

# ***Managing Threatening Processes***

The following section outlines the principal threatening processes that occur on Bruny Island, and the various ways in which these processes can be managed to ensure the long-term security of threatened species and communities on the island.

## LAND CLEARING

The *Threatened Species Strategy for Tasmania* (DPIWE) identifies native vegetation clearance as one of the most significant and widespread threatening processes both in Australia and elsewhere in the world (Parks & Wildlife Service 2000). Land clearing has been listed as a Key Threatening Process on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and the protection of native vegetation is one of the key Priority Recommendations of *Tasmania's Nature Conservation Strategy 2002-2006*.

Clearing of native vegetation occurs for a wide range of purposes, from commercial forestry operations, to the clearing of small patches of remnant vegetation on private land. Without doubt, land clearance has been the predominant influence in determining the current vegetation patterns on Bruny Island, and has played a major role in the decline of several animals and plants. Land clearance is also an ongoing process, and continues to be the key threatening process for a range of listed species on the island.

There are a number of ways in which the impact of land clearance on Bruny Island's threatened species can be ameliorated, halted and in some instances reversed. Various approaches to dealing with land clearance as a threatening process are detailed below.

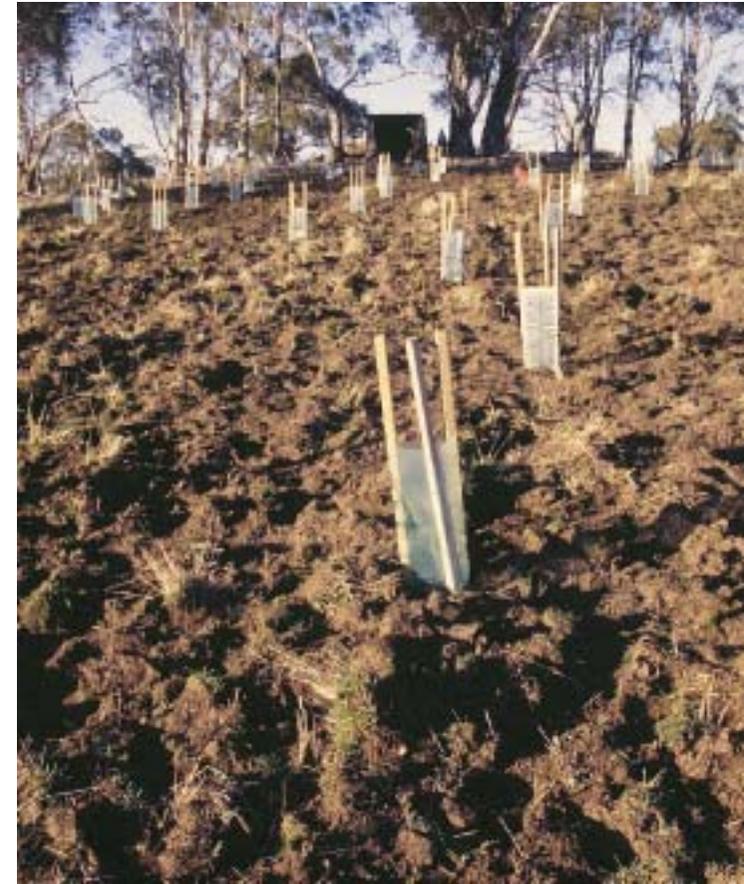
### ***Habitat protection on private land***

One way to protect threatened species from further threats of land clearance is to protect suitable areas of habitat on the island. There are a number of available options for long-term protection and nature conservation on private land. These are outlined in the booklet "Nature Conservation on Private land in Tasmania: a guide to programs and incentives" produced by the Australian Bush Heritage Fund, DPIWE and Tasmanian Farmers and Graziers Association (May 2000). These options range from Conservation Covenants and Management Agreements, fencing and tax incentives, participation in the Land for Wildlife Scheme, Whole Farm Planning or Property Management Planning, the proclamation of private reserves, and purchase of land through the Private Forest Reserves Program and the National Reserve Program.

### ***Revegetating important habitat***

Where important habitat for a threatened species has been degraded through clearing practices, it may be possible to restore habitat through appropriate revegetation and rehabilitation. However, revegetating even small areas of habitat is both expensive and time-consuming, and it is always preferable to avoid clearing important habitat in the first place.

Revegetation of important wildlife habitat on Bruny Island may be carried out with financial assistance from sources such as Landcare grants (funded through the Natural Heritage Trust). Participation in existing projects such as the Swift Parrot Habitat Rehabilitation Project is also possible. This project involves the participation of several schools throughout Tasmania, including four local schools: the Bruny Island District and Woodbridge High Schools, and Margate and Campbell Street Primary Schools. Large scale plantings of two eucalypt species, *Eucalyptus viminalis* (white gum) for the Forty-spotted Pardalote Recovery Project and *E. globulus* (blue gum) for the Swift Parrot Habitat Rehabilitation Project have already been carried out on Bruny Island. Examples of successful plantings can be found on “Murrayfield” on north Bruny Island (*E. viminalis*) and “Inala” on south Bruny Island (*E. viminalis* and *E. globulus*). Extension services are available for individual property owners to access information relating to native bush management specific to their property, as well as some funds through the programs mentioned above, such as Land for Wildlife. The Bushcare technical team have also published information for propagating seedlings of various understorey and tree species to provide habitat for small mammals such as bandicoots (Bushcare 2001).



*Revegetation: Threatened Species Unit*

## Grazing

Inappropriate or poorly managed grazing of stock can impact on both threatened flora and fauna. Riparian and coastal vegetation communities are particularly sensitive to grazing and trampling, and the survival and breeding success of many plants and animals may be directly disrupted. The *Threatened Species Strategy for Tasmania* (DPIWE 2000) identifies the greatest impacts of stock as being caused by:

- Repeated grazing of flowers that are essential for seed production and the continued survival of threatened plants.
- Grazing of habitat plants that harbour invertebrates, or grazing of seedlings that are essential for maintenance and regeneration of the community;
- Trampling of vegetation.
- Damage to fragile ecosystems such as sand dune systems.
- Soil compaction and erosion preventing seedling establishment.
- Fouling of water.
- Degradation of river and creek bank vegetation.
- The spread of weed seeds from pastures into native vegetation.

The Strategy also points out that disturbance can be beneficial for some species, by acting as a trigger in their lifecycle. It is therefore important to develop balanced and sustainable grazing regimes that allow for both the production requirements of the land, combined with the protection and persistence of viable populations of threatened species and communities. Such grazing regimes may include:

- Spelling areas of native vegetation to allow for adequate regeneration and maintenance of species diversity. This could include protection of threatened flora from grazing during flowering periods to ensure that sufficient seed is produced to maintain populations.
- Exclusion or reduced stock access to areas containing sensitive species (including riparian and coastal zones).
- Promotion of alternative stock watering systems in areas containing sensitive species.
- Rehabilitation of previously heavily grazed areas.

Contact DPIWE for further information and help in identifying and developing appropriate grazing regimes for your property.



*Cattle in waterways: Sharon Cunial*

## ***Fencing***

Much of the threatened species habitat on Bruny Island occurs in relatively small patches, often on private land. One way to preserve this important habitat from grazing is through appropriate fencing. Previously, funds have been made available through Fencing Incentive Schemes to provide financial assistance for landowners to fence remnant vegetation or rehabilitate habitat. These schemes have included Greening Australia's Fencing Incentive Scheme Tasmania (FIST) and National Heritage Trust (NHT) grants. For more information on current grants that may be available contact the Kingborough Council, the Nature Conservation Branch (DPIWE) or Environment Australia.

## ***Land Use Planning***

Another way to minimise the impacts of land clearance is through careful planning of developments to ensure that threatened species and their habitats are not significantly affected. The *Land Use Planning and Approvals Act 1993* (LUPAA) regulates land use and development in Tasmania through Planning Schemes and a permit system. Planning Schemes provide the basic rules for proposed new developments in Tasmania. Building developments and coastal and near-shore developments on Bruny Island are subject to approval by Kingborough Council. There are also several state policies such as the Coastal Policy, Policy on Water Quality Management and the Policy on Protection of Agricultural Land (Harries 1999).

In areas where threatened species have been recorded an Environmental Impact Assessment is recommended. An Environmental Impact Assessment should (i) evaluate the likely environmental impacts of a proposal, (ii) identify any conditions or restrictions and the management required to minimise or mitigate environmental harm, and (iii) identify the conditions and restrictions that determine whether or not the proposed activity should proceed (Harries 1999). The opportunity for public consultation must be provided.

The new Kingborough Planning Scheme (Kingborough Council 2000) replaces the existing Bruny Planning Scheme 1986. One of the Planning Scheme Objectives is the retention and maintenance of natural ecological processes. This includes an Environmental Protection Zone defined as "use of land associated with the maintenance, protection or management of ecological systems or features of environmental and cultural significance" (Kingborough Council, 2000). The Planning Scheme includes a Protected Vegetation Schedule. This lists the priority vegetation types that occur in the Planning Scheme area that should be protected as far as practicable. A Waterways, Wetlands and the Coastal Zone Schedule identifies zones that are "highly susceptible to human degradation and should be accorded the highest level of protection". An Environmental Weeds Schedule lists the environmental weeds that occur in the Planning Scheme area (Kingborough Council 2000).

## ***Production forestry***

Production forestry has an impact on threatened species and their habitats on Bruny Island and occurs on both private land and State Forest. The *Forest Practices Act 1985* was passed to ensure that forest operations on both private and public land occur in an environmentally acceptable manner. This Act is used in conjunction with a range of other Acts (including the *Threatened Species Protection Act 1995*) to provide the legislative framework within which forestry activities can occur. In addition to these legislative requirements there are a number of agreements and codes of practice that apply to forestry operations, including the Tasmanian Regional Forest Agreement, Forests and Forest Industry Strategy (FFIS), National Forest Policy Statement (NFPS: which is achieved via the Regional Forestry Agreement), and the Forest Practices Code (Forest Practices Board 2000a).

One of the objectives of the forest practices system in Tasmania is to achieve sustainable forest management, which is self-funding, well planned and in accordance with a Forest Practices Code. The Code aims to ensure forestry and related activities achieve the goals of ecologically sustainable forest management. The Forest Practices Code provides a set of guidelines and standards, which are applicable on the ground and allow for the protection of environmental values during forestry operations. These values include soils, water quality and flow, geomorphology, flora, fauna and genetic resources, visual landscape and cultural heritage values. Each operation that involves establishment of forests, the clearing or inundation of timber or the construction of a road or operation of a quarry in connection with the establishment of a forest or harvesting requires a Forest Practices Plan. A Forest Practices Plan covers a range of issues that will arise during harvesting or other operations and involves (amongst other things) the collection of information on the plant and animal species and forest communities involved in the operation. During the preparation of a Forest Practices Plan specialist advice on threatened species management is sought from the Forest Practices Board and DPIWE. The code provides that threatened species must be managed in accordance with procedures that have been agreed between DPIWE and the Forest Practices Board. Industry specific planning tools have been developed to support and ensure that appropriate procedures are used.

For more information on the Forest Practices Code visit the Forest Practices Board website at <http://www.fpb.tas.gov.au/fpb/>



*Clearfelling: Dave James*

## FIRE

In Tasmania, as in many parts of Australia, fire is an integral part of the environment. As a result, much of Tasmania's flora has evolved in an environment where fire has been a regular occurrence. Aborigines burned the landscape for tens of thousands of years before the Europeans arrived. Plants such as eucalypts, tea-trees (*Leptospermum*) and paperbarks (*Melaleuca*) and native plant communities such as the heathlands and heathy grassy bush are all adapted to fire (Kirkpatrick & Gilfedder 1999), and some species require the use of fire to propagate and perpetuate the species. Fire adaptations include thick bark, thick woody seed capsules, and the ability to re-sprout from woody bases (lignotubers) after a fire (Kirkpatrick & Gilfedder 1999). As well as playing a vital role in maintaining the diversity of plants in the bush, fire is also used to help protect life and property, improve bush pasture productivity, control some weeds and prevent fuel build-up which would increase the risk of wild fire or hot burns to mature canopy trees.

Different plant species and vegetation types require different fire regimes (i.e. different frequencies and intensities of fire). Some vegetation types such as rainforest and riparian (streamside) bush do not require fire, and are adversely affected by it. When using fire as a management tool, it is important that the reasons for burning are clear, and that an appropriate fire regime is chosen. For example, burning to reduce fuel loads will need to be more frequent than burning to promote tree regeneration (Kirkpatrick & Gilfedder 1999).

Given this inter-dependence of fire and the native bush, fire management can also be a useful tool in threatened species management on Bruny Island. Different fire management regimes have been identified for the management of different threatened species where applicable. Fire management must be considered on a case by case basis after taking into consideration the species involved, and may be applicable to habitats where the species is not recorded but likely to exist. In all cases, when using fire as a bush management tool, fire should favour the protection of threatened plant and animal species. In some cases the regimes required by different species will conflict. For example, the fire regime needed to maintain the underground fungi that are the food source for bettongs may be different to that required to maintain some threatened plant species (Kirkpatrick & Gilfedder 1999). Similarly, orchids can generally cope with, and thrive under, a more frequent fire regime than the rest of the surrounding vegetation (and some species require fire to flower), but they have the capacity to produce tubers on an annual basis and survive for longer fire intervals by producing leaves only (Hans Wapstra, personal communication). Expert help on the fire regimes should be sought from the Threatened Species Unit of DPIWE.

Two methods of fire management that may be applicable to threatened species management include:



*Fire: Michael Driessen*

### **Patchwork or mosaic burns**

Patchwork burns are an important tool in fire management. These involve burning smaller sections of an area rather than a large area at any one time, as well as burning different areas at different times, so that there is a mosaic in both space and time.

### **Reduction of fire frequency and intensity**

Reduction in fire frequency and intensity is important for such species as the Mt Mangana stag beetle and in the vicinity of nest sites for raptors such as the Wedge-tailed eagle and White-bellied sea-eagle. In other areas, repeated cool burns may lead to a slow diminishing of the vegetation, which also leads to changes in species composition in these areas. For example, by prescribing a cycle of cool autumn burns, one can introduce a fire regime to which the vegetation is not specifically adapted. However, cool burns are usually used as a compromise between having to burn an area and being able to control the fire.

Fire management procedures have been formulated by the State Fire Management Council of Tasmania and Forestry Tasmania (Forest Practice Boards 2000; Forestry Tasmania 2000). Fire management is also discussed in detail in the Tasmanian Bushcare Toolkit (Kirkpatrick & Gilfedder 1999) with suggested fire intervals for different bush types. Policies and actions for fire management in the South Bruny National Park, Waterfall Creek State Reserve and Green Island Nature Reserve have also been developed (Parks & Wildlife Service 2000).

## POLLUTION OF WATERWAYS & COASTAL AND MARINE ENVIRONMENTS

The pollution of waterways and of the coastal and marine environment is an important threatening process for a number of species on Bruny Island. Pollution may be either chemical or through accumulation of solid litter.

### *Toxic waste or chemical pollution*

Most marine pollution comes from the land, either as diffuse pollution (eg. run-off of agricultural pesticides and fertilisers into waterways which flow into the sea) or as point-source discharges (eg. concentrated pollution from heavy industries, paper and woodchip mills, sewage treatment plants and stormwater drains: Pryor 1998). Marine-based sources, such as oil spills, sewage and sometimes other chemicals from boats can also detrimentally affect the marine environment. For example, anti-foulant particles containing lead and copper are often directly washed from slipways into the coastal waters, causing toxic pollution.

The quality of Bruny Island's coastal waters has declined in the past 50 years due to siltation, eutrophication (enrichment of water by sewage and other nutrient-rich run-off) and chemical contamination. This has contributed to a loss in the biodiversity in marine and coastal environments and long-term damage to fragile ecosystems such as seagrass beds. Marine pollution has the potential to seriously affect all of the threatened marine species outlined in this document. Recreational boating in the D'Entrecasteaux Channel, particularly during the summer months is very popular. This is a cause of some concern to the aquaculture industry because of the potential for pollution through sewage discharge or oil spillage (Pryor 1998), and should be of equal concern to managers of the natural marine environment.



*Strangled by waste: Nigel Brothers*

## ***Litter***

In a comprehensive survey of marine debris by the Parks and Wildlife Service in 1990-1994, 74% of items collected were plastic. Of all the items, 23% could be positively attributed to commercial and recreational fishing and boating and a further 27% to recreation such as beach use, walking, camping, surfing and four-wheel driving (Pryor 1998). In addition to the visual impact of litter on the beaches and in the sea, some items such as plastics or fishing net can cause the death and injury of a range of marine and coastal species by ingestion and entanglement. Over half the items in the above survey were potential ingestion and entanglement hazards to wildlife, and Tasmania has one of the highest rates in the world of seal deaths due to entanglement in nets and other synthetic materials (Pryor 1998). Emphasis should be placed on public awareness, and education programs maintained which discourage the careless disposal of litter into the marine environment.

## ***Recreational and commercial fishing practices***

Threatened species and other marine fauna are at risk of death or injury through entanglement in nets or drowning on fishing hooks. The Shy albatross, White-bellied sea-eagle, whales, seals, the Leatherback turtle and the Great white shark are some of the species that can be affected. Practical suggestions to help protect seabirds from fishing activities can be found in the "Catch fish, not birds" pamphlet which is produced by the Nature Conservation Branch, DPIWE.



*Litter: Dave James*

## DISTURBANCE OF BREEDING AREAS AND SENSITIVE HABITATS

The physical disturbance of threatened species by the close proximity of humans or their activity is an important threatening process for a range of coastal birds, shorebirds and forest birds.

### *Sensitive breeding sites*

Some species are particularly sensitive to disturbance in the breeding season. Examples are the two eagle species and many of the coastal breeding birds. It is strongly recommended that buffer zones to minimise disturbing activities be placed around nests during this time. Examples of buffer zones for threatened bird species are given in Table 8.

**Table 8 Buffer distances, reserve sizes and breeding seasons for sensitive species on Bruny Island**  
(Mooney & Holdsworth 1991, Brereton & Mooney 1994, Thurstans 1998, Bryant & Jackson 1999)

Name of species	Minimum Buffer Distance	Minimum Nest Reserve size	Breeding Season
Wedge-tailed eagle	500m from nest site	10ha of intact forest	Aug - Jan inclusive
White-bellied sea-eagle	500m from nest site	10ha of intact forest	Aug - Dec inclusive
Grey goshawk	100m from nest site	Unknown	Early Nov - late Jan
Swift parrot	100m from nest site	Protection of nesting habitat	Sep - Mar
Hooded plover	5m-50m from nest site*	Unknown	Oct- Mar
Fairy tern	5m-50m from nest site*	Unknown	Oct- Mar
Pied oystercatcher	5m-50m from nest site*	Unknown	Oct- Mar

\*Comments based on discussions held with P. Park and R. Brereton.



*Protecting sensitive areas: Dave James*

### ***Collection of seaweed on beaches and removal of rocks in the intertidal zone***

Seaweed and beach drift is important for beach nesting birds such as the Hooded plover and the Fairy tern that rely heavily on such items for camouflage from predators. Beach-washed seaweeds also harbour a variety of invertebrates such as sand fleas (Amphipoda) on which these birds feed. It is therefore important to reduce or prohibit activities such as the collection of seaweed in areas in which these species have been recorded to breed, in order to maximise breeding success and food availability. Similarly, there should be no removal of rocks in the intertidal zone, to prevent disturbance of such species as the south-eastern seastars in areas in which they occur. Collection of seaweed is prohibited on all beaches without obtaining a “marine plant licence” for the taking of marine plants cast by the sea on Crown land which is under the control of the Minister (*Crown Lands Act 1976*). Collection of seaweed is prohibited in the South Bruny National Park (*National Parks and Reserves Regulations 1999*) without a permit.

### ***Stock on coastal areas and beaches***

The presence of stock on beaches and dunes is a potential source of disturbance to sensitive species. Stock should be excluded from the foreshore and beaches due to the damage that they cause to these sensitive areas, such as trampling of natural vegetation (causing dune erosion), damage to Little penguin and Short-tailed shearwater nesting burrows through grazing and trampling, and interference with the breeding of shorebirds that nest on the beach (including Hooded plovers and Fairy terns). As already outlined, it is good practice to maintain fences along coastlines to prohibit access to these areas by stock.

### ***Ecotourism***

Ecotourism operations, while seeking to promote wildlife and in particular threatened species, may inadvertently lead to disturbance of sensitive species. Species of particular concern are raptors (Wedge-tailed and White-bellied sea-eagles), Hooded plovers and Fairy terns at nests, Short-tailed shearwater and Little penguin rookeries. These species are sensitive to disturbance and may abandon eggs or chicks. Seal haul-outs on offshore islands, vagrant sub-Antarctic and Antarctic species of penguins and seals and whales should also be carefully monitored to minimise disturbance and stress to the species concerned. Whale watchers should follow the guidelines outlined in the booklet “Australian National Guidelines for Cetacean Observation and Areas of Special Interest for Cetacean Observation (ANZECC 2000)”.

Flora species that are susceptible to the root-rot pathogen *Phytophthora cinnamomi* are also of concern. Careful planning taking *Phytophthora cinnamomi* management into account should occur in those areas containing susceptible species (see following section).



*Inappropriate cattle grazing: Louise Gilfedder*

## VEHICULAR TRAFFIC

### *Road deaths*

Road kills are a particularly visible source of mortality for wildlife, and may in some instances be a significant threat to a populations of threatened species. Road deaths of wildlife are a common occurrence on Bruny Island, with the Bennett's wallaby, Tasmanian pademelon and Brush-tailed possum being the main species affected. However, there is concern that the Long-nosed potoroo, Eastern quoll and Little penguin are also suffering casualties. There are several hot spots for deaths of wildlife on Bruny Island roads that are affecting a number of different species. Two areas for possible trials to reduce this death toll include Neck Beach (particularly Little penguins straying onto the road from the adjacent rookery), and along the main road on north Bruny (especially north of the Bruny Island Neck, adjacent to "Murrayfield", and between the Dennes Point turn-off and the ferry terminal). People should be aware of these areas, drive carefully and slow down between dusk and dawn to minimise animal collisions.

### *Vehicles on beaches*

Vehicles on beaches and dunes can pose a significant disturbance threat to breeding birds, and access to breeding beaches should be strictly monitored. Vehicles are currently allowed access along designated areas of the Cloudy Bay and Jetty beaches for the purpose of accessing camping grounds and launching boats (Parks & Wildlife Service 2000). A number of policies and actions pertaining to the use of these beaches by vehicles is outlined in the Management Plan for the area (Parks & Wildlife Service 2000). This includes a policy stating that impacts of vehicular use on the Cloudy Bay beach between the Cloudy Bay Road and Cloudy Corner will be monitored and use modified or prohibited if the need arises (eg. during the breeding season of shorebirds). Traffic data collected by the Parks & Wildlife Service to determine visitor numbers to the South Bruny National Park have shown that a total of 2, 882 vehicles accessed the Cloudy Bay beach in a six month period between 12 December 1999 and 30 June 2000, with an estimate of approximately 4, 000 vehicles in a 12 month period in the 1999/2000 season. This number is far in excess of that expected, and raises concerns as to the long-term implications of access to beaches that are known breeding areas of such species as Hooded plovers.



## INAPPROPRIATE HARVESTING AND PERSECUTION

Inappropriate levels of harvesting, accidental by-catch, illegal take, and deliberate persecution can all directly and indirectly impact on threatened species (*Threatened Species Strategy for Tasmania: DPIWE 2000*). Examples of accidental by-catch have already been outlined in the preceding pages.

Inappropriate levels of harvesting may leave too few individuals of a species for its population to remain viable. In turn, this may have incidental or indirect impacts on other species that depend upon it for food or other purposes. Examples include excessive harvesting of kelp from sensitive areas, which in turn may remove habitat for marine species. Other examples include the over-collection of seaweed from beaches as already described, and the over-harvesting of fish or plants that in turn provide food resources for threatened species. As with grazing, appropriate and sustainable levels of harvesting need to be determined to protect the long-term viability of the species concerned.

Illegal take or poaching involves the deliberate collection of species that are not permitted to be collected. This may involve the illegal collection and sale of species that are edible or otherwise collectible. Examples include the collection of threatened stag beetles for export to overseas beetle collections, or the possession of Spotted handfish as aquarium fish.

Illegal take also includes the persecution of threatened species, or the deliberate killing, injuring, catching, damaging, or destruction of a protected species. The recent deliberate bashing of a seal has provided an unwelcome and highly publicised example of such persecution. Other species particularly prone to persecution include eagles and the Great white shark.

## WILDLIFE DAMAGE

Some wildlife can cause significant damage to crops or property and some are sometimes perceived as a threat to stock. On Bruny Island, problems mostly occur with Brush-tailed possums eating and damaging vegetable gardens and fruit crops, wallabies grazing pasture and crops, and raptors being perceived as potential predators of lambs.

Sometimes, a problem may seem to be larger than it really is. Management of the problem often incurs a cost, whether it is in materials, time, altered practices or a combination of these. The costs should be weighed against the level of damage being caused in order to assess whether it is worth attempting to solve the problem. Care should also be taken that the species is actually causing damage. For example, many species of birds forage in crops for insects and are likely to be beneficial, and eagles that are sometimes blamed for stock losses are in fact usually eating carcasses of lambs that were already dead or dying. Destroying a few individual animals will rarely solve a damage problem, and the reduction of the problem is not proportional to the number of animals killed. At best, killing of animals usually provides only short-term relief and is very labour intensive. Most species of wildlife that cause damage are adapted to withstand considerable levels of mortality without the population as a whole being affected. Thus the capacity of the population to produce young each year is unlikely to be affected by any but the most destructive campaigns. It is generally more sensible to look for longer-term solutions than killing to control damage in the case of problems that are likely to recur regularly. If management of wildlife is required, advice can be sought from the Game Management Unit, which operates a program for wildlife management on an individual basis. Contact details can be found in Appendix 1.

It should be remembered that threatened species are protected by law, and advice should be sought if the animal causing the damage is a threatened species (eg. Wedge-tailed eagle) or a species with high conservation significance (eg. Eastern quoll).

### *Poisons*

Care should be taken when using poisons such as herbicides and pesticides in accordance with recommended instructions for usage. Both direct and secondary poisoning of non-target domestic animals and native wildlife should be considered whenever using poisons. This is particularly important for poisons such as Pindone, to which raptors are susceptible, and 1080, to which domestic dogs are susceptible. Threatened plant species may also be affected when using herbicides. Chemical weed control methods and precautions when using herbicides are outlined in detail in the Tasmanian Bushcare Toolkit (Kirkpatrick & Gilfedder 1999) which is available from DPIWE, Hobart.

## INTRODUCED ANIMALS

### *Cats and dogs*

Cats and dogs are the most common introduced predator on Bruny Island. Feral cats are thought to be the most significant source of predation, although domestic cats and dogs can also cause considerable damage. In addition, cats are carriers of the neurological disease toxoplasmosis (see section: Disease). While cats and dogs do kill native wildlife, the impact of this predation on populations varies with the species involved. Some species may be relatively robust in the face of high levels of cat predation, providing the population is healthy and breeding at high rates. However, populations of other species may be highly susceptible to predation, particularly where the population is small, localised and vulnerable to other threats such as habitat loss. An example of the latter is shorebirds such as the Hooded plover, which is extremely vulnerable to predation while nesting.



### *Other introduced fauna*

Other introduced animals include mammals (rabbits, black rats, house mice) and birds (common starling, house sparrow, gold finch, green finch and European blackbird). All these species have impacts on native species and ecosystems, including introducing diseases, causing erosion and competing for habitat (Parks & Wildlife Service 2000) and may indirectly affect threatened species on Bruny Island. A number of black rats, which may affect the breeding success of penguins and shearwaters, have been caught in cat traps laid at the penguin rookery at the Neck Game Reserve. If the fox threat can not be mitigated on mainland Tasmania, then islands such as Bruny will be critical refuges for the protection of native animals.



*Introduced: Nature Conservation Branch, DPIWE*

### ***Introduced marine pests***

Several introduced marine pests are present along the coastline of Bruny Island. These include species such as the Pacific oyster (*Crassostrea gigas*), the green chiton (*Chiton glaucus*), the New Zealand screw shell (*Maoricolpus roseus*), the seastar *Patiriella regularis*, and the crab *Cancer novaezelandiae*, all of which are believed to have been accidentally introduced from New Zealand about 80 years ago with live shipments of oysters (Edgar, 1997). The New Zealand screw shell now occurs in massive aggregations in places such as the D'Entrecasteaux Channel, greatly altering the habitat. Numbers of the native screw shell (*Gazameda gunnii*) seem to decline following the arrival of this species (Edgar 1997).

Two other introduced species that are causing great concern in Tasmania are the European green or shore crab (*Carcinus maenas*) which was introduced to southern Australia from Europe in the mid to late nineteenth century, and the Northern Pacific seastar (*Asterias amurensis*) which has recently been introduced into south-eastern Tasmania, probably with ballast water on a ship from Japan or Korea (Edgar 1997). Both of these species are voracious predators, and have probably affected the populations of a number of local animal species (Edgar 1997; Ruiz & Rodriguez 1997; Ross 2001). With regard to their affect on threatened species, the Northern Pacific seastar is a potential threat to the Spotted handfish in particular, because of its ability to prey on handfish eggs, disturb egg supporting structures and benthic communities (Bryant & Jackson 1999).

Two live specimens of adult green crab were found by oyster farmers in Great Bay in late 1997, and in 1998 fresh carapace remains were found in Cloudy Bay Lagoon (C. Proctor, personal communication). No established populations of the crab have been detected on Bruny Island. However, the Northern Pacific seastar is present in the Derwent Estuary and shellfish farms in the D'Entrecasteaux Channel (Edgar 1997; Elizabeth Turner personal communication). Populations of these two species should be monitored on Bruny Island, and if detected, should be reported to Parks & Wildlife staff, Marine Resources Division (DPIWE) and/or to CSIRO Marine Research. It is probably impractical to control numbers of other introduced marine species, such as the New Zealand screw shell, green chiton and Pacific oyster, which are now widespread and present in large numbers.

It is illegal to collect these species without a permit from the South Bruny National Park under the National Parks and Reserves Regulations 1999 (Part 2, Division 1, 4 (1c)) which does not distinguish between introduced and native species.



*Northern Pacific Sea Star:*  
Sea Fisheries and Aquaculture, DPIWE

## INTRODUCED PLANTS (“WEEDS”)

A weed is often defined as “a plant growing where it is not wanted”. In bush and coastline that is managed for nature conservation, this means any plant introduced from overseas, or Australian natives that do not grow naturally in that location. Weeds are widespread and well established on Bruny Island. They are predominantly restricted to roadsides, pastures and bush-pasture edges, and range from aggressive invaders of pasture and disturbed ground such as Gorse (*Ulex europaeus*), Ragwort (*Senecio jacobaea*) and Spanish heath (*Erica lusitanica*), to less invasive species such as Butterfly bush (*Psoralea pinnata*). Neyland (1995) lists the distribution of weeds on south Bruny Island and outlines recommendations for their management, and this document would also apply to weeds on north Bruny. If planning a weed management strategy, check that this action will not inadvertently do any harm. For example, the Spanish heath along Lockleys Road, Mount Midway is presently being parasitised by the threatened plant species *Euphrasia collina* aff. subspecies *diemenica* and its uncontrolled removal by spraying would also kill the *Euphrasia*.

### *Coastal weeds*

Many areas of the coastline around Bruny Island contain introduced invasive weeds such as Marram grass and Lupins. These may affect the natural changes in dune formation, which subsequently affect the breeding success of species such as the Little penguin, Shearwaters and the Hooded plover. The Captain Cook Creek Landcare Group has commenced rehabilitation of the foreshore at the beach adjacent to the township of Adventure Bay and further rehabilitation is encouraged. Neyland (1995) outlines the species of concern and recommendations for further management of these species on Bruny Island.

### *Bush and pasture weeds*

Weeds in these areas can be classified into two groups: (i) those species that require long-term management and do not directly affect threatened species, and (ii) those species that have the potential to directly affect threatened plant species and should therefore be given priority in any weed control programs. Species such as Ragwort and Gorse, two of Tasmania’s most widespread and troublesome pasture weeds, fall into the first category, while Spanish heath is an example of a species which has the potential to directly effect threatened species. Spanish heath is spreading rapidly along road verges and cleared blocks where there is no grazing on Bruny Island and has the potential to compete with native species and cause overshadowing of these species and invade native bush. The species most at risk are the orchids, which often grow on road verges. Spanish heath cannot easily be controlled by chemical methods and it has been suggested that it should be the subject of a biological control program (Neyland 1995).



Gorse: Dave James

## DISEASE

### *Toxoplasmosis*

Toxoplasmosis is a neurological disease that can affect a number of species of wildlife as well as humans (McManus 1994). Marsupials are extremely sensitive to this disease, possibly because of lack of exposure until the domestic cat arrived with the first white settlers in the eighteenth century (Blyde 1999; Rose, 1999). Toxoplasmosis is a protozoan parasite shed by cats in faeces. Marsupials are usually infected when they ingest material infected with cat faeces (usually when grazing) and can exhibit very sudden onset signs of ataxia (loss of muscle coordination) blindness and ultimately death. This disease can also be transmitted to carnivores that eat raw meat (especially offal) from infected animals (Bellamy 1999). There is no reliable treatment. Native species affected include dasyurids (quolls and antechinus), echidnas, bandicoots, macropods (wallabies), wombats and possums (both Ringtails and Brushtails).

### *Phytophthora cinnamomi* (root rot pathogen)

The disease of most concern to native plants is the root rot pathogen *Phytophthora cinnamomi*. It is listed as a Key Threatening Process in the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. *Phytophthora cinnamomi* is an introduced plant pathogen that attacks the roots of susceptible plants and in many cases kills them. In some native plant communities, this disease can be epidemic, causing the death of large numbers of plants over large areas. This pathogen therefore has the capacity to substantially change the nature of susceptible plant communities, resulting in less diverse, sedge dominated ecosystems (Schahinger 2002b).

*Phytophthora cinnamomi* spreads between plants by root-to-root contact and by releasing microscopic spores that move through the soil and are easily transported by water. People can spread this disease long distances through transporting spores hidden in mud on vehicles, machinery, shoes, tent-pegs and other equipment. The removal of infected soil or gravel for road-works, track-works or gardening can also further spread this pathogen.

*Phytophthora cinnamomi* is present on Bruny Island (see Figure 1 & 2), and has the potential to cause enormous damage if not controlled. Unfortunately, the capacity to control *P. cinnamomi* once established is very limited (Tim Rudman, personal communication). Preventative action is the primary focus. This involves the identification of high risk plant communities, the identification of susceptible areas which do not have the disease, and the establishment of mechanisms (eg. restricting movement of people and vehicles) to attempt to prevent further infestation. As part of the "Conservation of Tasmanian Plant Communities Threatened by *P. cinnamomi*" plan being developed by the Threatened Species Unit, DPIWE, several management areas have been identified on Bruny Island targeting susceptible threatened species and communities. These areas include the Labillardiere Peninsula, West Cloudy Head, Chuckle Head and an area behind Cape Queen Elizabeth (see Figure 1 & 2).



*Feral cat: Nature Conservation Branch*



*Phytophthora dieback: Richard Schahinger*

Of the threatened plant species identified on Bruny Island, two species, (Pretty heath *Epacris virgata* “Kettering” and variable smoke-bush *Conospermum hooker*) are known to be susceptible to root rot. The plant communities on Bruny Island most susceptible to *P. cinnamomi* include coastal heath, wet heath, coastal *E. amygdalina* forest, *E. pulchella*/*E. globulus*/*E. viminalis* grassy/shrubby forest, and inland *E. tenuiramis* forest. Native grass-trees (*Xanthorrhoea australis*) occur in these three forest communities and are particularly badly affected by root rot. A striking example of *E. tenuiramis* forest with the devastating effects of root rot on the grass-tree understorey can be seen at Marks Point, North Bruny.

People can help reduce the spread of this disease by avoiding known infected areas; taking precautions such as removing dirt from equipment (eg. shoes, camping gear, vehicles and machinery) before entering vegetation susceptible to *P. cinnamomi*; keeping to formed tracks; using wash-down station; and avoiding driving in areas when soils are wet and sticky. Further information on management of *P. cinnamomi* on Bruny Island can be found in the recommendations contained in the report “Conservation of Tasmanian Plant Communities threatened by *P. cinnamomi*” (Schahinger 2002b).

## LACK OF KNOWLEDGE

Finally, one of the greatest challenges we face with threatened species is obtaining sufficient information on their distribution and how to manage them appropriately. Some species are well known, while for others we know very little. Gathering of information is ongoing and management advice can always be further refined and improved. To help improve knowledge, the Threatened Species Unit (DPIWE) welcomes any records, observations or feedback on threatened species and their management that landholders are able to provide.





**Figure 1** *Phytophthora cinnamomi* on north Bruny Island, October 2001.

(purple triangles = isolations, solid = symptoms)



**Figure 2** *Phytophthora cinnamomi* on south Bruny Island, October 2001

(purple triangles = isolations, solid = symptoms)

## **Summary of threatening processes and mitigating measures.**

The following table summarises the threatening processes identified on and around Bruny Island and outlines initial actions and approaches that can be put in place to deal with them. These include actions that landholders can undertake themselves, as well as broader scale actions that landholders should be aware of and can assist with in the ongoing management of threatened species on the island.

**Table 9 Suggested initial actions to be implemented.**

Threatening Process	Suggested Actions
Land Clearing	<ul style="list-style-type: none"> <li>• Identify important habitat for threatened species on the island</li> <li>• Promote the various schemes and options for habitat protection</li> <li>• Promote community-based revegetation schemes</li> <li>• Promote fencing schemes to land owners where identified important fauna and flora populations are currently unprotected</li> <li>• Alert relevant authorities to the presence of threatened species so that the information is incorporated into future development plans</li> </ul>
Grazing	<ul style="list-style-type: none"> <li>• Develop grazing regimes for sensitive vegetation communities</li> <li>• Spell areas of native vegetation to allow for adequate regeneration and maintenance of species diversity</li> <li>• Exclude grazing from sensitive areas and species eg. coastal and riparian areas</li> </ul>
Fire	<ul style="list-style-type: none"> <li>• Minimise the incidence of hot or frequent fires in areas where fire-sensitive species (eg. Mt Mangana stag beetle) occur</li> <li>• Develop an appropriate fire management regimes for key sensitive areas on Bruny Island (eg. the north Bruny Neck region)</li> </ul>
Pollution of waterways and coastal and marine environments	<ul style="list-style-type: none"> <li>• Promote education campaigns that encourage responsible disposal of litter</li> <li>• Reduce the input of pollutants into waterways and the ocean</li> <li>• Prevent unwanted deaths of threatened species by entanglement in fishing nets or fishing hooks by promoting awareness in the fishing community</li> </ul>
Disturbance of breeding areas and sensitive habitats	<ul style="list-style-type: none"> <li>• Limit seaweed collection on beaches where shorebirds nest to the winter months</li> <li>• Report shorebird nests to the Parks and Wildlife Service ranger</li> <li>• Encourage responsible dog ownership (including erecting signs notifying dog owners to leash their dogs on beaches where shorebirds nest)</li> <li>• Establish temporary enclosures around active nests of sensitive species</li> <li>• Discourage visits to bird nesting sites on Mewstone and Pedra Branca islands during the breeding season (October to March). For further information contact the Nature Conservation Branch, DPIWE</li> </ul>
Vehicular traffic	<ul style="list-style-type: none"> <li>• Continue to monitor vehicle numbers accessing Cloudy Bay beach and monitor hooded plovers to determine the affects of heavy vehicular traffic on this beach</li> <li>• Avoid areas of the beach with temporary enclosures indicating sensitive bird breeding sites</li> </ul>

Table 9 (cont'd)

Threatening Process	Suggested Actions
Inappropriate harvesting and persecution	<ul style="list-style-type: none"> <li>• Identify any harvesting regimes that may be directly or indirectly impacting on threatened species, and modify them to reach appropriate and sustainable levels</li> <li>• Improve education and awareness of sustainable harvesting techniques, and appreciation of the protected status of threatened species</li> <li>• Prevent and report illegal harvesting or persecution of threatened species</li> </ul>
Wildlife damage	<ul style="list-style-type: none"> <li>• Promote the development of property plans and game management plans by landowners, with support from the DPIWE</li> </ul>
Introduced animals	<ul style="list-style-type: none"> <li>• Develop a feral cat eradication program for Bruny Island</li> <li>• Target feral cats and rats in particular areas eg. penguin and shearwater rookeries and the refuse transfer station</li> <li>• Encourage responsible cat ownership eg. keeping cats indoors over night, de-sexing and wearing bells on collars.</li> <li>• Support monitoring programs for European green crabs (<i>Carcinus maenas</i>) and the Northern Pacific seastar (<i>Asterias amurensi</i>) in conjunction with relevant authorities (eg. DPIWE and CSIRO)</li> </ul>
Introduced plants	<ul style="list-style-type: none"> <li>• Develop a weed management strategy for Bruny Island</li> <li>• Introduce a roadside marker program to restrict activities such as roadside slashing to appropriate times of the year, to avoid further spread of weeds such as Spanish heath</li> <li>• Control weeds using the methods outlined in the Tasmanian Bushcare Toolkit</li> </ul>
Disease	<ul style="list-style-type: none"> <li>• Increase public awareness of <i>Phytophthora cinnamomi</i></li> <li>• Isolate and contain known areas of <i>Phytophthora cinnamomi</i></li> </ul>
Lack of knowledge	<ul style="list-style-type: none"> <li>• Foster better information flow between landholders, stakeholders and State and local governments to improve knowledge of threatened species and their management for all parties</li> </ul>

\*Ongoing development and refinement of the plan will take place through the Steering Committee in conjunction with feedback and information provided by the community.

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# Appendix 1

## Useful Websites

Environment, Protection and Biodiversity Conservation Act

<http://www.erin.gov.au/epbc/index.html>

Environment Australia's information on marine species conservation

<http://www.erin.gov.au/coasts/species/index.html>

State Fire Management Council of Tasmania

<http://www.sfmc.tas.gov.au>

Forestry Tasmania

<http://www.forestrytas.com.au>

Department of Primary Industries, Water and Environment (Including information on Threatened Species, Listing Statements and Recovery Plans).

<http://www.dpiwe.tas.gov.au>

Tasmanian Landcare

<http://www.taslandcare.org.au>

Bushcare

<http://www.bushcare.tas.gov.au>

Private Forest Reserve Program

<http://www.privaterfa.tas.gov.au>

## CONTACTS

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\*Note: Government emails and phone numbers were correct at the time of publishing. Consult the Tasmanian Government Directory website at <http://directory.tas.gov.au> or phone 1300 135 513 if details are not current.

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### Marine Resources Division

(introduced marine species)

Ph: 03 6233 3370

Fax: 03 6223 1539

### Weed Management

(information on weeds)

Ph: 03 6233 3654

Email: [Christian.Goninon@dpiwe.tas.gov.au](mailto:Christian.Goninon@dpiwe.tas.gov.au)

### Agricultural Services

Ph: 03 6336 5420

### Water Management

Ph: 03 6233 6157

Email: [Temple-Smith@dpiwe.tas.gov.au](mailto:Temple-Smith@dpiwe.tas.gov.au)

### Pollution Incidents & complaints

Ph: 1800 005 171 (freecall)

### Game Management Unit

Ph: 03 6233 5396

Email: [Graham.Hall@dpiwe.tas.gov.au](mailto:Graham.Hall@dpiwe.tas.gov.au)

### Soil & Land Management

Ph: 03 6233 6251

Email: [Marcus.Hardie@dpiwe.tas.gov.au](mailto:Marcus.Hardie@dpiwe.tas.gov.au)

### Wildcare

Ph: 03 6233 2836

Email: [wildcare@dpiwe.tas.gov.au](mailto:wildcare@dpiwe.tas.gov.au)

### Wildlife & Incident reporting

Ph: 03 6233 6556 (24 hours)

### Private Forest Reserve Program

Ph: 1300 660 062 (24 hour state-wide service- local call)

GPO Box 44

Hobart, Tasmania 7001

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## Appendix 2

### Endemic Tasmanian bird species found on Bruny Island

Species	Common name	Comments
<i>Gallinula mortierii</i>	Tasmanian native hen	Common species which inhabits grassy areas and pasture, usually in association with water.
<i>Platycercus caledonicus</i>	Green rosella	Common species which occurs in forested habitats.
<i>Sericornis frontalis</i>	White-browed scrubwren	Common in habitats ranging from rainforest to heathland with thick undergrowth and ground and leaf litter.
<i>Acanthiza ewingi</i>	Tasmanian thornbill	Common in wet forest and rainforest.
<i>Acanthornis magnus</i>	Scrubtit	Uncommon, prefers wet forest, rainforest and fern gullies with ground and leaf litter layer; identified as a "rainforest and wet eucalypt animal of interest by Bryant & Jackson 1999.
<i>Anthochaera paradoxa</i>	Yellow wattlebird	Common in a variety of habitats including gardens and wet and dry forests.
<i>Lichenostomus flavicollis</i>	Yellow throated honeyeater	Common in most forest types (except rainforest) and coastal scrub, heath and gardens.
<i>Melithreptus validirostris</i>	Strong-billed honeyeater	Moderately common, forages in the canopies of eucalypts in wetter forests.
<i>Melithreptus affinis</i>	Black-headed honeyeater	Common and often found in association with the Forty-spotted pardalote in <i>Eucalyptus viminalis</i> and other drier eucalypt forests; also found in heath and gardens.
<i>Pardalotus quadragintus</i>	Forty-spotted pardalote	Endangered species, restricted to forest with <i>Eucalyptus viminalis</i> ; occurs in colonies throughout the island.
<i>Melanodryas vittata</i>	Dusky robin	Common in open forests/woodlands and forest margins, can also occur in gardens and is often seen perching on fence posts.
<i>Strepera fuliginosa</i>	Black currawong	Common altitudinal migrant, occurring predominantly on Bruny Island in the winter months and migrating to higher altitudes during the summer.

## Appendix 3

**Bird species found on Bruny Island which are considered uncommon, require monitoring or insufficiently known.**

<b>Species</b>	<b>Common name</b>	<b>Comments</b>
<i>Pelecanus conspicillatus</i>	Australian pelican	Uncommon species occurring in sheltered bays and inlets eg. sand spit at Cloudy Bay Lagoon. Identified as a "near island and marine" animal of interest by Bryant & Jackson 1999.
<i>Morus serrator</i>	Australasian gannet	Commonly seen foraging offshore in Adventure Bay and off Cape Bruny. Main threats occur at breeding colonies. Identified as a "coastal animal of interest" by Bryant & Jackson 1999.
<i>Botaurus poiciloptilus</i>	Australasian bittern	Insufficiently known cryptic species that occurs in wet areas- reed beds, swamps, creeks and estuaries. Identified as a species of Unknown Risk Status (Vertebrate Advisory Group 1994) and a "wetland animal of interest" by Bryant & