do so.

RAP STATUS

In recognition of the high conservation value of the flora in the immediate vicinity of Mt Read, the Working Group for Forest Conservation (WGFC) has recommended that this RAP be declared a State Reserve with a management plan providing for underground mining. The WGFC is comprised of representatives from the Forestry Commission, the Department of Parks, Wildlife and Heritage, Department of Mines, and Department of Environment and Planning. The working group reports to the Minister for Forests and the Minister for Environment and Planning.

If such a recommendation was adopted, the right currently held by the lessees would not be affected. State Reserves can be declared under the *National Parks and Wildlife Act*

1970, but S.24 of that Act allows for “private rights” to continue. This means, in effect, that such declaration would have no effect on the rights and privileges enjoyed by the lessees by virtue of holding the mining leases.

At this point in time the RAP is classed as “unresolved”. This means that the agencies represented on the WGFC are not agreed on the proposed tenure. Unresolved RAPs may be sent to the Public Land Use Commission (PLUC) for consideration.

A far better solution is seen as instigating some sort of management regime, which recognises the importance of the vegetation and presents strategies for management of activities on the leases without imposing unreasonable hardships on the current lessees.

VEGETATION

The Mt Read RAP contains a number of rainforest communities currently either unreserved or poorly represented in the existing reserve system and considered to be of biogeographical significance in terms of their species composition, biodiversity and structural forms. The area is part of a major stronghold of the rare restricted endemic *Orites milliganii*, and also contains a significant population of the endemic conifer Cheshunt pine (*Diselma archeri*) in its rare arboreal form, including the largest and possibly oldest specimens recorded. Of the State’s 320 endemic species, 90 have been recorded in the RAP. Only one other site in the State (Mt Field) has an equivalent number of native conifers. The RAP (approximately 500 ha in area) is within a 21 km² patch of deciduous beech (*Nothofagus gunnii*), which is the biggest single patch in the State. However a good part of this patch is now within the World Heritage Area.

The RAP also contains two disjunct subalpine patches of Huon pine (*Lagarostrobos franklinii*). Anecdotal sources have reported Huon pine from a number of other high altitude sites in western Tasmania, and an occurrence at 850 m altitude on Frenchmans Cap has been described. However, at this point in time the Mt Read occurrences are undisputedly the highest recorded altitude of live Huon pine.

The vegetation on the Mt Read/Mt Dundas massif has attracted many studies. The revelation of the unique vegetation attributes is due, in part, to the intensity of the studies conducted to date, and the ease of access provided by mining and mineral exploration tracks. Nevertheless, the importance of the vegetation cannot be denied, particularly that near Lake Johnston.

Studies which have been done, or are in progress, include:

- Dendro-chronological studies of the live and fire-killed Huon pine, which have produced an important 1100 year climatic record (Cook *et al.* 1991, 1992). This record has now been extended to 2700 years, the longest record of its type in the southern hemisphere and on a global basis is considered to be one of the most significant. Dendro-chronological studies producing records of 2000 years or more have also been done on Huon pine in the Teepookana and Wilson River areas.

- Analysis of pollen in sediment cores taken from Lake Johnston and genetic studies indicate that the Huon pine stand near the lake may consist of, or is derived from, one single individual which has been present on the site for over 10,000 years.
- Pollen records from Lake Johnston have been used to interpret vegetation and climate profiles following the waning of the last glaciation (approximately 11,000 years ago). The sediment cores were also used for palaeomagnetic interpretation, part of an Australia-wide research project by the Bureau of Mineral Resources.
- The inferred long-undisturbed nature of rainforest communities on Mt Read is of great interest to ecologists and palaeobotanists. A comparative study of these communities with recently disturbed areas is providing new insights into vegetation succession and the effects of fire.

VEGETATION STUDIES

The RAP covers approximately 500 ha, 269 ha of this being covered by ML 33M/89 held by Pasminco-EZ and 182 ha being covered by ML 7M/91, held by RGC (Tasmania) Ltd and Little River Resources.

A vegetation survey of that part of ML 7M/91 which overlaps with the Mt Read RAP was commissioned by the lessee in response to a request from the Mineral Exploration Working Group (MEWG). The vegetation study over that part of the Pasminco-EZ lease area (part of ML 33M/89) which overlaps the Mt Read RAP was commissioned by the Department of Mines.

The aim of both these studies was to produce a vegetation map, together with notes on the various vegetation communities, to allow exploration works to be designed in such a way as to minimise impact on the flora and avoid, wherever possible, the vegetation communities of highest conservation significance. Both studies were undertaken by M. J. Peterson; the results of these studies are presented below. The vegetation is shown in Figure 4.

Sampling Limits

Examination of aerial photography suggested that this area contains a range of sub-alpine and montane rainforest types, with small patches of alpine heaths/herbfields at higher elevations. The impenetrable nature of much of the vegetation and the extreme variation in topography — altitude rises from 620 m near the Henty River to approximately 1127 m at the summit of Mt Read — restricts field sampling to established exploration gridlines or to areas in close proximity to old logging/mineral exploration tracks.

Initial photo-interpretation of colour aerial photography, flown in 1984 at a scale of 1:20 000 and 1991 at 1:10 000, suggested the presence of a number of distinct vegetation assemblages; eleven in the ML 7M/91 part of the RAP and twelve on the ML 33M/89 part.

Each of these assemblages were systematically sampled to cover the broad altitudinal range and geological variation

shown on the *Geology of the Henty River–Mt Read Area* (Corbett, 1986). Quadrats were subjectively located within areas of apparently homogeneous vegetation; the sampling intensity was sufficient to support a descriptive community classification and to also permit distributional mapping from interpretation of available aerial photography, correlated with field observations.

A total of 137 plots were located throughout the RAP area during these two studies; 97 plots were on ML 7M/91 and 40 plots on ML 33M/89.

This data was supplemented by records from 81 quadrats established in the study area during 1989/90 (Peterson and Podger, unpublished data). Quadrat data from sites outside the study area, but within assemblages contiguous with or apparently similar to those within the study area, were also included to improve confidence in community classification and description.

A species list is given in Appendix 1.

The mining/exploration tenements and established exploration grids, tracks and vegetation sample points within the study area and immediate environs are shown in Figures 2 and 3.

Data Collection and Floristic Classification

Examination of the vegetation was based on 5 × 5 and 10 × 10 metre quadrats. A species list was compiled for each quadrat, noting the cover of each vascular plant according to a six-point Braun Blanquet scale and relative abundance on a four-point scale. Community structure in terms of height, floristic composition and cover of each stratum was recorded according to the system of Specht (1970). Elevation, slope, aspect, soil type and parent material (if apparent) were also recorded at each site.

Community types were assessed from 218 sample sites, 107 on ML 33M/89 and 111 on ML 7M/91. Altogether forty-one quadrats were located on disturbed areas (33 on ML 33M/89 and 8 on ML 7M/91) to assess the resilience of vegetation communities and species to disturbance.

The terminology used by Peterson is based on that of Jarman *et al.* (1991, 1984) and Kirkpatrick (1977). Species nomenclature follows Buchanan *et al.* (1989).

Plant Communities

Fifteen plant communities were identified on ML 7M/91 and 17 on ML 33M/89. Most of these communities are common to both lease areas; in total some 21 communities were identified over the whole Mt Read RAP.

Several communities may be interpreted as intermediates of others, but at this level of discrimination they are described as separate communities. A general description of these communities and their principal indicator species is outlined below.

Callidendrous/Thamnic *Nothofagus cunninghamii*
Rainforest

- C 1.1 *Nothofagus cunninghamii*–*Atherosperma moschatum* over *Polystichum proliferum* and/or *Blechnum watsii*
ML 7M/91

This community closely resembles that described by Jarman *et al.* (1984), however *Dicksonia antarctica* is absent. Tall (25–35 m), widely-spaced *N. cunninghamii* and the subdominant *A. moschatum* produced a dense canopy above an open understorey dominated by patches of *P. proliferum* and *B. watsii*, with epiphytic ferns common on trunks of trees and logs. Vascular species diversity is generally low (<10 species) and none are endemic.

- CT2.1 *Nothofagus cunninghamii*–*Atherosperma moschatum* over *Anodopetalum biglandulosum* (C1.1 X T1.1)
ML 7M/91
ML 33M/89

This intermediate community has the same general structure as that of C1.1, with the inclusion of *A. biglandulosum* in the understorey.

