NATURE CONSERVATION PLAN

FOR

'BASE CAMP TASMANIA'

NOVEMBER 2008

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1 Introduction to this Nature Conservation Plan

This Nature Conservation Plan ("Plan") must be read in conjunction with the attached Conservation Covenant ("Covenant") registered on the land title(s). In this Plan, all definitions follow those described in Clause 3.1 of the Covenant.

The Covenant lists in Clause 4.2 those activities that are prohibited from the Land. Clause 4.2 also details those activities that may only be undertaken with authorisation in writing by the Minister. This Nature Conservation Plan contains Authorisation(s) from the Minister, for the purposes of Clause 4.2 of the Covenant, and details the extent to which these activities are permitted in the Land. This Plan also contains the management prescriptions issued by the Minister which are referred to in Clause 4.3 of the Covenant.

All decisions, approvals, consents, recommendations, monitoring and other responsibilities of the Minister specified in this Nature Conservation Plan may be made, given or carried out by the Minister or a duly appointed delegate (or authorised person) of the Minister.

The Minister will provide succeeding owners of the Land a Nature Conservation Plan containing authorisations, management prescriptions, and/or recommendations that will facilitate the ongoing management of the Land. Before transferring the property, the Owner may direct any enquires from purchasers regarding the Conservation Covenant and Nature Conservation Plan to the Department.

Any Management Prescriptions provided in this Nature Conservation Plan:

(a) may be varied at any time by agreement between the parties;

(b) will be reviewed jointly by the parties every 10 years (or as otherwise agreed) and if both parties agree, may be amended by the Minister pursuant to that review.

Any Authorisation(s) provided in this Nature Conservation Plan (in relation to the Covenant):

(a) may be reviewed by the Minister and the Owner at any time;

(b) will be reviewed by the Minister and the Owner at intervals no longer than 10 years (or as otherwise agreed);

(c) may be amended by the Minister pursuant to that review.

All notices or other communications given by the Owner to the Minister under the terms of this Nature Conservation Plan must be in writing and sent to the following address:

The Minister,
C/- The Secretary,
Department Primary Industries & Water
Private Land Conservation Program
GPO Box 44
HOBART TASMANIA 7001

OR

Facsimile number (03) 6223 8603

2 Management Objectives

2.1 General Objectives

The following general objectives apply to the management of the Land:

- Protection and conservation of the natural systems and features in the Land, including the diversity of species, habitats and communities;
- Protection of significant vegetation communities and populations of threatened and/or priority plant and animal species;
- Protection of the Land from damage by introduced plants and animals, disease and inappropriate management regimes.

2.2 Specific Management Objectives for Natural values

The management objectives are:

- To maintain the structure of vegetation community and allow for regeneration of native species under the proposed management regime;
- To implement appropriate fire regimes;
- To protect the habitat of threatened and/or priority species;
- To eradicate or control weeds and feral animals and prevent any further introduction(s) of exotic species.

The success, or otherwise, of the management regimes will be monitored by the Department of Primary Industries and Water ("the Department"). In general, the measures of success of the management regimes are:

- the maintenance or improvement in native species diversity, richness and abundance;
- adequate and appropriate opportunities for recruitment or regeneration of native species;
- the maintenance or an improvement in the population(s) of threatened species and their habitat; and
- a reduction in infestations of environmental weed species (where present).

3 Boundaries of the Land

Base Camp Tasmania is a property situated in Glenfern, 13km southwest of New Norfolk in the Derwent Valley as shown on the map below. The Land is shown on the attached map (see page 18). The vegetation that occurs on the Land is outlined on the attached vegetation map (see page 19).

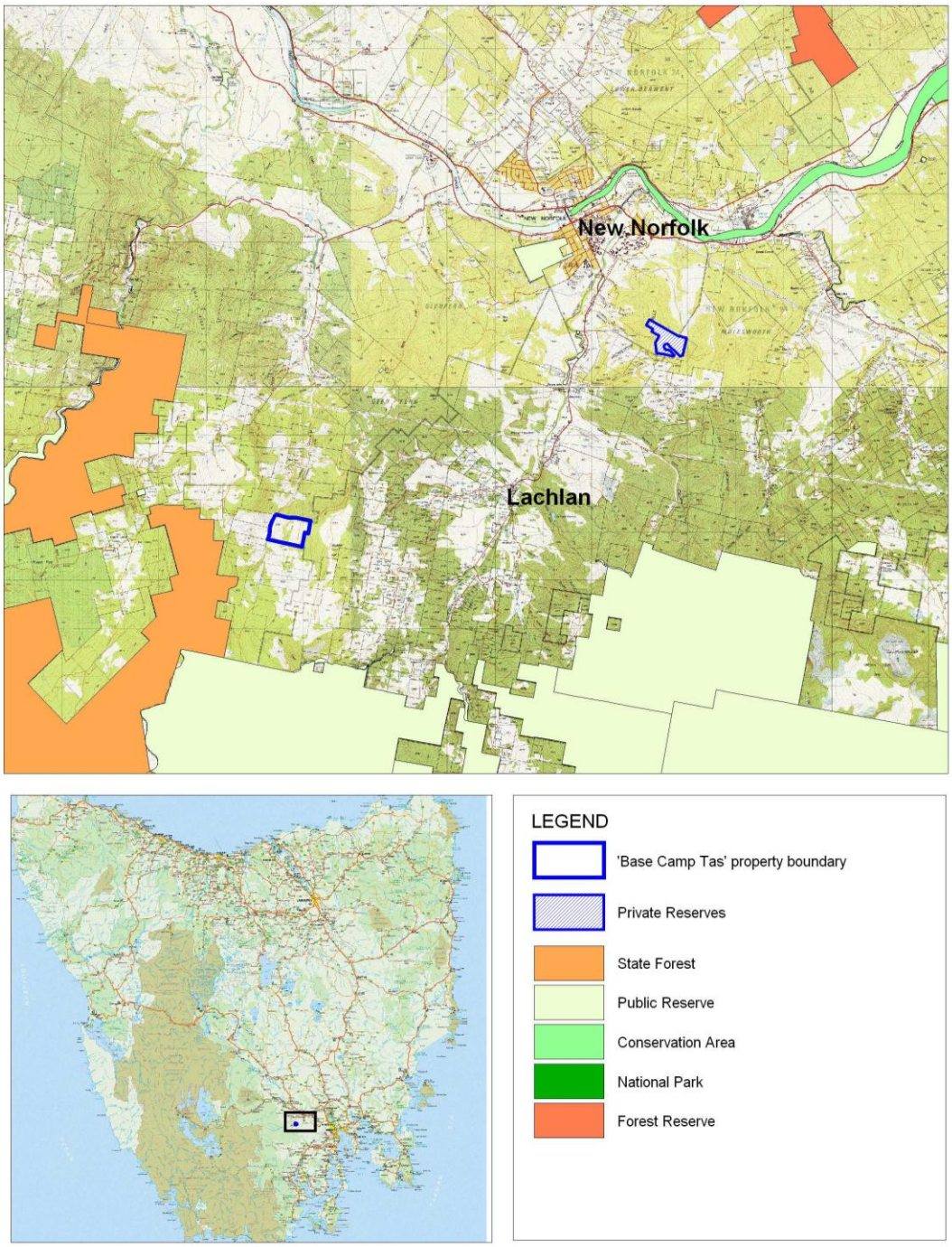


Figure 1 Location of Land on the property Base Camp Tasmania near New Norfolk.

4 Background information

The Land is 37.88 hectares, which Jennifer and Graham McLean have owned for 5 years. They are actively involved in the care, rehabilitation and release of injured and orphaned wildlife, for which the Land plays an important role.

In the past the Land has been selectively logged and cleared in some areas for grazing, though many large old trees remain throughout the Land. The fire regime has varied across the Land and is reflected in the resulting vegetation communities and species assemblages. Woody weeds have been brought under control since Jennifer and Graham have owned the Land and they remain diligent with follow-up control.

5 Natural Values on the Land

5.1 Vegetation communities

The following vegetation communities are present on the Land (refer to Vegetation map, page 19):

Stringy bark (*Eucalyptus obliqua)* dry forest (DOB)

This community totals approximately14.2 ha on the Land. It has high species diversity with significant old growth elements. There are many logs on the ground in various stages of decay and patches of rocky outcrops. The large shrubs in this *Eucalyptus obliqua* community include silver wattle (*Acacia dealbata)* and blackwood (*Acacia melanoxylon).* The understorey species distribution varies across this community and includes common heath (*Epacris impressa),* dwarf riceflower *(Pimelea humilis),* hop bitterpea *(Daviesia latifolia),* bracken *(Pteridium esculentum)* and ground cover of sedges, *Poa* and lilies. A silver gum (*Eucalyptus cordata)* sapling was found during the survey within the *Eucalyptus obliqua* community. The areas of hawthorn and broom located in this community are being controlled.

Gumtopped stringybark (*Eucalyptus delegatensis)* dry forest and woodland (DDE)

The *Eucalyptus obliqua* grades into a gumtopped stringybark (*Eucalyptus delegatensis)* dry forest and woodland (DDE) community at the high eastern side of the Land. This *Eucalyptus delegatensis* community contains scattered old growth trees but mainly consists of younger even aged trees that probably indicate a significant fire event 2-3 decades ago. The subdominants are mountain white gum (*E. dalrympleana),* stringybark *(E. obliqua)* and blue gum *(E. globulus)* and understorey species include coffeeberry (*Coprosma hirtella),* guitarplant *(Lomatia tinctoria)* and fireweed groundsel *(Senecio linearifolius)*. No weeds were observed within this community.

Stringybark *(Eucalyptus obliqua)* wet forest with broad-leaf shrubs (WOB)

There is approximately 4ha of *Eucalyptus obliqua* wet forest with broad-leaf shrubs (WOB) on the Land. This community includes some very large old stringy bark (*E. obliqua)* and blue gum (*E. globulus)* trees with good habitat hollows. Common dogwood (*Pomaderris apetala),* musk daisybush *(Olearia argophylla)* and Tasmanian currajong *(Asterotrichion discolor)* form a dense tall shrub layer with native currant (*Coprosma quadrifida),* hop-native primrose *(Goodenia ovata),* goldey wood *(Monotoca glauca),* mountain correa *(Correa lawrenceana)* and at least four species of ferns forming the basis of the understorey. There are pockets of dense woolly teatree (*Leptospermum lanigerum)* within this community. There are some areas of blackberry and gorse that the owners currently have under control.

Eucalyptus obliqua forest with broad-leaf shrubs (WOB), taken March 2008

Inland heathland (undifferentiated) (SHU)

The Land consists of approximately 4ha of Inland heathland (undifferentiated) (SHU).This community is diverse with dolly bush (*Cassinia aculeata),* everlasting *(Ozothamnus sp)* and rigid candleheath *(Richea sprengelioides)* being the most abundant species and also including guitar plant (*Lomatia tinctoria),* purple appleberry *(Billardiera longiflora) golden shaggy pea, (Oxylobium ellipticum),* forest raspwort *(Gonocarpus teucrioides)* and a *Monotoca* sp. This community is probably a result of past clearing or burning and will probably succeed to become stringy bark (*Eucalyptus obliqua)* if left unburnt. The location of inland heathland (undifferentiated) on this property provides valuable complementary habitat with the adjacent forests and woodlands. Sweet vernal and some hawthorn plants are present.

Silver wattle (Acacia dealbata) forest (NAD)

The *Acacia dealbata* forest (NAD) is located in the lower altitudinal band of the Land and includes large and sapling *Acacia dealbata*, scattered eucalypts including some recruiting Tasmanian silver gum (*E. cordata)* (or hybrid) and blue gum (*E. globulus)*. There are few shrubs present and the ground cover varies from dense bracken fern to a grassier understorey.

5.2 Threatened and/or priority species

The following threatened species could potentially be, or have been sighted on, the Land. For more information on Tasmanian threatened species please visit www.dpiw.tas.gov.au

Flora

Clasp leaf heath (*Epacris acuminata)* – recorded within 5km of the Land

Fine frilly heath *(Pentachondra ericifolia)* – recorded within 5km of the Land

Rayless starwort (*Stellaria multiflora)* – recorded within 5km of the Land

Fauna

Mt Mangana stag beetle (*Lissotes menalcas*) - There are records from within 500m of the Land. Many areas on the Land have rotting logs on the ground and the wet *Eucalyptus obliqua* forest is particularly good habitat.

Eastern barred bandicoot *(Perameles gunnii*) has been observed on the Land by the owners.

Tasmanian devil *(Sarcophilus harrisii*) has been observed on the Land by the owners.

Wedge-tailed eagle *(Aquila audax*) - A pair of breeding eagles nests on nearby Mount Lloyd. The pair and their offspring regularly visit the Land. The Land provides excellent foraging habitat and the large trees provide excellent potential nest sites.

The following priority species are present on the Land:

Tasmanian Currajong *(Asterotrichion discolor)* is a Tasmanian endemic plant with a limited distribution in damp gullies of the south-east.

Tasmanian (Eastern) Bettong *(Bettongia gaimardi)* is extinct on mainland and has a patchy distribution in Tasmania.

Pink Robin *(Petroica rodinogaster)* is endemic to south-eastern Australia and is listed as vulnerable in New South Wales.

5.3 Other natural values or features of conservation significance

Tasmanian silver gum *(Eucalyptus Cordata)* Arboretum

In 1984, an arboretum of 1000 *Eucalyptus cordata* trees were established just north of the exclusion zone by Brad Potts (*Professor, Forest Genetics School of Plant Science and Cooperative Research Centre for Forestry University of Tasmania*) (see Management map, page 20).

The site is still used by the University of Tasmania (UTAS) and has important long-term scientific values as well as being a diverse ex situ germplasm reserve for this rare Tasmanian endemic eucalypt. It is one of only a few places where scientists can assess the extent of genetic control of the traits which differentiate populations and subspecies of *Eucalyptus cordata*.

Eucalyptus cordata and/or hybrid recruitment is occurring at present in and near by the arboretum area as well as some distance away in the *Eucalyptus obliqua* (DOB).

6 Management Prescriptions, Authorisations & Recommendations

This section of the Plan may contain the **'Authorisations'** from the Minister to the Owner as referred to in Clause 4.2 of the Conservation Covenant. …]
To achieve the objectives of this Plan, the Owner, the Minister and the Department must abide by the **'Management Prescriptions'** detailed in this section of the Plan.
These Management Prescriptions (listed in dot-point throughout this section) are:

The conditions under which an Authorisation is provided; and/or
The prescriptions issued by the Minister which are referred to in Clause 4.3 of the Covenant;

This section may also contain **'Recommendations'** that the relevant parties should abide by.

6.1 Demarcation

- The Land must be clearly marked on the Owner's property map
- The Owner must inform everyone undertaking activities &/or development in or around the Land about the existence and purpose of the Conservation Covenant as well as the location of the Land, and inform them of any relevant prescriptions listed below.
- Signs will be supplied by the Department to indicate the location and significance of the Land and to recognise the efforts of the Owner. These signs should be placed at strategic points around the Land (eg. gates that enter onto the Land).

6.2 Threatened and/or priority species

- The Minister, in conjunction with the Owner, will develop specific management prescriptions if required for threatened and/or priority species that are identified on the Land.

6.3 Timber Harvesting

- No timber harvesting is to take place on the Land.
- No commercial firewood collecting is permitted on the Land.

6.4 Domestic Firewood

Authorisation: The Owner is permitted to collect firewood in the Land but only under the conditions outlined below:

- The quantity of firewood that may be collected is restricted to 3 tonnes per year and must only be for domestic use on the property.
- Wherever possible, firewood collection should be limited to cutting of timber that is required for removal in the course of track and/or fence maintenance.
- Trees should be felled in areas with little or no habitat trees (habitat trees are those containing hollows and structural damage). Live trees should be selected, not just dead or dying trees. Decaying trees often provide excellent habitat for a range of native animals.
- The collection of firewood **is not permitted** in sensitive sites such as the gully area, the wet *Eucalyptus obliqua* forest (WOB) and or in the *Eucalyptus cordata* arboretum.
- Firewood collection must not target species preferentially or to such a degree that the proportional representation of that species is significantly changed.
- In multi-aged forests, tree felling must not target one particular age-class, although old-growth trees should be left, as they are often habitat trees.
- Fallen logs/trees containing hollows must be left on the ground and must not be disturbed or cut for firewood.
- Trees must either be retained in a dispersed manner across the Land so that large areas are not left under-stocked or be retained as a combination of individual trees and clumps depending on site conditions.
- Firewood must only be collected during dry conditions to reduce damage to the soil caused by vehicles.
- Only hand machinery (such as a chainsaw) must be used to collect firewood so that there is minimal impact on the understorey species and soil profile.

6.5 Stock grazing

- Grazing by stock must not be undertaken because it will have an adverse effect on the Natural Values.

6.6 Fencing

All the boundaries of the Land are currently fenced. There are some internal fences still standing and these will gradually be removed with minimal impact to the Natural Values of the Land.

Authorisation: The Owner may construct additional fences that are required to protect the Natural Values of the Land. The Owner must consult with the Department to ensure that the location of the new fence(s) does not impact on good quality native grasslands or critical habitat of threatened species.

Authorisation: The Owner may clear along the boundary fencelines for maintenance purposes to a maximum of 4 metres either side of the fence.

- Wherever possible, clearing along fencelines should avoid soil disturbance in order to reduce the potential for weeds to establish.
- The Owner must maintain in a satisfactory condition all the fences that are required to protect the Land (eg. stock-proof fences to control stock access).
- The Owner must seek approval from the Minister if additional fences need to be constructed that are internal to the boundary of the Land.
- Any new fence(s) must allow native wildlife access to natural water sources.

6.7 Clearing of Vegetation

- No clearing (or slashing) of vegetation – including shrubs, grasses and other understorey species – is to occur in the Land unless it is:
    - (i) part of the weed management prescriptions (see section 6.12 *Control of Exotic plant species* for details);
    - (ii) for track maintenance (see section 6.19 *Vehicle Use and Tracks* for further information);
    - (iii) for fence construction and maintenance (see section 6.7 *Fencing* for further information);
    - (iv) for fire hazard reduction, fire-fighting, ecological burns and/or firebreaks (see section 6.9 *Fire* and 6.10 *Firebreaks* for further information);
    - (v) for firewood collecting (see section *6.4 Domestic Firewood* for details).
    - (vi) for the purpose of construction and maintenance of infrastructure associated with wildlife rehabilitation and release (see Management map page 20 for location of the site and section 6.22 *Additional Issues*).
- Vegetation cleared during the process of “approved clearing” operations (such as shrubs, branches, trunks etc.) may be removed from, and used external to, the Land.

6.8 Fire

Planned Fire (Fire Hazard Reduction &/or Ecological Burns)

- Fire will be excluded from the Land, unless the Minister deems it necessary for management, or the Tasmania Fire Service deems it necessary for safety reasons.

In the Event of Wildfire:

- The Owner must inform the Tasmania Fire Service (TFS) of any fire that threatens the Land as soon as possible after the Owner becomes aware of the fire. The TFS is the responsible authority for fighting fires in Tasmania.
- The Owner must, as soon as possible after becoming aware of the fire, inform those directing the fire-fighting that TFS personnel should (wherever practicable) use existing firebreaks or access tracks and avoid creating new firebreaks through sensitive areas such as the *Eucalyptus cordata* arboretum or the wet *Eucalyptus obliqua* forest (WOB).

6.9 Firebreaks

Permanent Firebreaks:

- The Department must be consulted prior to the creation of new permanent firebreaks to ensure that no firebreak has an adverse impact on areas with important Natural Values such as threatened species.
- The creation and maintenance of permanent firebreaks must be in accordance with guidelines obtained from the Tasmania Fire Service and the Department.
- Machinery used for firebreak construction or maintenance must be cleaned prior to entering the land (if practicable) to prevent the establishment or entrenchment of weeds or pathogens.

Emergency Firebreaks:

Authorisation: Emergency firebreaks will be permitted if there is an immediate threat to life or property but only under the conditions outlined below.

- The Owner will make all reasonable efforts to consult with the Tasmania Fire Service regarding the placement of emergency firebreaks before construction begins.
- The placement of emergency firebreaks must not disturb (unless unavoidable) the *Eucalyptus cordata* arboretum or the wet *Eucalyptus obliqua* forest (WOB).

6.10 Herbicides, Pesticides, Fertilisers and other Chemicals

- No fertilisers are to be applied on the Land.
- Herbicides may only be applied on the Land if used as part of the weed management program described in section 6.11 *Control of Exotic Plant Species*.
- Pesticides may only be applied on the Land if required as part of the feral animal management program described in the section 6.12 *Control of Exotic Animal Species*.

Recommendation: Wherever possible, the Owner must also ensure that the use of fertilisers, pesticides or herbicides on land adjacent to the Land will not impact on the Land.

6.11 Control of Exotic plant species (Weeds)

Blackberry, gorse, broom and hawthorn are present on the Land at locations shown on the Management map, page 20.

- The Owner will make annual inspections of the Land and must control and (if possible) eradicate infestations of environmental weeds (such as, gorse, blackberry, hawthorn and broom). Particular attention should be paid to the margins of roads and tracks, and to any recently disturbed sites.
- The control of environmental weeds (for example, gorse, blackberry, hawthorn and/or broom) will need to be strategic. Once an infestation site has been controlled it should be annually inspected and follow up control undertaken for a number of years.
- The Owner must make annual inspections of the boundaries of the Land which border neighbouring properties that have weed infestations.
- Only herbicides that are registered in Tasmania for the control of the target species are to be applied (see product label &/or contact the Department for advice). The Owner will apply and dispose of herbicides in accordance with the manufacturer's recommendations.
- The Owner will inform the Minister of any weed infestations or species that do not respond to standard control methods (refer to attached Department weed fact sheets Appendix 1).
- Spraying must only occur under conditions where spray drift will be minimised to avoid damage to native species.

6.12 Control of Exotic (Feral) animal species

- The Owner is responsible for the control or eradication (if feasible) of feral animals (including feral cats, goats, rabbits and hares) on the Land.
- Control of feral animals on the Land must be by shooting or trapping in accordance with current Codes of Practice, legal permits and conditions.
- The use of pesticides – including '1080' poison – for feral animal control is not permitted on the Land unless otherwise authorised by the Minister (eg. for fox control).
- The Owner must inform the Minister of any feral animal population that does not respond to standard control methods.

Recommendation: The Owner must not, where other reasonable alternatives are available, lay poisons adjacent to the Land.

6.13 Control of Native animals

Authorisation: The control of native animals on the Land is permitted if and when the animals pose a significant threat to the integrity of other Natural Values, but only under the conditions outlined below:

- Permits to control native animals under the *Nature Conservation Act 2002* or the *Wildlife Regulations 1999* must be obtained.
- To obtain each permit, the Owner must seek agreement from the Minister that particular native animal species pose a significant threat to the integrity of other Natural Values on the Land.

- The Minister may arrange an on-ground assessment of the threat before making a decision.
- If the Minister accepts that native animal control is necessary, then the Owner's permit request will be processed by the Department.
- If a permit is issued, it must address the following conditions:
  - (i) Native animal control, where necessary, will only be considered for the following species: Bennetts wallaby, Tasmanian pademelon and Brush-tail possum. All other native species must not be controlled on the Land;
  - (ii) The control of native animals must have the objective of maintaining natural population levels of all native species throughout their natural ranges and must only be undertaken for management purposes;
  - (iii) Any control of native animals on the Land must be by shooting or trapping in accordance with current Codes of Practice, legal permits and conditions;
  - (iv) Poisoning of native animals is not permitted on the Land;
  - (v) Dogs must not be used to hunt or flush native animals.
- The Owner must comply with the permit conditions.

Recommendation: Where and when necessary, native animal control should occur outside the Land.

6.14 Exotic (non-Native) flora or fauna species

For the purpose of this Plan, 'Native species' means species occurring naturally on the Land or its immediate surrounds prior to the year 1788. 'Exotic species' means all species not occurring naturally on the Land or its immediate surrounds prior to the year 1788.

- Exotic species may be deliberately established on the Land, if they are biological control organisms (as listed on the Biological Control Act 1986) that are specifically for the control of target weed &/or pest species that are present on or adjacent to the Land.

6.15 Native flora and fauna species

For the purpose of this Plan, 'Native species' means species occurring naturally on the Land or its immediate surrounds prior to the year 1788.

- No Native flora and/or fauna species are to be deliberately introduced to the Land unless approved by the Minister (for example, as part of a rehabilitation, revegetation or translocation strategy).

Authorisation: The Land may be used by the Owner as a release site for rehabilitated fauna only as part of a wildlife rehabilitation strategy approved by the Department's Nature Conservation Branch and only under the conditions outlined below:

- The release of rehabilitated animals should do so in accordance with the Department's current policy, relevant legislation and codes of practice.

- A permit will be required prior to the release of wildlife onto the Land. It is the Owner's responsibility to seek the permit and ensure conditions of the permit are met.
- Rehabilitated fauna must be released in accordance with the guidelines entitled: "General requirements for the care and rehabilitation of injured and orphaned wildlife in Tasmania" by Patsy Davies, Injured and Orphaned Wildlife Program, Department of Primary Industries and Water, see Appendix 2.
- The release site will not become over populated.
- No wildlife should be released unless free from disease and displaying appropriate physical and psychological behavioural patterns.
- Release into the wild must always be in the interest of the wildlife, the population and the ecosystem.
- The details of the process and facilities to be made available for the release of protected wildlife and the common wombat should be provided to the Wildlife Management Branch, DPIW prior to the release.

6.16 Natural flow of water

Authorisation: Water can be only taken from the Land at the spring site marked on the Management map (see page 20) for domestic use on the Owner's property.

- Changes to the natural flow of water (for example, dams and waterholes) are not permitted unless authorised in writing by the Minister.

Recommendations: Wherever possible, the Owner must also ensure that changes to the natural flow of water on land adjacent to the Land will not impact on the Land.

6.17 Effluent and Irrigation

- The use of irrigation water or effluent of any kind is prohibited on the Land.

Recommendations: Wherever possible, the Owner must also ensure that the use of irrigation water and/or effluent of any kind on land adjacent to the Land will not impact on the Land.

6.18 Vehicle Use and Tracks

Authorisation: The Owner may introduce Foreign Materials (limited to the following: road base and gravel) along the existing carriageways but only under the conditions listed below:

- Foreign Materials such as road base and gravel used to maintain tracks must be sourced from sites that are free of Root-rot Fungus, *Phytophthora cinnamomi.* Seek advice from the Department regarding suitable sites. (Note: Root-rot Fungus is a plant pathogen that can devastate the ecology of many communities across Tasmania. This prescription will help prevent the introduction of the Root-rot Fungus into the habitat of susceptible species.)
- Vehicle use on the Land must be confined to only those existing vehicle tracks (see map, page 20 for location of existing tracks).

- The Owner may maintain any existing tracks on the Land in accordance with Local Government standards.
- Off-track vehicle use is permitted in emergency situations (eg. bushfires or medical evacuations) or for the maintenance of boundary fences or construction and maintenance of infrastructure.
- Vehicles must be washed prior to entering the Land (if practicable) if they have come from areas infested by weeds (especially those in seed) or disease (especially areas with Root Rot Fungus).

6.19 Recreational Use

- Recreational activities that are not considered deleterious to the Natural Values (including bushwalking, bird watching) are permitted on the Land.
- No recreational activities (including but not confined to, trail bike riding, shooting and horse riding) which are or may be considered deleterious to the Natural Values are permitted on the Land unless approved by the Minister.

6.20 Deleterious Activities

- No activities (including, but not confined to, removal of natural resources, dumping of rubbish, general disturbance, etc) which are or may be considered deleterious to the Natural Values are permitted on the Land unless approved by the Minister.
- The Owner must notify the Minister of any proposed changes in land use on land adjacent to the Land in case any management issues need to be addressed.

6.21 Monitoring, Reporting and Review

- The Owner must notify the Minister of any actions by a third party that affect the Natural Values on the Land.
- The Owner and the Minister will advise each other of any proposed action that could adversely affect the Natural Values.
- The Minister and the Owner will respond promptly to all communications from each other relating to this Plan.
- Monitoring by the Department will continue as required so that management practices can be modified as necessary to achieve the conservation objectives.
- The Department may establish monitoring plots on the Land and revisit these sites from time to time.
- The Minister may undertake site inspections and will periodically contact the landowner to discuss the outcomes of any activities, or other issues affecting the Land and its Natural Values.
- The University of Tasmania (UTAS) may undertake additional monitoring in collaboration with the Department to :
    - gauge the effectiveness of current management regimes in the *E. cordata* arboretum;
    - monitor the recruitment or occurrence of *Eucalyptus cordata* outside of the arboretum area.

6.22 Additional Issues

Research activities in the Tasmanian silver gum (*Eucalyptus cordata)* arboretum

The *Eucalyptus cordata* arboretum is situated on the Land as shown on the management map on page 20. The University of Tasmania (UTAS) have historically used this arboretum for research purposes and to enable the conservation of this species.

The Minister may grant approval for the collection of plant material for research purposes but any approval will be conditional on the following:

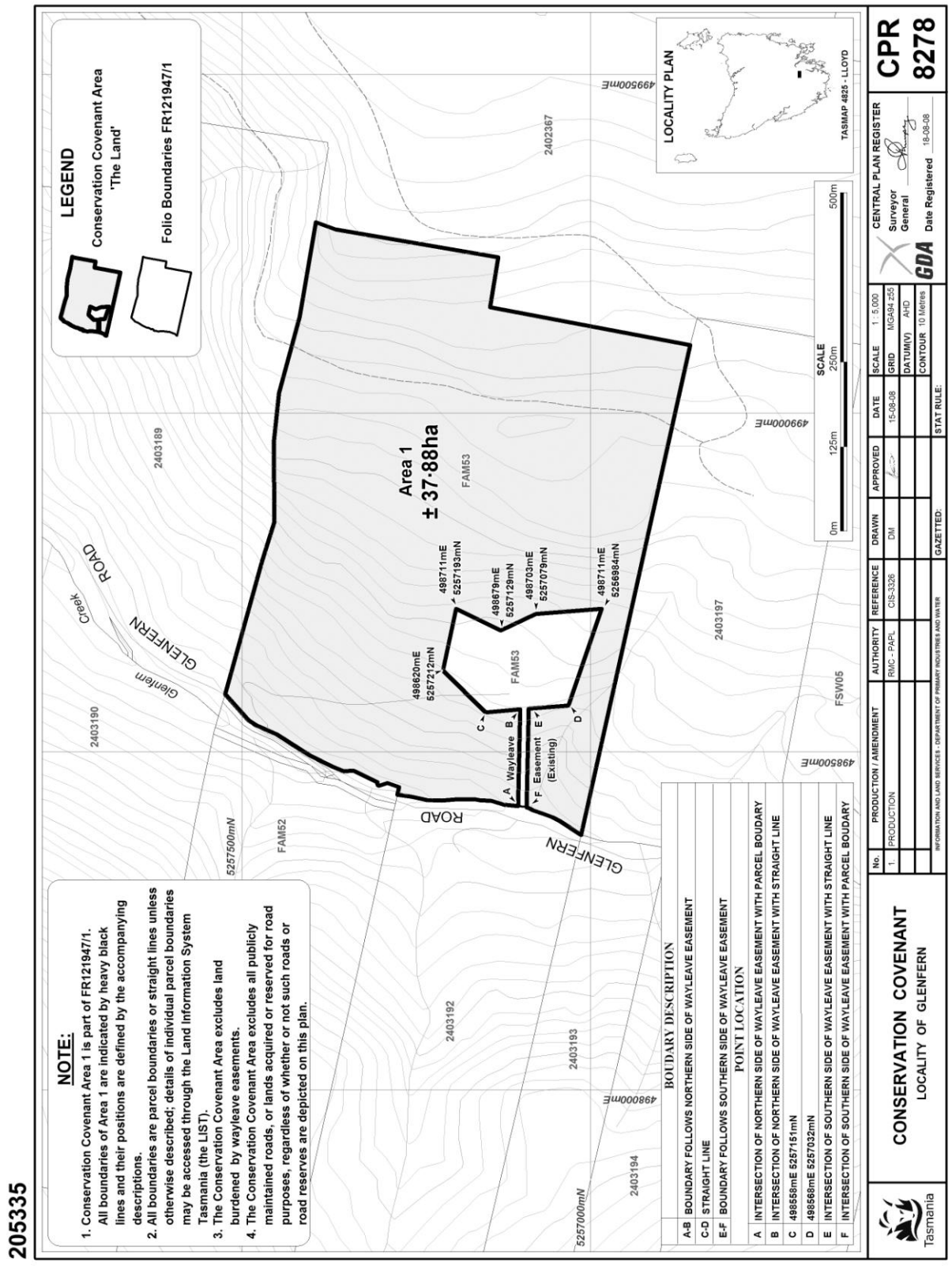
- UTAS must seek the written approval of the Minister prior to any sampling or seed collection of plants on the Land.
- Any sampling or seed collection must be undertaken in strict accordance with any relevant legislation, regulations and permits.
- sampling or seed collection shall only be undertaken in a manner that is not deleterious to the Natural Values on the Land.

Native fauna rehabilitation and release site

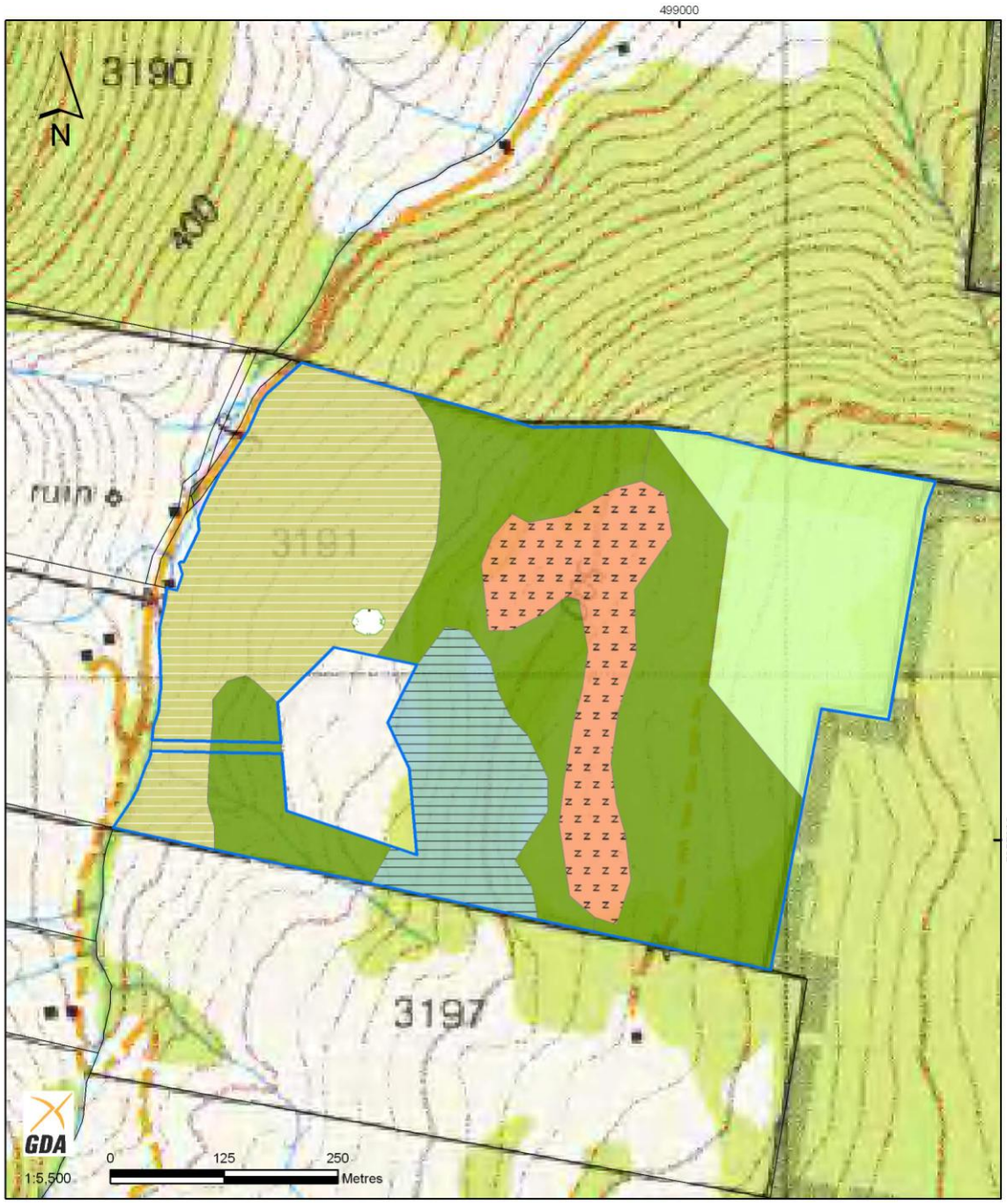
Authorisation: The Owner may construct a 400 square meter wombat pre-release pen and associated infrastructure but only under the conditions outlined below:

- The structure will be constructed at the site marked ‘wombat release site’ on the management map (see page 20).
- The maximum area to be cleared is 0.25 ha and located on a previously cleared area.
- The pre-release pen will be approximately 400 square meters with metal walls on the existing soil substrate.
- Associated infrastructure will be limited to a small water tank and catchment roof.
- The Owners are required to do regular weed control in this area to control infestations of gorse and blackberry.

Land


205335
LEGEND
Conservation Covenant Area 'The Land'
Folio Boundaries FR121947/1
NOTE:
1. Conservation Covenant Area 1 is part of FR1219947/1. All boundaries of Area 1 are indicated by heavy black lines and their positions are defined by the accompanying descriptions.
2. All boundaries are parcel boundaries or straight lines unless otherwise described; details of individual parcel boundaries may be accessed through the Land Information System Tasmania (the LIST).
3. The Conservation Covenant Area excludes land burdened by wayleave easements.
4. The Conservation Covenant Area excludes all publicly maintained roads, or lands acquired or reserved for road purposes, regardless of whether or not such roads or road reserves are depicted on this plan.
Area 1
± 37·88ha
Wayleave
Easement (Existing)
498620mE 5257212mN
498711mE 5257193mN
498679mE 5257129mN
498703mE 5257079mN
498711mE 5256984mN
GLENFERN ROAD
Glenfern Creek
FAM52
FAM53
FSW05
2403189
2403190
2403192
2403193
2403194
2403197
2402367
5257500mN
5257000mN
498500mE
499000mE
499500mE
SCALE
0m 125m 250m 500m
LOCALITY PLAN
TASMAP 4828 - LLOYD
BOUNDARY DESCRIPTION
A-B BOUNDARY FOLLOWS NORTHERN SIDE OF WAYLEAVE EASEMENT
C-D STRAIGHT LINE
E-F BOUNDARY FOLLOWS SOUTHERN SIDE OF WAYLEAVE EASEMENT
POINT LOCATION
A INTERSECTION OF NORTHERN SIDE OF WAYLEAVE EASEMENT WITH PARCEL BOUDARY
B INTERSECTION OF NORTHERN SIDE OF WAYLEAVE EASEMENT WITH STRAIGHT LINE
C 498558mE 5257151mN
D 498568mE 5257032mN
E INTERSECTION OF SOUTHERN SIDE OF WAYLEAVE EASEMENT WITH STRAIGHT LINE
F INTERSECTION OF SOUTHERN SIDE OF WAYLEAVE EASEMENT WITH PARCEL BOUDARY
Tasmania
CONSERVATION COVENANT
LOCALITY OF GLENFERN
No. PRODUCTION / AMENDMENT AUTHORITY REFERENCE DRAWN APPROVED DATE
1. PRODUCTION RMC - PAPL CIS-3326 DM 15-08-08
INFORMATION AND LAND SERVICES - DEPARTMENT OF PRIMARY INDUSTRIES AND WATER
GAZETTED: STAT RULE:
SCALE 1 : 5,000
GRID MGA94 z55
DATUM(V) AHD
CONTOUR 10 Metres
GDA
CENTRAL PLAN REGISTER
Surveyor General
Date Registered 18-08-08
CPR 8278

Vegetation Map



Protected Areas on Private Land Vegetation Map

Property: Base Camp Tasmania

Title Ref: 121947/1

Database ID: 10817

File No: 217754

Mapsheet: LLOYD, 4825.

Data Sources: LIST, DPIW, TFGA.

Map Date: 28th August 2008

The Land

Eucalyptus cordata plantation

DDE *Eucalyptus delegatensis dry forest and woodland*

DOB *Eucalyptus obliqua dry forest and woodland*

WOB *Eucalyptus obliqua forest with broad-leaf shrubs*

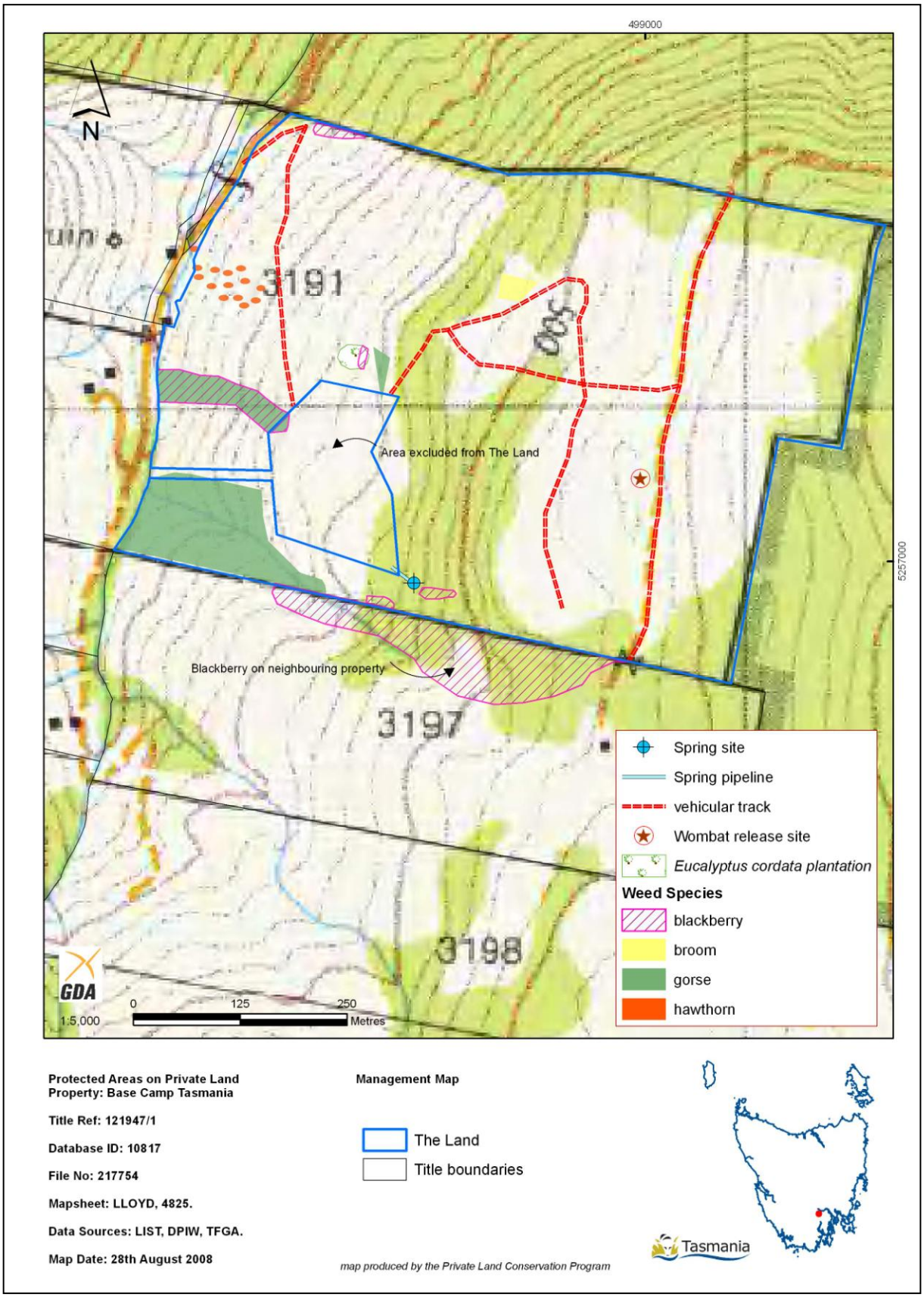
NAD *Acacia dealbata forest*

SHU *Inland Heathland (undifferentiated)*

Tasmania

map produced by the Private Land Conservation Program

Management Map



This Nature Conservation Plan has been signed as follows on the of 200…

SIGNED by the Honourable DAVID LLEWELLYN)
as a duly authorised agent of the Minister)
administering the *Nature Conservation Act* 2002)
to indicate his approval of the terms of this)
Nature Conservation Plan) .....

SIGNED by GRAHAM JOHN MCLEAN)
being the current owner of the abovementioned)
Property to indicate that the terms of this)
Nature Conservation Plan have been read,)
understood and accepted) .....
Owner

SIGNED by JENNIFER ANNE MCLEAN
being the current owner of the abovementioned)
Property to indicate that the terms of this)
Nature Conservation Plan have been read,)
understood and accepted) .....
Owner

7 Appendices and/or Attachments

7.1 Appendix 1: Weed Factsheets

Blackberry (*Rubus fruticosus* aggregate) Control Guide

Identification and Characteristics

Blackberry is the name commonly used for a range of closely-related brambles.

Blackberry plants in Tasmania vary considerably in factors such as size, vigour, leaf and cane shape, height of thickets, and ability to spread by rooting at cane tips. This variation also affects the susceptibility of blackberry types to control measures such as herbicide use and biological control.

At least nine "species", including the distinctive cutleaf blackberry, are known to occur in Tasmania, but there may be others not yet identified.

Blackberries commonly form dense thickets that may reach two or more metres in height and cover tens or even hundreds of square metres in area. The plant has prickly stems or canes which grow from a perennial crown up to 150mm in diameter. The canes may be erect, arching or trailing and they can reach six metres in length. Individual canes normally live for two or three years before dying off to be replaced by new growth. In an established thicket, up to 70 per cent of the growth may consist of dead canes.

http://www.dpiw.tas.gov.au/inter.nsf/WebPages/RPIO-4ZW2MF?open - top#top

Distribution

Blackberries occur in all settled areas of the State. They grow most vigorously in higher rainfall areas and may be restricted to the edges of creeks and rivers in the drier parts.

The plant flourishes on waste and neglected land where it creates a fire hazard and a haven for vermin. It is particularly prevalent along waterways and on roadsides. Often in association with bracken it can quickly over-run large areas.

Under favourable conditions it is capable of spreading in pasture.

http://www.dpiw.tas.gov.au/inter.nsf/WebPages/RPIO-4ZW2MF?open - top#top

Dispersal

The berries are eaten by many birds and animals. The seeds survive in the droppings and can germinate in autumn or spring.

Birds are largely responsible for spreading blackberries from one site to another, but a lot of seed is also distributed by water in creeks and rivers.

The canes of blackberries are able to send out roots at the tip where they touch the ground and this is one way in which uncontrolled patches of blackberries keep getting bigger. Apart from 'tip layering', blackberries will grow from root suckers and root fragments. Their extensive root system and their ability to send up new shoots make them very persistent.

http://www.dpiw.tas.gov.au/inter.nsf/WebPages/RPIO-4ZW2MF?open - top#top

Status Under the Weed Management Act 1999

Blackberries are declared weeds in Tasmania, largely due to their impacts on the environment and agricultural productivity. As such, the importation, sale and distribution of these plants are prohibited. The legal responsibilities of land holders and other stakeholders for this declared weed are specified in a statutory weed management plan available from the DPIW.

http://www.dpiw.tas.gov.au/inter.nsf/WebPages/TPRY-5GS6E7?open

INTEGRATED MANAGEMENT

Physical Control:

Pasture Competition

Competition from well managed, properly fertilised pasture will help prevent the establishment and spread of blackberries in grazing land.

Cultivation

Where machinery can be used, established blackberry thickets can be dozed out and the area then deep-cultivated to destroy the root system.

Repeated cultivation is necessary to destroy seedlings and regrowth before the area is sown to pasture or crop.

Seedlings and regrowth from root fragments may have to be sprayed for one or two seasons afterwards.

Slashing

Repeated slashing may help to limit the spread of blackberries but it is not an effective method of control. Blackberry canes growing along the ground will often be missed completely by the slasherblades.

http://www.dpiw.tas.gov.au/inter.nsf/WebPages/RPIO-4ZW2MF?open - top#top

Biological Control:

The rust (*Phragmidium violaceum),* which was illegally introduced into Australia in 1984, is now prevalent throughout Tasmania. The susceptibility of blackberries to the rust varies markedly with species, habitat and seasonal conditions. In most cases, the rust will not provide adequate control and other control measures will be necessary. Improved strains of the rust are being examined interstate for possible release.

Blackberries slightly or moderately infested with rust can still be treated with herbicides if required. In many situations, more effective control can be achieved from the combination of rust disease and herbicide. However, if bushes have been severely defoliated by the rust, herbicide application may not be effective.

http://www.dpiw.tas.gov.au/inter.nsf/WebPages/RPIO-4ZW2MF?open - top#top

Chemical Control:

The effectiveness of all foliar applied herbicides will be reduced significantly if the blackberries are moisture-stressed or grazed heavily at the time of application.

Regrowth after slashing, burning, or grazing should be at least 500mm high before

herbicide application.

With all herbicides, complete coverage of all canes and leaves, including those growing from suckers away from the main bush, is essential for maximum effectiveness.

Do not slash or burn treated bushes for at least six months after herbicide application.

Several of the herbicides registered for use on blackberries can cause significant damage to surrounding plants if not used correctly. Always refer to the product label before using any herbicide and carefully follow all directions.

Herbicide spraying of blackberries will achieve greatest effect when carried out in the period from petal fall to leaf fall. Generally this runs from December to May in Tasmania.

Triclopyr
Extensive trials in Tasmania have shown that this is the most cost-effective herbicide for blackberry control.

Triclopyr is absorbed through the foliage and stems and translocated to the crown and roots. Grasses are tolerant to triclopyr but most broadleaf plants, including clover, are susceptible.

Where foliar application of herbicides to blackberry is not practical, basal treatment may be used. A solution of 4.8g triclopyr per litre of diesel distillate or kerosene (e.g. 8 ml of "Garlon 600" per litre of diesel distillate or kerosene) can be sprayed or painted onto the lower 300mm of canes and the above-ground portion of the crown after most of the top growth has been removed mechanically.

Metsulfuron-methyl
Metsulfuron-methyl is a highly effective herbicide for blackberry control. Treated bushes are slow to show the effects of the herbicide and may not show any symptoms until the growing season following application.

Little or no regrowth will occur in the season after treatment but strong regrowth from the periphery of the bush may occur two years after treatment. This regrowth must be treated to avoid the re-establishment of the bush.

Metsulfuron-methyl may be used in urban areas and near crops where triclopyr is unsuitable, or when bracken or gorse is also to be controlled at the same time.

Grasses are tolerant to metsulfuron-methyl, but clover is susceptible.

Glyphosate
Glyphosate can be used for blackberry control in situations where its non-selective activity is acceptable or where care can be taken to prevent the material coming into contact with desirable shrubs, plants or grass. Overall it is less effective on large blackberry bushes than triclopyr and metsulfuron-methyl

Hexazinone

This product is useful for controlling isolated plants or small patches in industrial areas, roadside drains and similar places where its non-selective and persistent properties are useful.

Hexazinone must not be used in the root zone of desirable plants or trees nor on slopes where runoff water may carry it into their root zone.

It should not be applied when the soil is dry.

Contamination of Blackberry Fruit
Most herbicides may leave residues in the fruit of treated bushes.

Where the public has free access to blackberry bushes, herbicides must not be applied to plants carrying mature or near mature fruit. To do so is in contravention of label directions and is illegal.
http://www.dpiw.tas.gov.au/inter.nsf/WebPages/RPIO-4ZW2MF?open - top#top

Some herbicides are toxic to bees.
As a general rule, avoid applying herbicides when and where bees are foraging.
Always read the label.

Note
These herbicide recommendations are made subject to the product being registered for that purpose under relevant legislation. It is the user's responsibility to check that registration or an off-label permit covers the proposed use. Always read the herbicide label. If in doubt, check with the Registrar of Chemical Products, Department of Primary Industries and Water. Statewide Freecall 1300 368 550.

Table 1. Blackberry herbicide properties and recommendations for use

Herbicide (Active ingredient)	Commercial product (Content of active ingredient)	Application rate of Commercial product per L	With-holding period	Comments
Triclopyr[1]	GARLON 600 (600 g/L)	0.85 - 1.7 mL	Nil	Apply to foliage from petal fall to leaf senescence.
	GRAZON DS (300 g/L Triclopyr, 100 g/L Picloram)	3.5 - 5.0 mL	Nil	Use higher rate on large bushes when complete wetting is difficult.
Glyphosate[1]	ROUNDUP (360 g/L)	10 - 13 mL	Nil	Apply to foliage from petal fall to leaf senescence. Add wetting
	GLYPHOSATE 360			

	(360 g/L) TROUNCE BRUSH-PACK (835 g/L Glyphosate, 10 g/L Metsulfuron-methyl)	1.7 g	Nil	agent.
Metsulfuron-methyl	BRUSH-OFF (600 g/Kg)	0.1 g	Nil	Apply to foliage from petal fall to leaf senescence. Add wetting agent.
Hexazinone[2]	a) VELPAR L (250 g/L) b) VELPAR 20 G (200 g/Kg)	a) liquid: 4 mL spots per small crown b) granules: 4g/m^2 beneath bushes	Nil	Apply in spring or autumn when soil is moist. Single crown bushes up to 1 metre tall. a) soil injected a) & b) to ground around base of canes

[1]More dilute formulations are available for use in home gardens.
[2]May show up to 24 months residual activity against crops and pasture species. Seek advice if the treated area is to be sown within this time after treatment.

NB: Do not apply any herbicide to bushes that bear mature or near-mature fruit.

Primary Industries, Water, and Environment

Service Sheet

PRODUCED BY THE DEPARTMENT OF PRIMARY INDUSTRIES, WATER, AND ENVIRONMENT

Revised 11/02
Revised 113/97
Agdex 640

Gorse
(*Ulex europaeus* L.)

Identification and Characteristics

Gorse is one of Tasmania's most widespread and troublesome weeds. It is a prickly, perennial, evergreen shrub which if left undisturbed will grow to a height and diameter in excess of 3 metres.

Gorse is a member of the legume family *Fabaceae*. It produces an extremely deep and extensive root system, giving it access to water at very low depths in the soil. All stems and leaves end in a sharp spine, making plants impenetrable to animals and unpalatable to all stock except goats. The dark green leaves and stems are ridged and covered with a waxy cuticle to help minimise water loss. This feature, coupled with its deep root system, allows gorse to proliferate in areas of very low rainfall.

Flowers are bright yellow, pea-like, approximately 20mm long, and are borne all over the plant. The buds develop during February and March, however flowering occurs in two distinct seasons, spring and autumn. A small number of flowers may be present at other times if climatic conditions suit. The flowers are primarily pollinated by bees.

Vast quantities of brown to black seed, approximately 4mm long, are produced in grey, hairy pods. Each pod generally holds three to five seeds.

Distribution

Gorse is a native of Europe, where it is widespread, but causes few problems as a weed. Generally the plants does not grow as large in Europe as in Tasmania as it is restricted by a range of natural predators.

Gorse is a troublesome introduced weed in many other parts of the world including Canada and New Zealand. It was deliberately introduced into Australia as a hedge plant. These plantings, coupled with a suitable climate, a lack of natural predators and various land management techniques have allowed gorse to dominate vast areas in a short period of time.

Gorse is undoubtably one of Tasmania's significant weeds of concern. It is present in most agricultural and urban areas and is particularly dense in the Midlands, rendering many hectares of grazing land useless.

As an environmental weed, gorse has become a major problem by invading bushland and conservation areas throughout the State. Due to surrounding vegetation and terrain, it is usually difficult to eradicate in these situations.

Dispersal

Most seeds tend to fall below the parent, although the seed pods are capable of splitting open explosively, usually on warm days, and catapulting the seeds up to several metres from the parent bush. The seeds have a hard, water-resistant coating, allowing them to remain dormant in the soil for more than 20 years. These seeds are often stimulated into germination when the existing bushes are burned or mechanically disturbed.

Gorse spread is mainly by seeds, however cultivation and spread of the root system does occasionally permit some fragments to regenerate.

Economic Significance

Infestations occur on rural land throughout Tasmania. The heaviest infestations cover approximately 30,000 ha in the central and northern midlands on pastures grazed mainly by sheep. In these areas alone, losses in animal production are currently estimated at approx. $1 million per annum.

Rabbits and feral cats frequently reside in gorse thickets. Near buildings, around towns and on fence lines gorse also constitutes a serious fire hazard due to high levels of volatile oils present in stems and leaves.

Status under the *Weed Management Act 1999*

Gorse is a declared weed in Tasmania due to its impacts on the environment and agricultural productivity. As such, its importation, sale and distribution are prohibited. The legal responsibilities of landholders and other stakeholders for this declared weed are specified in a statutory weed management plan available from the DPIWE.

Control

A range of techniques are available for gorse management. Regardless of the methods employed, some vital points must first be understood:

- Destruction of existing plants is only the start of achieving long term eradication. The large quantities of seed in the soil will quickly germinate and re-establish the infestation if vigilant follow-up is not carried out over ensuing years.
- No one method alone will give total control of existing gorse plants and subsequent seedlings. A combination of methods must be employed to give maximum chances for long term success.
- Where gorse transcends property boundaries, any eradication efforts should be made in conjunction with neighbouring landholders to achieve a complete eradication of all plants in the area to prevent reinfestation.
- Whilst the largest thickets may appear the most obvious place to commence works, ideally the smaller, outlying infestations should be tackled first. This allows a greater area of land to be cleaned up first, and follow up maintenance will be less in these areas as a smaller seed bank is likely to be present.

Hygiene

As gorse spreads mostly by seeds, gorse-free areas can be protected by preventing the introduction of seed. Gorse seed is too heavy to be dispersed by wind and birds are generally of little significance in seed dispersal. Seed is usually carried into new areas in soil and mud attached to machinery or boots. These items should therefore be thoroughly cleaned after use in any gorse infested areas. This is especially important in bushland and forests areas.

Seed can also be carried in water. Removing gorse bushes growing on the edges of water courses is important in preventing dispersal of seed downstream.

Biological control

The gorse weevil (*Apion ulicis*) is a small beetle whose larvae feed on the developing gorse seeds in the pods. It was introduced to Tasmania in 1939 from Britain, and is now present in all parts of the State.

The weevil has had some effect in reducing the spread of gorse as it attacks the spring seed production. Unfortunately the weevil is dormant in the autumn and thus seeds produced at this time escape predation.

Detailed studies in Europe carried out in the 1970s by the New Zealand Department of Scientific and Industrial Research showed that about 94 insect and mite species were known to attack gorse in Europe. However, only six were shown to be sufficiently host specific for release in NZ.
The gorse spider mite (*Tetranychus lintearius*) was released in December 1998. Infestations of these mites on gorse plants are easily recognisable by the silk webbing that house the mite colonies. The

gorse spider mite is now widespread in the State and causes considerable damage in the first year after release, however the long term impact is yet to be assessed. A threat to the effectiveness of the gorse spider mite is predation by the introduced Chilean predatory mite *Phytoseiulus persimilis* and the native coccinellid beetle *Stethorus histrio*.

The gorse thrip (*Sericothrips staphylinus*) is a foliage feeder and was released in Tasmania in 1998. Its impact in the field is currently under investigation by TIAR.

The gorse soft shoot moth (*Agonopterix ulicitella*), a foliage feeder, and the gorse pod moth (*Cydia succedana*), which destroys seeds in both spring and autumn are additional agents that will be released and are expected to compliment the effects of the other gorse agents already present in the State.
See TIAR Weed Biological Control Pamphlets for additional details on all of these agents.

As with all bio-control agents, these insects, if successful, will compliment existing activities to manage gorse. They will not destroy all gorse plants alone, and must be used in conjunction with other activities for maximum effect.

Burning

Burning alone will not adequately control gorse bushes; it should only be used in conjunction with other management practices. Even if all above ground parts of the plant are destroyed, gorse will often regenerate from its lignotuber, a swollen, modified stem section at its base.

Fire can be very useful in reducing impenetrable thickets of gorse to ground level, to allow follow up herbicide spraying of regrowth. The fire will also stimulate seed germination, allowing a high proportion of the seedlings to be sprayed the following year, greatly reducing the seed bank.

Burning can also be useful when combined with grazing by sheep or goats as it reduces the amount of foliage and stems and stimulates growth of softer green shoots which are far more palatable to grazing animals.

Burning is also beneficial when carried out several months after spraying when, under the best conditions, it reduces dead woody stems to ashes.

Gorse burns readily and gorse fires may cause severe damage to adjacent bush. Extreme care should be taken when burning gorse near desirable vegetation, fences or buildings. Gorse growing underneath H.E.C. high voltage distribution lines should not be burned without consulting the H.E.C. as gorse smoke is electrically conductive and can cause arcing from the high tension line to the ground.

Burning may actually increase the density of gorse infestations over time by stimulating the germination of gorse seed beneath the burned bushes. At the same time, burning will destroy much of the grass beneath the bush, reducing the competition for the gorse seedlings. For these reasons, **burning should not be undertaken unless it is part of an overall strategy employing other complimentary management practices**.

Cultivation

Mechanical clearing is an ideal method of controlling large infestations on land that is suitable for sowing down to pasture. Bulldozers with rippers, or medium to heavy tractors with dozer blades and rippers attached can be used.

Cutting off established bushes near the soil surface with dozer blades or hard equipment is another option. This treatment reduces soil disturbance, thereby stimulating less seeds into germination.

In either case, follow-up management is vital for long term success. This includes establishment of a vigorous pasture to provide competition, grazing of gorse seedlings and herbicide use on plants surviving grazing.

Regular slashing or mowing is not effective in eradicating gorse. These practices will eliminate most seed production and maintain plants at a low height, but plants will regrow vigorously if slashing ceases.

Grazing

Grazing by sheep is moderately effective for controlling gorse seedlings. After a dense gorse infestation has been removed and the pasture established, it should be subjected to periodic heavy grazing by sheep during the spring and summer to prevent the establishment of gorse seedlings. Grazing needs to be carefully managed to avoid overgrazing and subsequent pasture damage.

Sheep will browse established gorse bushes during spring or when alternative feed is in short supply. However, as they prefer to eat pasture species, significant control of established plants cannot be

achieved by sheep grazing unless large numbers are confined to gorse patches for most of the year.

Goats prefer to browse young gorse shoots rather than graze actively growing pasture. They remove flowers and defoliate bushes, browsing them back to stumps when the stocking rate is high enough. Unfortunately well established gorse bushes are not readily killed by browsing and are capable of recovery, even after several years of browsing, if the goats are removed from the area.

DPIF trials some years ago indicated that Angora goats were ideal for gorse control. In the gorse infested country of the Midlands, wethers are preferred for this task, however in areas where medium to high quality pasture is also available, breeding stock can be used.

The suggested strategy is to burn the gorse bushes immediately before the stock are introduced to the area. It should then be set-stocked with goats supported by large numbers of sheep during spring and early summer to reduce pasture availability.

Goats prefer gorse to pasture during spring but will graze the pasture readily in late summer-autumn when it has dried off. Reducing pasture carryover by sheep-grazing in the spring means that goat browsing pressure can be maintained on the gorse bushes throughout the growing season.

Experience suggests that a stocking rate of 3 Angora wethers per hectare of gorse infestation will contain gorse, while a rate of 5-6 wethers per hectare of gorse will almost totally prevent regrowth after burning. These stocking rates apply where sheep also graze the area, as recommended above.

Alternatively a high stocking rate of up to 20 goats per hectare of gorse could be used initially where a degree of regrowth after burning has already occurred. This number can be slowly reduced to 3-5 per hectare as control is effected. It is stressed that these stocking rates refer to stock numbers per hectare of actual gorse and not to the total area of the paddock.

Gorse is a moderately nutritious fodder and Angora goats will produce reasonable yields of mohair while browsing it. Using the strategy described above, gorse can provide mohair production with little reduction in wool yield from the area.

Cashmere and meat goats are also suitable for gorse control but sturdier fences are required for these larger goat breeds.

Chemical control

A number of herbicides are registered for use on gorse in Tasmania, in a variety of application methods. In dense gorse stands satisfactory spray cover is not likely to be obtained beyond a range of 4-5 metres. If the stand is larger, access paths should be cleared to allow complete coverage.

(i) Foliar application

As with most weeds, the optimum time for herbicide application is when plants are actively growing. This is generally spring to early summer, and after the autumn break. With large plants or thickets, a high spray volume, up to 4000 L/Ha, should be applied to ensure the entire plant is contacted, not just the outer leaves and stems.

Extensive trial work and experience throughout the State indicates that the most effective herbicide for gorse control is a mixture of triclopyr and picloram (e.g. Grazon DS®). Where thorough coverage of the bush can be achieved, one application will usually give complete control with no regrowth. However, treated bushes should be checked twelve months after the herbicide application and any regrowth treated.

Care is needed when treating gorse with Grazon DS® in areas where desirable trees are present, or where trees may have roots extending into the treated area. They may be severely damaged or killed by spray drift onto leaves or green stems or by root uptake from the soil.

In urban or horticultural areas this triclopyr/picloram mixture is not recommended for use as it may volatilise, move on air currents, and cause damage to nearby plants or crops. Vineyards are particularly susceptible. Alternate herbicides such as triclopyr alone (e.g. Garlon 600®), glyphosate (e.g. Roundup Biactive®), metsulfuron-methyl (e.g. Brush Off®), ammonium thiocyanate (e.g. Amitrole T®) or glyphosate/metsulfuron-methyl mixture (e.g. Trounce®) are less volatile and are preferred for foliar use in such areas.

All of these herbicides are less effective than triclopyr/picloram mixture and should only be used where the use of this product is not appropriate.

Triclopyr, picloram and metsulfuron-methyl will not significantly affect grasses, however they will severely damage clovers and other broadleaved plants, including surrounding trees, contacted by

the spray. Picloram and metsulfuron-methyl are also soil-residual, hindering the re-establishment of these plants for up to twelve months. Where this poses a problem, herbicides not containing these chemicals should be used.
Have removed page break.
Glyphosate and ammonium-thiocyanate are non-selective and will affect grasses, clovers and other broadleaf plants contacted by the spray. This will leave bare areas where gorse seedlings may re-establish.

Irrespective of the herbicide used, regrowth of well established gorse bushes after burning or mechanical control is not suitable for herbicide treatment until it is approximately 500 - 1000mm high. Treatment before this will be of low effectiveness as there will not be enough leaf area present to absorb sufficient herbicide to kill the roots.

(ii) Cut stump treatment

Stumps of bushes left after removal of the top growth can be painted with a herbicide solution to prevent regrowth. This method of treatment is particularly useful where foliar application of herbicide may cause off-target damage, for example, in treating gorse growing on riverbanks or amongst desirable shrubs and trees.

When applied in this manner Grazon DS® is used at 1 part to 10 parts of water. Alternatively, Tordon Timber Control Herbicide® at one part to 20 parts of water, or 1 part glyphosate-based herbicide to 1 part water may be used.

The herbicide solution must be applied immediately after top growth removal by chainsaw, brush-cutter or similar implement.

Treatment after herbicide application

In most agricultural situations gorse bushes should be removed after spraying to facilitate the preparation of a seedbed, the sowing of pasture seed and the spot treatment of regrowth. This removal will also reduce the fire hazard created by the dead, dry bushes.

Sprayed bushes should not be removed until full brownout has occurred - at least six months after treatment. Bushes treated in autumn or winter may need to be left for up to 18 months before complete brown-out.

Removal by burning will encourage the germination of gorse and other weeds which will rapidly cover bare areas left after the fire. When pasture species cannot be established on these areas (e.g. stony ground, creek banks), or a regeneration of native species is required (national parks, conservation areas and bushlands) the bushes should be removed by other means with minimal soil disturbance.

Integrated management

In most situations, the most effective and long term control of gorse will be achieved by a combination of the above methods rather than by reliance on a single method. Such a combination of methods is termed an integrated management program.

In agricultural situations, herbicide application, burning, cultivation, pasture establishment and grazing can be combined successfully.

For bushland areas, mechanical methods (chainsaw, brushcutter), herbicide application (cut stump treatment) and revegetation can be combined to control gorse with minimal damage to surrounding vegetation.

In wasteland areas such as gullies and rocky banks where pasture establishment is impractical, spraying or cut-stump treatment are the most economical and effective ways of preventing reinfestation. In these areas, grazing should be restricted to prevent soil disturbance and encourage the natural regeneration of grasses and other plants to compete with gorse seedlings.

Bee Careful !

Some herbicides are toxic to bees. As a general rule, avoid applying herbicides when and where bees are foraging. Always read the label.

Note:
These herbicide recommendations are made subject to the product being registered for that purpose under relevant legislation. It is the user's responsibility to check that registration or an off-label permit covers the proposed use. Always read the herbicide label. If in doubt, check with the Registrar of Chemical Products, Department of Primary Industry and Fisheries. Statewide Freecall 131318.

Rates and times of application of herbicides for foliar treatment of gorse

Herbicide (Active ingredient)	Commercial products (Content of active ingredient)	Rate of commercial product per litre of water	Withholding period for use in pasture	Comments
triclopyr+ picloram	Grazon DS® (300 g/L + 100 g/L)	Spring & summer, to 1.5m tall: 2.5 ml Autumn or over 1.5m tall: 3.5 ml Winter: 5.0 ml	Nil	Optimum time of application is when plants are actively growing.
	Tordon Timber Control Herbicide® (100 g/L + 50 g/L)	7.5 ml	Nil	Apply to actively growing plants from September to March. Treat any regrowth in the following season.
triclopyr	Garlon 600® (600 g/L)	1.7ml - 3.5ml	Nil	Apply from spring to mid-summer. Use the higher rate on older plants.
metsulfuron -methyl	Brush-Off® (600 g/Kg)	0.15 g (1.5g / 10 litres)	Nil	Apply to bushes up to 2m tall.
glyphosate	Roundup Biactive® (360 g/L) Glyphosate 360® (360 g/L)	15 ml	1 day	Optimum time of application is when plants are actively growing.
ammonium thiocyanate	Amitrole T® (220 g/L)	20 ml	Orchards & Vines - 56 days Other areas - Nil	Apply during summer or before full flowering. Respraying will be necessary.
glyphosate+ metsulfuron -methyl	Trounce® (835 g/L + 10 g/L)	1.7 g	Nil	Optimum time of application is when plants are actively growing.

Note: Addition of adjuvants to most herbicides alters their effectiveness. Carefully consult each product's label for specific directions before adding any adjuvant.

Triclopyr, picloram and metsulfuron-methyl will not significantly affect grasses, however they will severely damage clovers and other broadleaved plants, including surrounding trees, contacted by the spray.

Glyphosate and ammonium-thiocyanate are non-selective and will affect grasses, clovers and most broadleaf plants.

Picloram and metsulfuron-methyl are soil-residual, hindering the re-establishment of clovers and other broadleaved plants for up to twelve months.

Rates of application of herbicides for cut stump treatment of gorse

Herbicide (Active ingredient)	Commercial products (Content of active ingredient)	Rate of commercial product per litre of water	Withholding period for use in pasture	Comments
triclopyr+ picloram	Grazon DS® (300 g/L + 100 g/L)	100ml	Nil	Optimum time of application is when plants are actively growing. The mixture must be applied immediately after the cut is made.
	Tordon Timber Control Herbicide® (100 g/L + 50 g/L)	50ml	Nil	
glyphosate	Roundup Biactive® (360 g/L) Glyphosate 360® (360 g/L)	1 litre	Nil	As above.

Primary Industries, Water, and Environment

Service Sheet

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Broom
Montpellier broom
(*Genista monspessulana* L.)
English broom
(*Cytisus scoparius* (L.) Link)

Identification and Characteristics

There are two species of broom that cause significant weed problems in Tasmania. Both species are erect, semi-woody branched shrubs reaching 2-3 metres tall at maturity.

The leaves are trifoliate with the central leaflet being longer than the outer two leaflets. The leaves of English broom are deciduous and the stems may be bare of leaves. The leaves of Montpellier broom are always attached to the stems by stalks (petioles) whereas those of English broom may lack petioles, especially on the upper part of the stems.

The flowers of Montpellier broom are carried on short lateral branches singly and in clusters of 3-7 flowers while the flowers of English broom are usually axillary (arising from the angle between leaf and stem) and solitary. In both species the flowers are bright yellow, although the lower petals of English broom may be brownish-red.

Both brooms produce seed in pods which on maturity, while still attached to the parent plant, open explosively to eject the seed. Seed pods of English broom are 4-5 cm long, dark brown or black, with brown hairs along the margins. They contain 6-18 yellow seeds. Pods of Montpellier broom are 2-2.5cm long, covered in fine hairs and contain 5-8 black seeds. English broom normally flowers in late spring while Montpellier broom flowers from late winter to late spring.

Distribution

Montpellier broom is native to scrub and open woodlands in the Mediterranean region, Portugal and the Azores. English broom is a native to most of Europe. It is an important weed in the Pacific coast states of the USA, Hawaii, New Zealand and in parts of Asia and its native range. Both species were probably introduced into Australia as hedging and ornamental plants but escaped from cultivation to become naturalised over much of south-eastern Australia.

In New South Wales, Montpellier broom is a significant weed of semi-improved pasture on the coast and tablelands. However, in Tasmania, English broom is the more common species, occurring throughout the settled areas of the State in a wide range of habitats. Plants are locally abundant on roadsides, waste areas, poor quality pastures and disturbed bushland. Those environments range from the high rainfall west coast to the lower rainfall Derwent Valley.

Dispersal

Brooms spread solely by seed. The bursting pods can eject seed for 1-3 metres from the parent plant. The seeds are not buoyant in water but are carried

in the bed load of rivers and streams, resulting in long distance dispersal. Scouring in the streambed damages the hard seed coat preparing the seed for germination when it washes up on the bank. Ants may also locally disperse seeds. Dry pods containing seeds can be blown short distances by wind. Long distance seed movement can occur in mud and soil carried on road graders and earth moving equipment, farm machinery, vehicles and footwear and in sand and gravel from quarrying operations. Seed can also be carried within the digestive tracts of horses and other animals. Contaminated agricultural produce probably results in some spread.

Economic and Environmental Significance

In pastures, broom may form thickets that prevent grazing on infested areas. As mature bushes are relatively unpalatable to sheep and cattle their presence represents a loss of grazing area while on roadsides, they reduce drivers' vision and increase road maintenance costs.

Dense thickets of broom provide cover for pest animals such as rabbits and inhibit access to bushland and recreational areas. Broom invades natural ecosystems where it competes with indigenous plants and changes fauna habitat. Broom is found in grassland and woodland/open forest, including a wide range of disturbed as well as undisturbed communities in cool, moist regions. Broom invades and persists in treeless vegetation such as subalpine grassland and cleared pastureland, but will not grow in heavily shaded or swampy places.

Successful seedling establishment occurs away from broom shading, usually after soil or vegetation disturbance, including cultivation, fire, slashing, herbicide treatment, road-making and pig-digging. Broom can, however, also readily invade vegetation without major disturbance, with seedlings being found in open microsites such as along animal tracks and beside fallen timber.

Properties

Both Montpellier and English broom are members of the Fabaceae (legume) family. Rhizobial nodules on broom roots fix nitrogen but compared to agricultural legumes, broom is relatively poorly nodulated and has low nitrogenase activity. However, this is probably important in allowing broom to grow on nitrogen-poor soils. Broom seedlings establish readily on sites where the soil has been disturbed or after fire and can survive in shade. Successful seedling establishment requires protection from drought and grazing and does not occur in existing dense broom stands.

The seeds of broom are considered toxic to stock if eaten excessively and the foliage has been known to cause digestive troubles in horses. Sparteine and other quinolizidine alkaloids are found in very small quantities throughout the plant although concentrated in the flowers and seeds. Ingestion of these plant parts could cause lack of coordination, nervous system depression, convulsions and respiratory failure however it is unlikely that animals would consume the large enough amounts necessary to cause poisoning. In practice, the toxicity of brooms is not considered to be a problem in Australia.

Brooms have been used in herbal medicine and have various culinary uses such as a substitute for hops, capers and coffee. The stems were once utilised to make brooms and to thatch rooves.

The hard seed coat can delay germination for months or years. Seed stored dry can remain viable for more than 80 years and more than 80% of buried seed can remain dormant and viable after 4 years. As a result large seed banks can develop under mature plants and seed banks exceeding 50 000 seeds per square metre are not uncommon. The seed coat needs to be ruptured before seed will germinate. Fire can stimulate seed germination resulting in dense infestations of seedlings.

Both Montpellier and English broom and their hybrids are widely sold as ornamentals in Australia.

Status under the *Weed Management Act 1999*

Montpellier broom and English broom are both declared weeds in Tasmania, largely due to their environmental impacts. As such, their importation, sale and distribution are prohibited. The legal responsibilities of landholders and other stakeholders for these declared weeds are specified in a statutory weed management plan available from the DPIWE.

Control

Brooms do not normally cause problems as weeds of arable land nor in pastures where sheep readily graze seedlings and young plants. Pasture improvement is the most appropriate method of control for infested pastures where mechanical removal of large plants and cultivation to destroy seedlings can be undertaken.

Long term management programs must be developed to effectively control brooms. In planning these programs, integrated management strategies will achieve the best results. Early treatment of new infestations should be a priority.

New infestations should be treated prior to plants reaching the flowering stage. Once plants begin seeding, control becomes more difficult and expensive. The persistent soil seed bank usually leads to rapid regeneration after initial treatment with herbicides, mechanical means or fire. In native vegetation, preventing ground disturbance should reduce the rate of invasion by brooms.

Hygiene:

Vehicles, bush walkers and horse riders should keep to designated routes to minimise the amount of seed picked up on tyres, footwear and hooves. Broom growing along access tracks must be controlled to limit the potential for such spread. Equipment, vehicles and animals should be thoroughly checked and cleaned when leaving infested areas to ensure seed is not being carried. Gravel and sand should not be removed from infested quarries and streams.

If cultivation must be carried out in infested areas, ensure all equipment is cleaned before moving to uninfested areas. If possible, always work uninfested areas first.

Cultivation:

On agricultural land, cultivation can destroy small plants but as it produces conditions suitable for seedling establishment it must be followed up by further cultivation, heavy grazing or use of herbicides. Some dense infestations have been destroyed by bulldozing and repeated cultivation over two years. However, soil disturbance will move seed from the surface and distribute it through the soil profile and may increase the difficulty of long term management.

Slashing:

Cutting seedlings when they are 5 to 10 cm high can provide effective control of regenerating plants. Thickets can be slashed with a brushcutter and regrowth sprayed with herbicide.

Manual:

Small plants can be hand pulled or grubbed in spring when the ground is soft. Larger shrubs should be cut close to ground level and the stumps painted with herbicide.

Fire:

Fire may be a useful technique to reduce the soil seed bank. Most adult plants are killed by fire, while younger plants may re-sprout, depending on the fire intensity. Mass germination of the seed is stimulated by high soil heating and fire can deplete seed banks by up to 90%. If infestations are burned in the spring the seedling growth will be subject to summer drought stress which will reduce seedling survival. Regeneration after fire can be treated with herbicide or by hand weeding.

Grazing:

Sheep and goats will graze broom seedlings and flowers and assist in suppressing the development of infestations and production of seed.

Biological Control:

An international program involving Australia, New Zealand and the USA has been underway since 1990 to introduce a number of natural enemies to control English broom. These agents can be released only after rigorous testing has demonstrated they are specific to English broom and pose no danger to native plants or plants of economic significance.

Two biological control agents, the twig mining moth, *Leucoptera spartifoliella* (Hubner) and the broom bud psyllid, *Arytainilla spartiophila* (Forster) were released in the north west, west and south of Tasmania in spring 1996 but follow up surveys have indicated these agents have failed to establish. Further investigations are taking place with future releases planned. Other potential biological control agents for English broom are also under investigation.

Montpellier broom has been nominated as a target plant for biological control. However, testing and evaluation of potential biological control agents will take a number of years.

Chemical Control:

Triclopyr (Garlon®) and triclopyr/picloram (Grazon DS®) are the only herbicides registered for use on broom in Tasmania. However, a permit has now been issued specifically designed for basal bark and cut stump applications in bush land using

triclopyr, triclopyr/picloram and glyphosate (e.g. Roundup®, Roundup Biactive®). This permit also covers metsulfuron methyl (e.g. Brushoff®, Brushkiller®) for spot spray application. For further information contact your regional Bushcare Officer.

(i) Foliar application

In dense broom stands satisfactory spray cover is not likely to be obtained beyond a range of 4-5 metres. If the stand is larger, access paths should be cleared to allow complete coverage.

As with most weeds, the optimum time for herbicide application is when plants are actively growing. This is generally spring to early summer, and after the autumn break. With large plants or thickets, a high spray volume, up to 4000 L/Ha, should be applied to ensure the entire bush is contacted, not just the outer leaves and stems.

Extensive trial work and experience throughout the State indicates that the most effective herbicide for broom control is a mixture of triclopyr and picloram (e.g. Grazon DS®). Where thorough coverage of the plants can be achieved, one application will usually give complete control with no regrowth. However, treated bushes should be checked twelve months after the herbicide application and any regrowth treated.

Care is needed when treating broom with triclopyr/picloram or metsulfuron methyl in areas where desirable trees are present, or where trees may have roots extending into the treated area. They may be severely damaged or killed by spray drift onto leaves or green stems or by root uptake from the soil. Although not residual, glyphosate is non-selective and will also damage or kill trees and grasses that come into contact with spray drift.

In urban or horticultural areas this triclopyr/picloram mixture is not recommended for use as it may volatilise, move on air currents, and cause damage to nearby plants or crops. Vineyards are particularly susceptible. However, triclopyr alone (e.g. Garlon 600®), is less volatile and preferred for foliar use in such areas.

Triclopyr, picloram and metsulfuron methyl will not significantly affect grasses, however they will severely damage clovers and other broadleaved plants, including surrounding trees and crops, contacted by the spray. Picloram is also soil-residual, hindering the re-establishment of these plants for up to twelve months. Where this poses a problem, herbicides containing picloram should not be used.

Irrespective of the herbicide used, regrowth of well established broom bushes after burning or mechanical control is not suitable for herbicide treatment until it is approximately 500 - 1000mm high. Treatment before this will be of low effectiveness as there will not be enough leaf area present to absorb sufficient herbicide to kill the roots.

(ii) Cut stump and Basal bark treatment

Stumps of plants left after removal of the top growth can be painted with a herbicide solution to prevent regrowth. The herbicide solution must be applied immediately after top growth removal by chainsaw, brush-cutter or similar implement.

For plants with a basal diameter up to 50mm, instead of removing the top growth, a herbicide solution is applied to the lower 300mm of stems. This is done by thickly painting the mixture right around the stem.

These methods of treatment are particularly useful where foliar application of herbicide may cause off-target damage, for example, in treating broom on riverbanks or amongst desirable shrubs and trees.

Triclopyr, triclopyr/picloram and glyphosate are all permitted for these uses.

Treatment after herbicide application:

In most agricultural situations broom bushes should be removed after spraying to facilitate the preparation of a seedbed, the sowing of pasture seed and the spot treatment of regrowth. This removal will also reduce the fire hazard created by the dead, dry plants.

Sprayed bushes should not be removed until full brownout has occurred - at least six months after treatment.

Removal by burning will encourage the germination of broom and other weeds, which will rapidly cover bare areas left after the fire. When pasture species cannot be established on these areas (e.g. stony ground, creek banks), or a regeneration of native species is required (conservation areas and bushlands) the bushes should be removed by other means with minimal soil disturbance.

Integrated management:

In most situations, the most effective and long term control of broom will be achieved by a combination of the above methods rather than by reliance on a

single method. Such a combination of methods is termed an integrated weed management program.

In agricultural situations, herbicide application, burning, cultivation, pasture establishment and grazing can be combined successfully.

For bushland areas, mechanical methods (chainsaw, brushcutter), herbicide application (cut stump treatment) and revegetation can be combined to control broom with minimal damage to surrounding vegetation.
In wasteland areas such as gullies and rocky banks where pasture establishment is impractical, spraying or cut-stump treatment are the most economical and effective ways of preventing reinfestation. In these areas, grazing should be restricted to prevent soil disturbance and encourage the natural regeneration of grasses and other plants to compete with broom seedlings.

Bee Careful !

Some herbicides are toxic to bees. As a general rule, avoid applying herbicides when and where bees are foraging. Always read the label.

Note: These herbicide recommendations are made subject to the product being registered for that purpose under relevant legislation. It is the user's responsibility to check that registration or an off-label permit covers the proposed use. If in doubt, check with the Registrar of Chemical Products, Department of Primary Industries, Water and Environment. Statewide Freecall 1300 368 550.

FOLIAR APPLICATION

Herbicide (Active ingredient)	Commercial products (Content of active ingredient)	Rate of commercial product per litre of water	Withholding period for use in pasture	Comments
triclopyr+ picloram	Grazon DS® (300 g/L + 100 g/L)	Spring to mid-summer prior to pod formation: 2.5 mL	Nil	Optimum time of application is when plants are actively growing and not stressed.
triclopyr	Garlon 600® (600 g/L)	2 mL	Nil	Thoroughly spray foliage when growth is active.
*metsulfuron methyl	Brushoff ® (600g/Kg)	0.1 –0.15g	Nil	As per existing registrations.
*glyphosate	Roundup® (360g/L)	10-13 mL	Nil	Addition of adjuvant in accordance with label.

Note:

- Addition of adjuvants to most herbicides alters their effectiveness. Carefully consult each product's label for specific directions before adding any adjuvant.
- Triclopyr, picloram and metsulfuron methyl will not significantly affect grasses, however, they will severely damage clovers and other broadleaved plants, including surrounding trees, contacted by the spray.
- Picloram and metsulfuron methyl are soil-residual, hindering the re-establishment of clovers and other broadleaved plants for between 6-12 months.
- * These products are not registered for this use on broom in Tasmania and will not be mentioned on product labels, however, a permit has been issued. For further information on permit details contact your local Bushcare Officer – Statewide Freecall 1300 368 550.

BASAL BARK AND CUT STUMP APPLICATION

Herbicide (Active ingredient)	Commercial products (Content of active ingredient)	Rate of commercial product	Withholding period for use in pasture	Comments
Triclopyr	Garlon 600® (600 g/L)	20 mL per litre of diesel distillate	Nil	Optimum time of application is when plants are actively growing. **Basal Bark Method:** Spray or paint the bark around the stem from the ground level to a minimum height of 30cm, wetting thoroughly to runoff. **Cut Stump Method:** Stems should be cut less than 15cm above ground level. Immediately apply the mixture to the freshly cut stump by spraying or painting the cut surface and side of the stem liberally.
*triclopyr+ picloram	Grazon DS® (300 g/L + 100 g/L)	20 mL per litre of diesel distillate	Nil	
*glyphosate	Roundup® (360g/L)	1 part to 5 parts water or undiluted	Nil	

- * These products are not registered for this use on broom in Tasmania and will not be mentioned on product labels, however a permit has been issued. For further information on permit details contact DPIWE Statewide Freecall 1300 368 550.

7.2 Appendix 2: General requirements for the care and rehabilitation of injured and orphaned wildlife in Tasmania