- T1.1 *Nothofagus cunninghamii*–*Atherosperma moschatum*–*Eucryphia lucida* (–*Phyllocladus aspleniifolius*) over *Anodopetalum biglandulosum*
ML 33M/89
ML 7M/91

This forest type is also dominated by tall (25–35 m) *N. cunninghamii* and appears to be associated with similar but less well-drained sites to those on which the above community (CT2.1) was observed. *Atherosperma moschatum*, and to a lesser extent *E. lucida* and *P. aspleniifolius*, are found as subdominants. Gaps in the canopy have permitted the development of thickets of *A. biglandulosum*, often accompanied by *Cenarrhenes nitida*, *Anopterus glandulosus*, *Archeria eriocarpa* and occasionally *Trochocarpa gunnii*. *Blechnum watsii* is the prominent ground fern. *Hymenophyllum* spp. and *Grammitis billardieri* are common epiphytics. Ground cover is composed of dense patches of moss and lichens or litter.

Thamnic *Athrotaxis selaginoides* Rainforest

- T1.3 *Athrotaxis selaginoides* over *Anodopetalum biglandulosum*–*Richea pandanifolia*
ML 7M/91
ML 33M/89

This community is similar to T1.1 in most aspects, but tall (20–30 m) *A. selaginoides* is present as a co-dominant. The climbing heath, *Prionotes cerinthoides*, is common on *Athrotaxis* stems, and *Richea pandanifolia*, *Tasmannia lanceolata* and *Coprosma nitida* occur sparsely where there are gaps in the canopy.

- T4.3 *Athrotaxis selaginoides*–*Nothofagus cunninghamii*–*Eucryphia* sp. over *Archeria eriocarpa* / *A. hirtella*–*Richea pandanifolia*
ML 7M/91
ML 33M/89

Scattered *A. selaginoides* to 25 metres dominate a closed layer of *N. cunninghamii* and *E. lucida* and/or *E. milliganii*. Understorey shrubs, such as *Archeria* spp., *Anopterus glandulosus*, *Olearia persoonioides*, *Anodopetalum biglandulosum* and *Cenarrhenes nitida* may be present. Smaller shrubs include *Tasmannia lanceolata*, *Coprosma nitida* and *Orites diversifolia*.

Implicate Conifer Rainforest

- I1.3 *Athrotaxis selaginoides* over a mixed *Agastachys odorata* tangle with *Richea pandanifolia*
ML 7M/91

Athrotaxis selaginoides (18–25 m) is scattered and dominates mid–high *N. cunninghamii* and *E. milliganii*. *Eucryphia lucida* and *Phyllocladus aspleniifolius* are often present as small stems. In the study area the understorey shrub layer was densely tangled, displaying typical implicate traits. Prominent shrubs include *A. odorata*, *Anodopetalum biglandulosum*, *Anopterus glandulosus*, *A. eriocarpa*, *A. hirtella*, *Cenarrhenes nitida*, *Olearia persoonioides* and *R. pandanifolia*. *Prionotes cerinthoides* is common on many stems, logs and the dense matt of moss which forms the ground cover. Ferns include *Blechnum watsii*, *Grammitis billardieri*, *Hymenophyllum* spp., and sometimes *Apteropteris applanata*.

All the implicate communities listed below may be broadly grouped in the I2.1 type described by Jarman *et al.* (1984). There is, in M. J. Peterson's opinion, sufficient variation in structure and component species to discriminate each and therefore accord each community status. These communities are unusual in that the level of species diversity and the degree of endemism far exceeds all other forest communities in the study area.

- I2.1 *Athrotaxis selaginoides*–*Diselma archeri* over *Nothofagus gunnii* tangle
ML 7M/91
ML 33M/89

Athrotaxis selaginoides and *N. gunnii* are the most conspicuous trees in this mid–high (8–15 m) forest type, the *N. gunnii* forming an often dense tangle below the dominant conifer. *Diselma archeri* is present in tree-form, attaining heights of up to twelve metres and diameters of 40 centimetres. *Phyllocladus aspleniifolius*, *Nothofagus cunninghamii*, *Eucryphia milliganii* and *Richea pandanifolia* are frequently present in the tallest layer. A prominent indicator in this community is the shrub *Orites milliganii*. *Agastachys odorata*, *Archeria eriocarpa*, *A. hirtella*, *Anodopetalum biglandulosum*, *Cenarrhenes nitida*, *Olearia persoonioides*, *Telopea truncata* and *Trochocarpa gunnii* are also common woody shrubs. *Prionotes cerinthoides* often forms dense matts on stems and the extensive cover of moss. *Gahnia grandis* tussocks are common. Other monocots are present but do not feature

in high abundance. A variety of ferns are encountered, with *Blechnum watsii* the most abundant.

I2.2 *Athrotaxis selaginoides*–*Phyllocladus aspleniifolius* over *Nothofagus gunnii* tangle

ML 7M/91
ML 33M/89

This variant is similar to I2.1, described above, but *Diselma archeri* and *Orites milliganii* are absent. *Phyllocladus aspleniifolius* is also co-dominant. *Eucryphia milliganii* and *Archeria* spp. feature more prominently in this community.

I2.3 *Athrotaxis selaginoides*–*Leptospermum nitidum* over *Nothofagus gunnii* tangle

ML 7M/91

This community is a variant of I2.2 (above) but *L. nitidum* is a prominent co-dominant tree. *Anodopetalum biglandulosum*, *Anopterus glandulosus* and *Cenarrhenes nitida* are also found in greater abundance.

I2.4 Dwarf *Athrotaxis selaginoides*–*Diselma archeri*–*Leptospermum nitidum* over *Nothofagus gunnii* tangle

ML 7M/91
ML 33M/89

Although this community has component attributes of rainforest it is better described as a low rainforest scrub or dwarf implicate deciduous beech rainforest. Generally the dominants are between three and eight metres in height. Floristically it can be interpreted as an intermediate of I2.1 and I2.3. Species common to alpine areas were also observed, perhaps due to the more open nature of this community.

I2.5 Dwarf *Athrotaxis selaginoides*–*Phyllocladus aspleniifolius*–*Eucryphia milliganii* over *Nothofagus gunnii* tangle

ML 7M/91

This community is also low in stature (3–8 m). Floristically it is similar to I2.2, however *A. selaginoides*, *P. aspleniifolius* and *E. milliganii* are present as co-dominants over a diverse tangle of *N. gunnii* and *Agastachys odorata*. Of note is the absence of *Diselma archeri* and *Orites milliganii*.

I2.6 *Lagarostrobos franklinii* over *Nothofagus gunnii* tangle

ML 33M/89

In this previously undescribed community the endemic conifer, Huon pine (*L. franklinii*), forms a dense cover in association with *N. gunnii* over an open cover of mosses and lichens. There is a general paucity of understorey shrubs, the most prominent being the shrubs *Trochocarpa cunninghamii*, *Tasmania lanceolata* and *Archeria eriocarpa*. Part of the stand was burnt by a wildfire in 1960.

I2.7 *Athrotaxis laxifolia*–*Diselma archeri* over *Nothofagus gunnii* tangle

ML 33M/89

In this community, which is structurally and floristically similar to I2.1, a putative *Athrotaxis* hybrid, *A. laxifolia*, replaces *A. selaginoides* as the dominant conifer. Of note is the presence of a number of large (1.4–1.9 m) diameter specimens of *A. laxifolia* near Lake Johnston.

I2.8 *Athrotaxis cupressoides*–*Diselma archeri* over *Nothofagus gunnii* tangle

ML 33M/89

Pencil pine, *A. cupressoides*, is the dominant tree in this community which has a deciduous scrub understorey component similar to that of I2.1. Stems of *D. archeri* and *N. gunnii* commonly exceed 40 cm diameter in this mid-high (8–15 m) forest type.

Sub-alpine Heaths/Scrubs

H1.1 *Nothofagus gunnii*–*Diselma archeri*–*Microcachrys tetragona* heath

ML 7M/91
ML 33M/89

This community was found at high windswept altitudes above 900 m elevation. *Nothofagus gunnii* dominates a closed heath which includes *Richea scoparia*, *Orites milliganii*, and the conifers *D. archeri* and *M. tetragona*. Numerous small endemic shrubs and herbs are present in varying abundance.

H2.1 Very tall *Leptospermum nitidum*–*Gahnia grandis*–*Baeura rubioides* closed heath

ML 7M/91
ML 33M/89

Found on the ridgelines near the western boundary of ML 7M/91 and in the southeastern corner of ML 33M/89. This community appears to be a sere of the 'climax' implicate deciduous beech rainforest types. The diameter of the sclerophyllous *Leptospermum* indicates a fire event probably occurred several hundred years ago — similar sized stems near Lake Johnston were measured to be 185 to 220 years old.

This community is dominated by 3–8 m high, well-spaced *Leptospermum nitidum*. There is a dense ground cover of *G. grandis*, *B. rubioides* and *Empodisma minus*. Occasional clumps of the fire sprout *Anodopetalum biglandulosum* and *Agastachys odorata* were observed. Of note was the presence of seedling *Nothofagus gunnii*, *Athrotaxis selaginoides*, *Diselma archeri* and *Orites milliganii*.

H2.2 Tall (1–3 m) *Gahnia grandis*–
Leptospermum nitidum open clumpwood
heath

ML 33M/89
ML 7M/91

This community is essentially an assemblage of recently burnt (c.1960) facies of the deciduous implicate types (I2.1 and variants) and the tall conifer/deciduous heath (H1.1). The community is structurally variable and is generally composed of thickets of *Gahnia grandis* and *Leptospermum nitidum* or extensive mats of *Baeura rubioides*. Fire sprout *Agastachys odorata*, *Cenarrhenes nitida* and *Anodopetalum biglandulosum* are found in and around the thickets. Seedlings of rainforest and alpine species are frequently encountered.

SH1.1 Very tall (3–6 m) *Leptospermum nitidum*–
Gahnia grandis closed scrub heath

ML 33M/89

Patches of recently burnt tall *Athrotaxis selaginoides* thamnic rainforest (T1.3 and T4.3) have regenerated to a dense thicket of *L. nitidum* and *G. grandis*. Fire sprout *Nothofagus cunninghamii*, *Anodopetalum biglandulosum*, *Cenarrhenes nitida* and seedling *A. selaginoides* are commonly found.

Alpine Complexes

A1.1 Alpine gramminoid herbfield/heath

ML 33M/89
ML 7M/91

This community is an assemblage of recently fired alpine communities (described below). The area is generally dominated by hard leaved gramminoids and/or Cyperaceae species. *Astelia alpina* or *Carpha alpina* is found in dense mats. *Baeura rubioides*, *Diplarrena latifolia*, *Gahnia grandis* and *Milligania densiflora* may be locally abundant. Regenerating alpine species of the Epacridaceae and Proteaceae are frequently found but their importance is presently low. *Athrotaxis selaginoides* is sparsely present as small seedlings. All other conifers were absent.

A1.2 Low (<0.5 m) coniferous bolster heath

ML 33M/89

Diselma archeri and/or *Microcachrys tetragona* form dense low mats in which bolsters of *Donatia novae-zelandiae*, *Centrolepis monogyna*, *Gaimardia fitzgeraldii* and *Oreobolus* spp. are common. Numerous other endemic and cosmopolitan alpine species were observed in this type, which appears to be extremely fire sensitive.

A2.1 Krummholz conifer–*Nothofagus gunnii*
shrubs

ML 33M/89

On exposed southerly aspects above the timber-line (approximately 1000 m) there are extensive patches of low (1–3 m) conifer–deciduous beech scrub. Pruned by wind

and ice particles, the dominant plants have assumed a krummholz form (def. — dwarf and deformed trees, often prostrate; resulting from strong winds). The community is particularly rich in endemic species, with component species from both the implicate conifer rainforests and alpine communities. The principal species are *N. gunnii*, *Athrotaxis selaginoides*, *Diselma archeri*, *Podocarpus lawrencii*, *Orites milliganii*, *Astelia alpina*, *Richea scoparia*, *Olearia pinifolia* and *Epacris serpyllifolia*.

The most unusual krummholz association is a small patch which includes Huon pine (*Lagarostrobos franklinii*) as the dominant conifer. Unfortunately 95% of this stand has been destroyed by fire and only three live stems remain. These three individuals (?) are the highest recorded for the species. A ring count of a 23 cm diameter sample taken from a fire-killed specimen indicated an age of 976 years before death.

COMMUNITY CONSERVATION STATUS

Of the fourteen rainforest community types recorded from the whole RAP, ten are not known from any State Reserve (although a fragmented variant of the implicate conifer–deciduous beech communities has been recorded from a locality now reserved on Mt Bobs in the south of the State). The remaining rainforest communities are adequately represented in the existing reserve system.

The areal distribution of the unreserved rainforest types are shown in Figure 5. These are:

T1.3:

The thamnic horizontal rainforest with King Billy pine is composed almost entirely of endemics and covers an area of 30 ha in the Mt Read RAP (12 ha on ML 33M/89 and 18 ha on ML 7M/91). The community has been recorded at Red Hills in the West Coast Range (Jarman *et al.* 1984, 1991); Grant (1989) also recorded this community frequently in a botanical survey of King Billy pine forest at Howards Road, suggesting the largest patches of this type probably exist within or in close proximity to the Mt Read RAP.

I1.3:

The implicate *Agastachys* rainforest with King Billy pine and pandani (I1.3) is also unreserved and has been recorded along Anthony Road, where it has been disturbed by logging. The undisturbed 10 ha in the Mt Read RAP area enhances the significance of this community.

I2.1 and Variants (I2.2–I2.8):

The distinctive and essentially unreserved conifer–deciduous beech communities (I2.1 and variants) achieve their most developed state, where *Diselma archeri* and *Orites milliganii* assume an arboreal form, on the south and southeastern slopes of Mt Read. Some 55 ha were found on ML 7M/91 and 73 ha on ML 33M/89.

The communities are relatively undisturbed, with the exception of a small area (1–2 ha) near the southern boundary of the RAP [AMG 379100, 364650] where there has been the intrusion of several vehicular tracks and the cutting of a number of exploration gridlines in the last 20 years. The known areas of these communities form a contiguous band from Moxon Saddle to Jones Creek, west of Lake Johnston.

The limited extent of these communities and the degree of endemism exhibited by component species implies they have a very high conservation value. In addition, increment cores taken from a number of conifers in these communities indicate that many specimens are over 1000 years old and that several *Athrotaxis laxifolia* may be in the order of 2000 to 2500 years old.

The implicate high altitude Huon pine community (I2.6) has not previously been described. Given the present known distribution of the species there is only a remote possibility that a similar stand exists elsewhere in the state. As a consequence the 0.7 ha mapped on the slopes of Mt Read, above Lake Johnston, is considered to be a unique disjunct stand with very high conservation and scientific values.

SPECIES CONSERVATION STATUS

One endemic vascular species recorded from the survey area was noted to have national and statewide conservation significance by Briggs and Leigh (1988) and Kirkpatrick *et al.* (1991).

Orites milliganii — Conservation status code Rr2

R = taxa that have limited distributions nationally (following Briggs and Leigh, 1988).

r2 = taxa that occur in 20 or less 10 × 10 km National Mapping grid squares in Tasmania.

Orites milliganii was commonly observed as a large shrub or small tree throughout the Implicate I2.1, I2.4 and I2.7, Alpine 2.1 and Heath H1.1 communities. Its presence was also noted as sparse in the Implicate I2.6 and I2.8, and Heath H2.1 communities.

GIS analysis suggests that the total areal extent of communities containing this species within the Mt Read RAP is approximately 167 ha (105 ha in ML 33M/89 and 62 ha in ML 7M/91). It should be noted that *Orites milliganii* has been observed in *Nothofagus gunnii* communities outside the Mt Read RAP; for example, in the low sub-alpine scrub and implicate types on the eastern flanks of Mt Dundas. On the Mt Read/Mt Dundas massif the total area of communities in which *Orites milliganii* is a component is estimated to be 270–300 ha.

MANAGEMENT PRIORITY ZONES

During the course of the two vegetation surveys the consultant was asked to identify or “zone” the vegetation into areas according to similarities in respect of community and species conservation significance and perceived hazards. The reason for this was to allow mineral exploration activities, access routes and gridlines to be

planned to minimise impact on all communities and to avoid disturbance in the zones deemed to be of the highest conservation and scientific value.

These zones are shown on in Figure 6.

Zone 1

Two rectangular blocks in Figure 6 contain the valuable Huon pine (*Lagarostrobos franklinii*) communities. A buffer of 50–80 m is incorporated around the known extent of these communities. One stand is close to Lake Johnston and the other some metres above the lake on the slopes of Mt Read.

Principal Community: I2.6 on ML 33M/89 only

Zone 2

This zone principally contains the rare association of *Nothofagus gunnii*, *Diselma archeri* (often in tree form) and the restricted endemic *Orites milliganii*. The component communities have the highest species diversity amongst the rainforest communities, with endemics often representing in excess of 75% of total species present at any one site. This zone also includes the small areas of Coniferous Bolster Heath (A2.1) which have escaped past firing of the alpine areas, and the unreserved implicate deciduous beech associations dominated by Pencil pine, *Athrotaxis cupressoides* and *Athrotaxis laxifolia*.

Communities:

I2.1, I2.4, I2.7, I2.8, H1.1, H2.1, A1.2, A2.1 on ML 7M/91

I2.1, I2.4, H1.1, H2.1 on ML 33M/89

Zone 3

This zone contains the other unreserved implicate deciduous beech (*Nothofagus gunnii*) community with levels of endemism almost equivalent to those in Zone 2.

Communities:

I2.2 on ML 33M/89

I2.1, I2.2, I2.3, I2.5 on ML 7M/91

Zone 4

The unreserved and undisturbed implicate *Agastachys* rainforest with King Billy pine and pandani defines this zone. The uncommon species, *Pseudopanax gunnii*, was recorded twice in this community.

Communities:

I1.3 on ML 7M/91 only

Zone 5

This zone comprises the tall thamnisc King Billy pine (*Athrotaxis selaginoides*) rainforest communities, one of which is unreserved, and a burnt facie of these communities; the closed *Leptospermum* scrub heath.

Communities:

T1.3, T4.3, H2.3 on ML 33M/89

T1.3, T4.3 on ML 7M/91

Zone 6

This zone consists of the burnt Alpine herbfield and heaths. Numerous endemics are present.

Communities:

A1.1, H2.2 on ML 33M/89

A1.1, H2.2 on ML 7M/91

Zone 7

Nothofagus cunninghamii dominates this zone. Species diversity is low and generally few endemics are present. These communities have the lowest conservation significance in the study area. Revegetation on the fertile clay-loam/basaltic soils in this zone is likely to be rapid in comparison to other areas.

Communities:

CT2.1, T1.1 on ML 33M/89

C1.1, CT2.1, T1.1 on ML 7M/91

VEGETATION MANAGEMENT AIMS

Zone 1

As these stands of Huon pine are of immense scientific interest the aim is total preservation of this flora, with no additional cutting of the vegetation or mechanical disturbance in these areas. The lessee (Pasminco Australia Ltd) is agreed that this aim can be accommodated without interference with mineral exploration activities.

Zone 2-5

In Zones 2-5 the aim is to avoid any further grid cutting wherever possible. The area is well served by existing grids, which do not grow over quickly due to the slow growing nature of the flora.

The existing grid network should be sufficient to allow access for the immediate future, and every effort should be made to tailor work programmes around these existing tracks.

Vehicular track construction in these zones should be avoided unless the need for such access is essential. Alternatives, such as drilling angled holes from alternative locations or helicopter-assisted drilling programmes, should be thoroughly investigated. Vegetation disturbance in Zones 2-5 should be kept to a minimum.

Zone 6

Gridding and low impact works will not unduly affect the vegetation values of Zone 6; however together with Zones 2-5, construction of vehicular access should only be contemplated if essential.

In Zones 1-6 the terrain is steep; existing tracks are prone to erosion and future earthworks are to be avoided wherever possible. Any future works should be designed, constructed and rehabilitated in a manner which takes into account the steep nature of the ground.

Zone 7

The vegetation values in Zone 7 will not be greatly affected by more intensive activities, such as costeaning and track construction, but again erosion is seen as a major hazard and every effort should be made to use existing access.

MAINTENANCE AND REHABILITATION

All Zones

Existing tracks will be kept in good repair if required for further exploration work; drainage will be installed where required. If not required these existing tracks will be rehabilitated.

FIRE MANAGEMENT

The greatest threat to the vegetation is from fire. Over 30% of the Mt Read RAP has been disturbed by fire in the last 125 years. All rainforest and alpine communities are extremely sensitive to fire and research suggests it will be many millenia before fire-disturbed areas reach climax species composition and structure. Further firing of disturbed sites may lead to local extinction of species and community types.

Lease conditions on mining leases include provisions for the lighting and suppression of fires. Fires may only be lit on ML 7M/91 with the written permission of the District Forester, West Coast. The lease conditions (which were written when the relevant Forestry District was named Queenstown) read:

7. No fires to be lit on or adjacent to the lease area without the prior written approval of the District Forester, Queenstown, and then only in accordance with the provisions of the *Fire Service Act 1979*.
8. The lessee shall be responsible for the immediate suppression of any fires which may occur on the lease area due to mining or exploration activities to the satisfaction of the District Forester, Queenstown.

The Licence to Operate Schedules Premises for the Henty Gold Mine, issued by the Department of Environment and Planning, also includes clauses relating to fire.

Condition G8 of the licence ensures the licensee shall:

- (a) ensure that there is no open burning of vegetation, rubbish, or other matter on the premises; and
- (b) clear firebreaks around areas and machinery from which there is a risk of fire escaping; and
- (c) instruct employees on the fire sensitive nature of the surrounding vegetation communities, and the fire control provisions of this licence; and
- (d) from the commencement of pre-production mining (as described in the EMP), station a fire-fighting vehicle and equipment on the premises, train personnel in fire-fighting techniques, and maintain an "at-call" trained crew to man the vehicle and equipment in the case of a fire; and

- (e) ensure that peat stockpiles are located at least 10 m from road edges; and
- (f) liaise with the Tasmania Fire Service, Department of Parks, Wildlife and Heritage, Hydro-Electric Commission and Forestry Commission with respect to fire management, planning and control. The licensee shall provide to the Director of Environmental Control a report on the outcome of these discussions and the agreed role of the licensee in a co-operative fire management plan within 6 months of the date of issue of these conditions.

The Mt Read RAP is incorporated in a regional land unit for which the Department of Parks, Wildlife and Heritage is currently preparing a fire management plan. This plan will broadly define natural and cultural assets, and outline proposed fire management strategies and prescriptions, taking into account the existing licence and lease conditions which will not be altered by the production of this plan.

Fires must not be lit on exploration licences without written permission of the relevant land manager, and the explorer is responsible for suppression of non-permit fires arising from any activities. Clauses in standard schedules A and B read:

SCHEDULE A

- 6. The licensee shall not light any fires without the approval of the State Fire Commission or the relevant District Forester when on State Forest. When on land reserved under the *National Parks and Wildlife Act 1970* or the *Crown Lands Act 1976*, the approval of the Secretary of the Department of Parks, Wildlife and Heritage is required. Precautions are to be taken with fuel storage to minimise the risk of fire. The licensee, agent and/or employees during exploration activities shall be responsible for the immediate suppression of non-permit fires arising from those activities.

Chainsaws and other mechanical equipment may not be used on days of total fire ban, and during fire permit periods all work sites must be stocked with relevant fire fighting equipment.

SCHEDULE B

Exploration managers will ensure that **during a fire permit period**, persons occupying permanent and semi-permanent camp sites, drilling sites, or work sites using, servicing or refuelling earth-moving equipment shall have the sites equipped with the following fire-fighting tools:

- a serviceable knapsack pump filled with not less than 10 litres of water, or a powder type extinguisher of not less than 1 kg capacity;
- a slash hook;
- a fire rake or grubbing hoe;
- a receptacle containing not less than 180 litres of water.

Track cutting teams using chainsaws, and persons on work sites where chainsaws, power augers, generators or other petrol engines are frequently used, will maintain within sensible reach a serviceable knapsack pump filled with not less than 10 litres of water, or a powder type extinguisher of not less than 1 kg capacity.

All premises used as kitchens or as sites for storing fuel or storing, servicing or refuelling engines will be:

- cleared to bare earth;
- surrounded by a firebreak sufficient to isolate the premises from the surrounding vegetation.

All fires in the vicinity of the Mt Read/Mt Dundas massif should be reported immediately to the lessees: Henty Gold Mine (004 71 6565) or Rosebery Mine (004 73 1104), or to the Tasmania Fire Service control centre at Burnie (004 31 1155) or the Department of Parks, Wildlife and Heritage at Queenstown (004 71 2511) or Strahan (004 71 7122).

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[27 October 1992]

APPENDIX 1

Native Species Observed in the Mt Read RAP

	Endemic	Western Section*	Eastern Section†
ANGIOSPERMAE (DICOTYLEDONAE)			
APIACEAE (UMBELLIFEREAE)			
<i>Actinotus moorei</i>	e	*	*
<i>Xanthosia dissecta</i>		*	
ARALIACEAE			
<i>Pseudopanax gunnii</i>	e		*
ASTERACEAE			
<i>Abrotonella scapigera</i>		*	
<i>Celmisia asteliifolia</i>		*	
<i>Celmisia longifolia</i>			*
<i>C. saxifraga</i>	e	*	*
<i>Cotula filicula</i>		*	
<i>Erigeron sp.</i>			*
<i>Erigeron stellatus</i>	e	*	
<i>Ewartia catipes</i>	e	*	*
<i>E. meredithae</i>	e	*	*
<i>E. planchonii</i>	e	*	
<i>Helichrysum backhousii</i>	e	*	*
<i>H. milliganii</i>	e	*	
<i>H. pumilum</i>	e	*	*
<i>Olearia ledifolia</i>	e	*	*
<i>O. persoonioides</i>	e	*	*
<i>O. pinifolia</i>	e	*	*
<i>Pterygonpappus lawrencii</i>	e	*	
<i>Senecio leptocarpus</i>	e	*	
CUNONIACEAE			
<i>Anodopetalum biglandulosum</i>	e	*	*
<i>Baeura rubioides</i>		*	*
DONATIACEAE			
<i>Donatia novae-zelandiae</i>		*	*
DROSERACEAE			
<i>Drosera arcturi</i>		*	*
<i>D. pygmaea</i>		*	
ELAEOCARPACEAE			
<i>Aristotelia peduncularis</i>	e	*	*
EPACRIDACEAE			
<i>Archeria comberi</i>	e	*	
<i>A. eriocarpa</i>	e	*	*
<i>A. hirtella</i>	e	*	*
<i>A. serpyllifolia</i>	e	*	*
<i>Cyathodes dealbata</i>	e	*	*

Nb.: e = endemic

* denotes Roseberry Mine Lease, ML 33M/89, EL 11/85 and unallocated Crown Land

† denotes ML 7M/91

	Endemic	Western Section*	Eastern Section†
<i>C. glauca</i>	<i>e</i>	*	*
<i>C. juniperina</i>		*	*
<i>C. parvifolia</i>	<i>e</i>	*	*
<i>C. petiolaris</i>	<i>e</i>	*	*
<i>Drachophyllum milliganii</i>	<i>e</i>	*	*
<i>D. minimum</i>	<i>e</i>	*	
<i>Epacris corymbiflora</i>	<i>e</i>	*	*
EPACRIDACEAE			
<i>E. gunnii</i>	<i>e</i>	*	
<i>E. serpyllifolia</i>		*	*
<i>Leucopogon hookeri</i>		*	*
<i>Monotoca glauca</i>	<i>e</i>	*	*
<i>M. submutica</i>	<i>e</i>	*	*
<i>Pentachondra pumila</i>		*	*
<i>Prionotes cerinthoides</i>	<i>e</i>	*	*
<i>Richea augustifolia</i>	<i>e</i>	*	
<i>R. milliganii</i>	<i>e</i>	*	
<i>R. pandanifolia</i>	<i>e</i>	*	*
<i>R. scoparia</i>	<i>e</i>	*	*
<i>R. sprengelioides</i>	<i>e</i>	*	*
<i>Sprengelia incarnata</i>		*	*
<i>Trochocarpa cunninghamii</i>	<i>e</i>	*	*
<i>T. gunnii</i>	<i>e</i>	*	*
ERICACEAE			
<i>Gaultheria hispida</i>	<i>e</i>	*	*
ESCALLONIACEAE			
<i>Anopterus glandulosus</i>	<i>e</i>	*	*
<i>Tetracapaea tasmanica</i>	<i>e</i>	*	*
EUCRYPHIACEAE			
<i>Eucryphia lucida</i>	<i>e</i>	*	*
<i>E. milliganii</i>	<i>e</i>	*	*
FAGACEAE			
<i>Nothofagus cunninghamii</i>		*	*
<i>N. gunnii</i>	<i>e</i>	*	*
GENTIANACEAE			
<i>Gentianella diemensis</i>		*	
HALORAGACEAE			
<i>Myriophyllum pedunculatum</i>		*	
MENYANTHACEAE			
<i>Nymphoides exigua</i>	<i>e</i>	*	
MONIMIACEAE			
<i>Atherosperma moschatum</i>		*	*
MYRTACEAE			
<i>Leptospermum nitidum</i>		*	*
OXALIDACEAE			
<i>Oxalis magellanica</i>		*	
PITTOSPORACEAE			
<i>Pittosporum bicolor</i>		*	*
PROTEACEAE			
<i>Agastachys odorata</i>	<i>e</i>	*	*

	Endemic	Western Section*	Eastern Section†
<i>Bellenden montana</i>	<i>e</i>	*	*
<i>Cenarrhenes nitida</i>	<i>e</i>	*	*
<i>Lomatia polymorpha</i>	<i>e</i>	*	*
<i>Orites acicularis</i>	<i>e</i>	*	*
<i>O. diversifolia</i>	<i>e</i>	*	*
<i>O. milliganii</i>	<i>e</i>	*	*
<i>O. revoluta</i>	<i>e</i>	*	*
<i>Persoonia gunnii</i>	<i>e</i>	*	*
<i>Telopea truncata</i>	<i>e</i>	*	*
RUNUNCULACEAE			
<i>Anemone crassifolia</i>	<i>e</i>	*	*
ROSACEAE			
<i>Acaena montana</i>	<i>e</i>	*	*
<i>A. novae-zelandiae</i>		*	
<i>Rubus gunnianus</i>	<i>e</i>	*	*
RUBIACEAE			
<i>Coprosma moorei</i>		*	
<i>C. nitida</i>		*	*
SANTALACEAE			
<i>Exocarpos humifusus</i>	<i>e</i>	*	*
SCROPHULARIACEAE			
<i>Euphrasia gibbsiae</i>	<i>e</i>	*	*
<i>E. hookeri</i>	<i>e</i>	*	
<i>E. striata</i>	<i>e</i>	*	*
THYMELAEACEAE			
<i>Pimelia cineria</i>	<i>e</i>	*	*
<i>P. lindleyana</i>	<i>e</i>	*	*
<i>P. sericea</i>	<i>e</i>	*	*
WINTERACEAE			
<i>Tasmania lanceoolata</i>		*	*
ANGIOSPERMAE (MONOCOTYLEDONAE)			
CENTROLEPIDACEAE			
<i>Centrolepis monogyna</i>	<i>e</i>	*	
<i>Gaimardia fitzgeraldii</i>	<i>e</i>	*	
CYPERACEAE			
<i>Carpha alpina</i>		*	*
<i>C. Curvata</i>	<i>e</i>	*	*
<i>Eleocharis sphacelata</i>		*	
<i>Gahnia grandis</i>		*	*
<i>Isolepis sp.</i>		*	*
<i>Lepidosperma filiforme</i>		*	
<i>Oreobolus acutifolius</i>	<i>e</i>	*	*
<i>O. pumilio</i>		*	*
<i>Tetraria capillaris</i>	<i>e</i>	*	*
<i>Unicinia compacta</i>		*	
<i>U. tenella</i>		*	*
IRIDACEAE			
<i>Diplarrena latifolia</i>	<i>e</i>	*	*
<i>Isophysis tasmanica</i>	<i>e</i>	*	*

	Endemic	Western Section*	Eastern Section†
<i>Libertia pulchella</i>		*	*
JUNACEAE			
<i>Juncus</i> sp.		*	
LILIACEAE			
<i>Astelia alpina</i>		*	*
<i>Blandfordia punicea</i>	e	*	*
<i>Campynema lineare</i>	e	*	
<i>Milligania densiflora</i>	e	*	*
POACEAE			
<i>Danthonia</i> sp.		*	*
<i>Ehrharta</i> sp.		*	
<i>Poa gunnii</i>	e	*	
<i>Poa</i> sp.		*	*
RESTIONACEAE			
<i>Calorophus elongatus</i>	e	*	*
<i>Empodisma minus</i>		*	*
<i>Restio</i> sp.		*	
XYRIDACEAE			
<i>Xyris gracilis</i>			*
<i>X. marginata</i>	e	*	*
<i>X. operculata</i>			*
GYMNOSPERMAE			
CUPRESSACEAE			
<i>Diselma archeri</i>	e	*	*
PHYLLOCLADACEAE			
<i>Phyllocladus aspleniifolius</i>	e	*	*
PODOCARPACEAE			
<i>Lagarostrobos franklinii</i>	e	*	
<i>Microcachrys tetragona</i>	e	*	*
<i>Podocarpus lawrencii</i>		*	*
TAXODIACEAE			
<i>Athrotaxis cupressoides</i>	e	*	
<i>Athrotaxis laxifolia</i>	e	*	*
<i>A. selaginoides</i>	e	*	*
PTERIDOPHYTA			
ASPIDIACEAE			
<i>Polystichum proliferum</i>		*	*
BLECHNACEAE			
<i>Blechnum nudum</i>		*	*
<i>B. wattsii</i>		*	*
DENNSTAEDTIACEAE			
<i>Histiopteris incisa</i>		*	*
<i>Pteridium esculentum</i>		*	*
DICKSONIACEAE			
<i>Dicksonia antarctica</i>			*
GLEICHENIACEAE			
<i>Gleichenia alpina</i>		*	*
<i>Gleichenia dicarpa</i>		*	*

	Endemic	Western Section*	Eastern Section†
<i>Sticherus tener</i>		*	*
GRAMMITIDACEAE			
<i>Grammitis billardieri</i>		*	*
HYMENOPHYLLACEAE			
<i>Apteropteris applanata</i>	e	*	*
<i>Hymenophyllum australe</i>		*	*
<i>H. marginatum</i>		*	*
<i>H. peltatum</i>		*	*
<i>H. rarum</i>		*	*
IOSETACEAE			
<i>Isoetes gunnii</i>	e	*	
LYCOPODIACEAE			
<i>Lycopodium fastigiatum</i>		*	*
<i>L. laterale</i>		*	*
<i>L. myrtifolium</i>		*	*
<i>L. scariosum</i>		*	*



APPENDIX 2

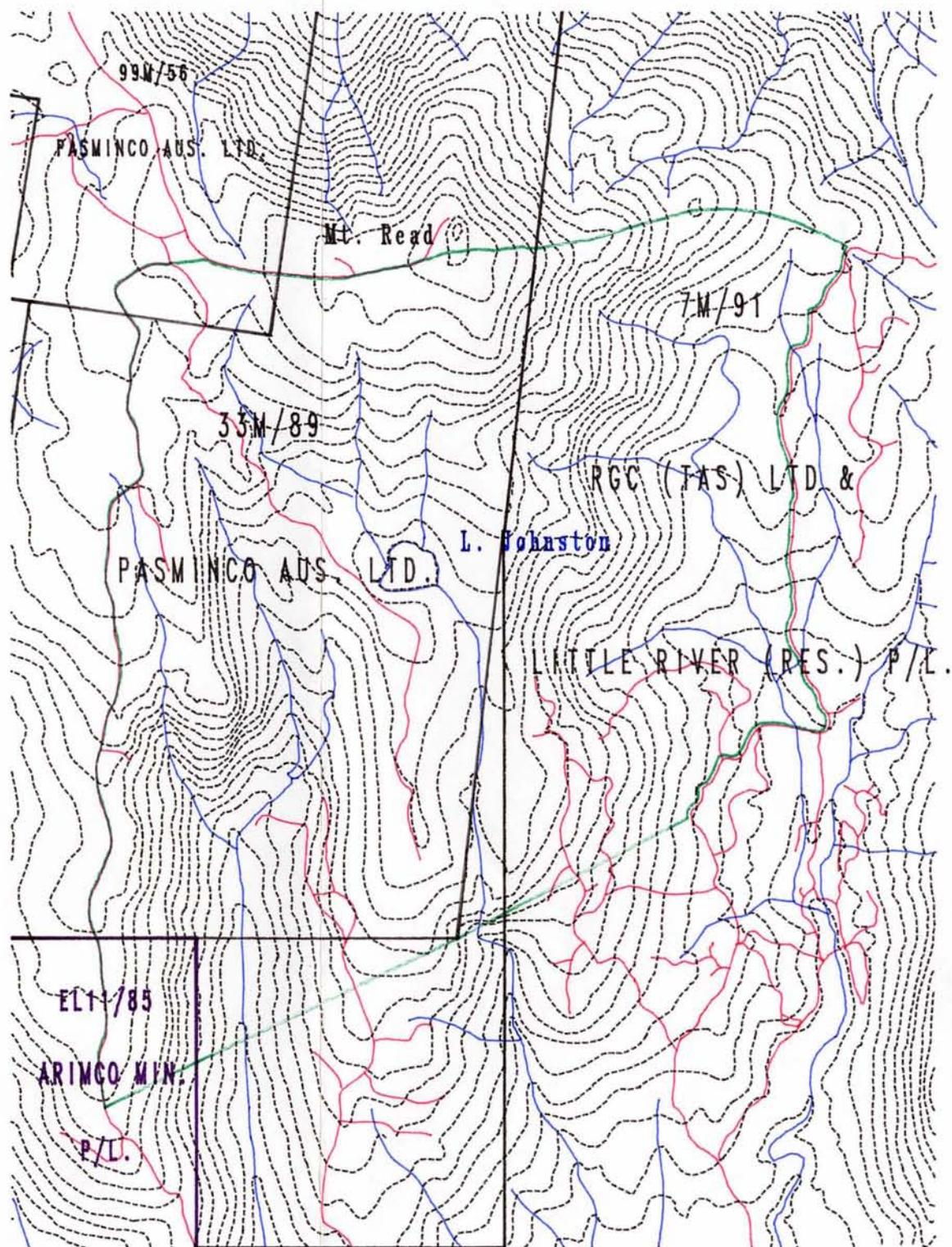
Areal extent (ha) of vegetation communities

Community	Western Area (ha)	Eastern Area (ha)
<i>Callidendrous r/f</i>		
CF C1.1		5
<i>Call/Tham N. cunninghamii r/f</i>		
CT 2.1/T1.1	21	
<i>Thamnic A. selaginoides r/f</i>		
T1.1		21
T1.3*	12	18
T4.3	29	17
<i>Implicate N. gunnii r/f</i>		
I 1.3*		10
I 2.1*	54	29
I 2.2*	27	32
I 2.3*		3
I 2.4*	14	27
I 2.5*		5
I 2.6*	1	
I 2.7*	5	
I 2.8*	0.4	
<i>Subalpine Heaths/Shrub</i>		
H1.1	9	3
H2.1	13	5
H2.2	66	3
SH1.1	3	
<i>Alpine complexes</i>		
A1.1	40	4
A1.2	3	
A2.1	9	
<i>Bare Ground/rock</i>	2	
<i>Lake Johnston</i>	2	
Total	310.4	182

* not reserved or poorly represented in current reserve system

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EXPLORATION LICENCES &
MINING LEASES
 Scale - 1 : 20000

∨ Mining Lease Boundary
 ∨ Exploration Licence Boundary
 Contour Interval 20 metres.



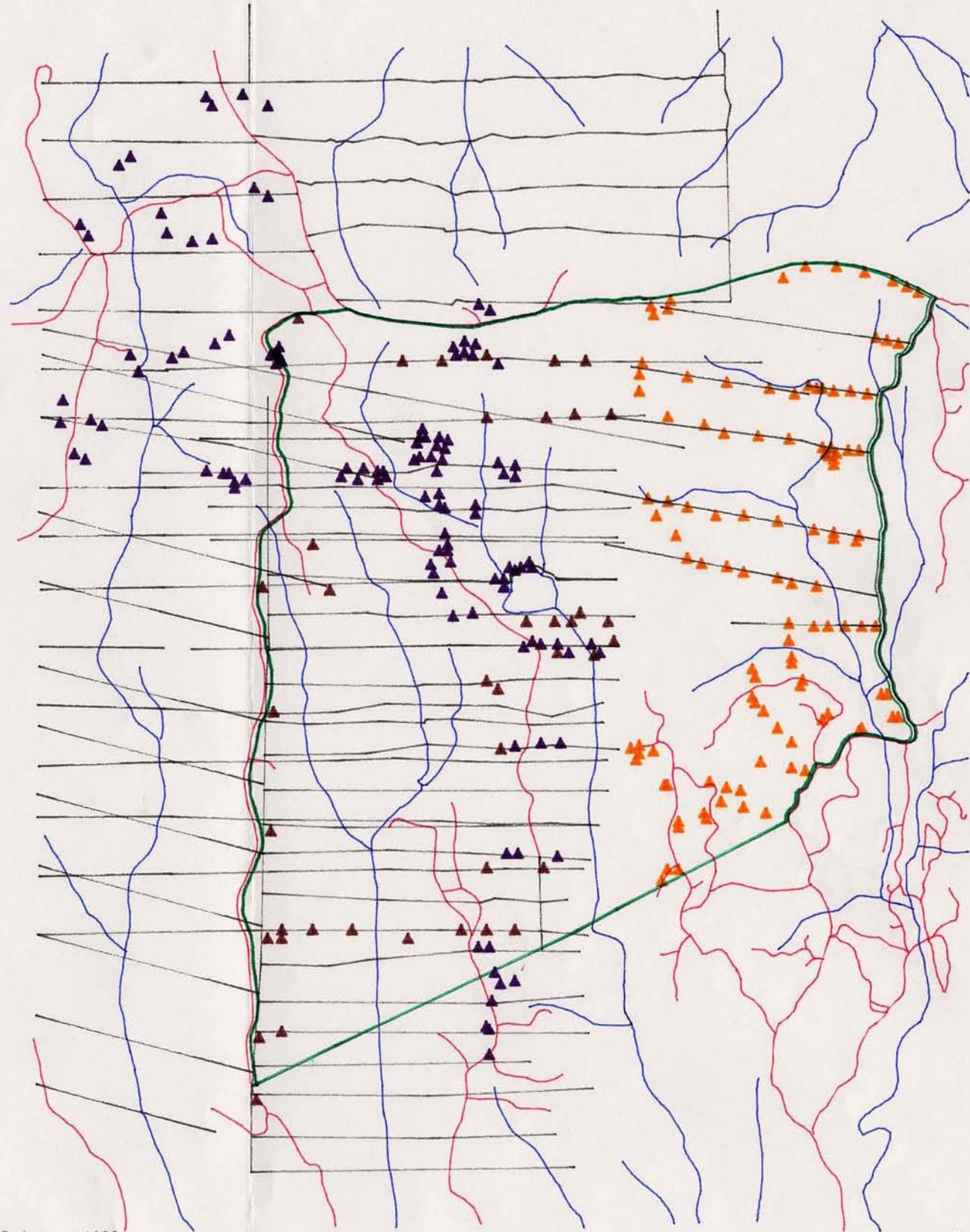
Topographical data M.J.Peterson 1992

fmel

Figure 2

Department of Mines - Tasmania
MT. READ RAP
EXPLORATION GRIDLINES &
VEGETATION SAMPLE POINTS
Scale - 1 : 20000

- ▲ RGC Survey
- ▲ Department of Mines Survey
- ▲ Fire Study
- ∨ Exploration Grid Lines



Exploration gridlines and vegetation survey points M.J.Peterson 1992.

#grid

Figure 3

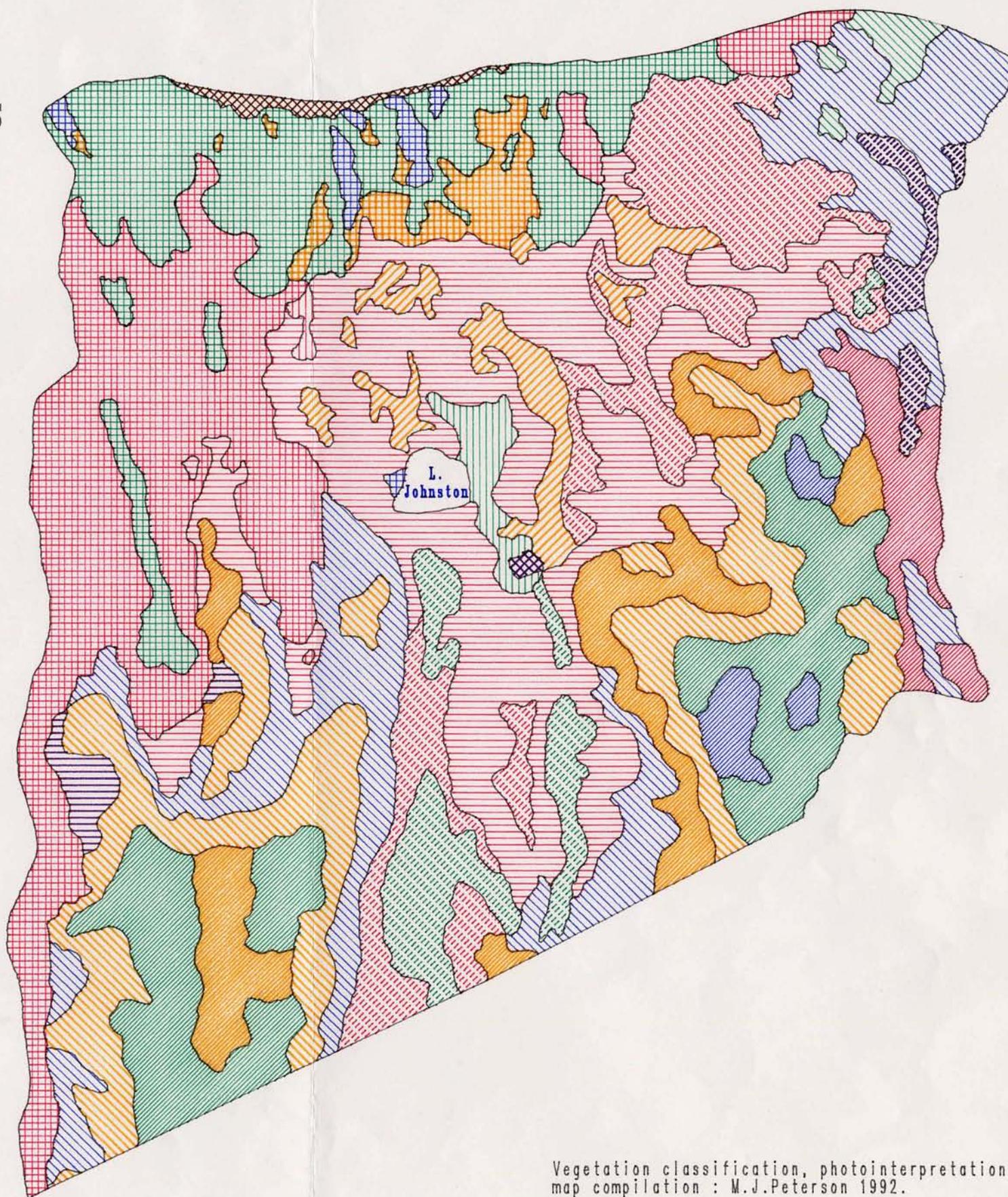
Department of Mines - Tasmania

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VEGETATION COMMUNITIES

Scale - 1 : 12500

-  A1.1 -Alpine herbfield/heath
-  A1.2 -Alp conifer/bolster heath
-  A2.1 -Krummholz conifer/N.gunn
-  C1.1 - Call N.cunn/A.mosc
-  CT2.1/T1.1 -Call-Tham N.cunn
-  H1.1 -N.gunn/D.arch low heath
-  H2.1 -L.niti/G.gran closed heath
-  H2.2 -G.gran open clumpw heath
-  H2.3 -L.niti/G.gran scrub heath
-  I1.3 -Impl A.sela/N.cunn
-  I2.1 -Impl A.sela/D.arch/N.gunn
-  I2.2 -Impl A.sela/P/aspl/N.gunn
-  I2.3 -Impl A.sela/L.niti/N.gunn
-  I2.4 -Dwarf A.sela/D.arch/L.niti
-  I2.5 -Dwarf A.sela/N.gunn
-  I2.6 -Impl L.franklinii
-  I2.7 -Impl A.laxifolia
-  I2.8 -Impl/Tham A.cupressoides
-  T1.3 -Tham A.sela/A.bigl
-  T4.3 -Tham A.sela/N.cunn
-  Wr -Bare ground/rock

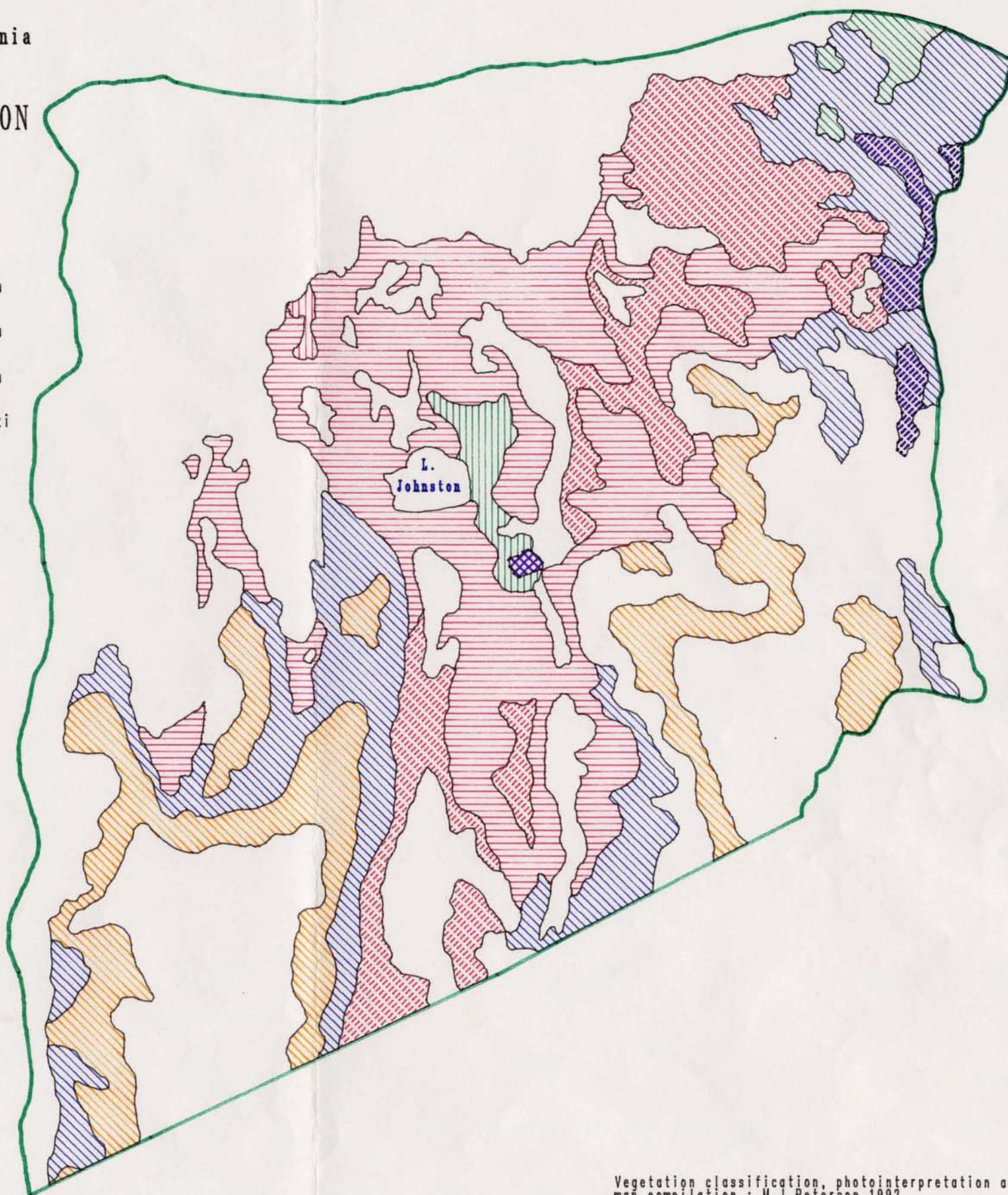


Vegetation classification, photointerpretation and map compilation : M.J.Peterson 1992.

Figure 4

Department of Mines - Tasmania
 MT. READ RAP
 UNRESERVED VEGETATION
 COMMUNITIES
 Scale - 1 : 12500

-  12.1 - Impl A.sela/D.arch/N.gunn
-  12.2 - Impl A.sela/P/aspl/N.gunn
-  12.3 - Impl A.sela/L.niti/N.gunn
-  12.4 - Dwarf A.sela/D.arch/L.niti
-  12.5 - Dwarf A.sela/N.gunn
-  12.6 - Impl L.franklinii
-  12.7 - Impl A.laxifolia
-  12.8 - Impl/Tham A.cupressoides
-  T1.3 - Tham A.sela/A.bigl



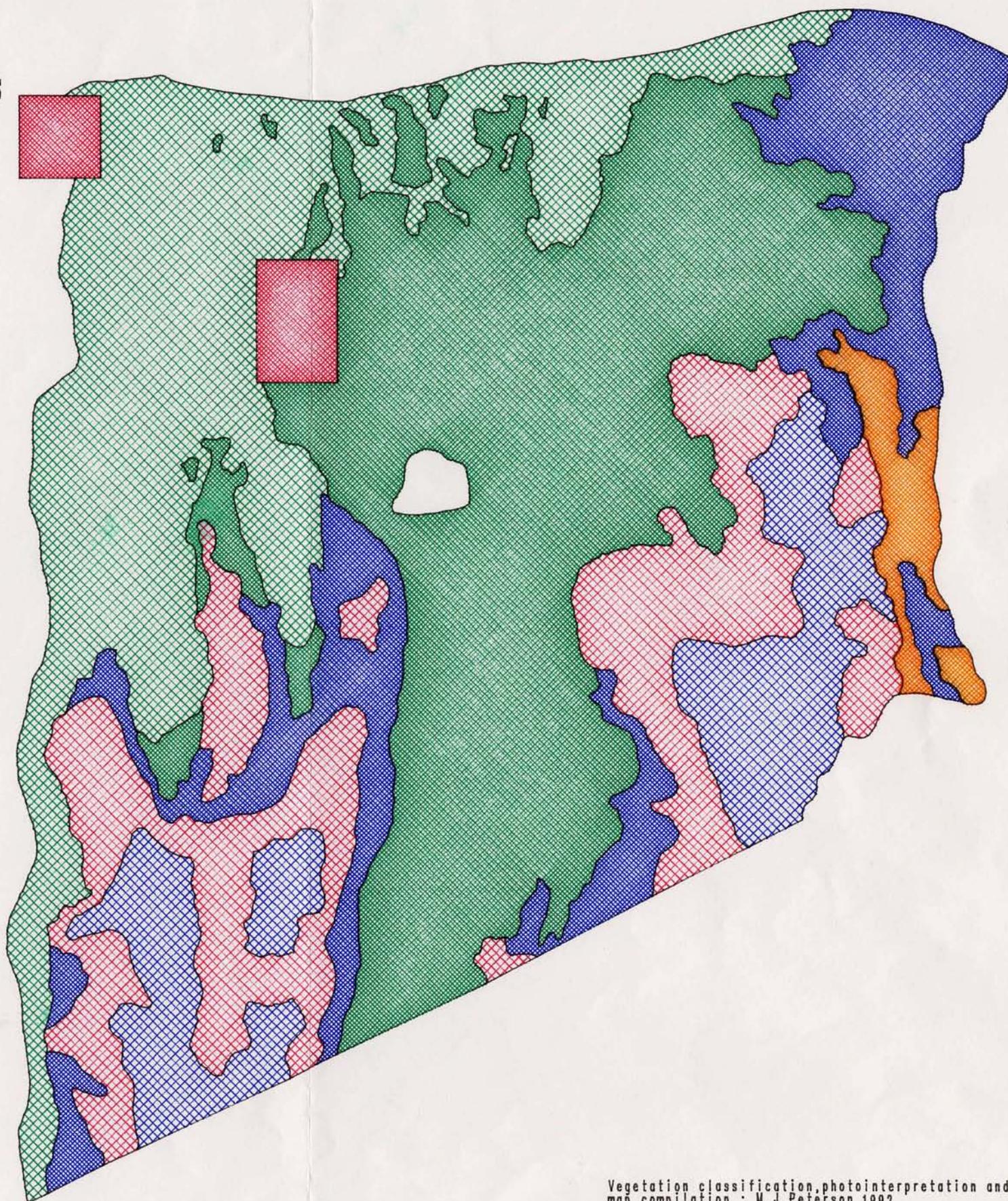
#unresvegcom

Vegetation classification, photointerpretation and
 map compilation : M.J.Peterson 1992.

Figure 5

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MT. READ RAP
MANAGEMENT PRIORITY ZONES
Scale - 1: 12500

- ZONE 1
- ZONE 2
- ZONE 3
- ZONE 4
- ZONE 5
- ZONE 6
- ZONE 7



fmanogzones

Vegetation classification, photointerpretation and
map compilation : W.J.Peterson 1992

Figure 6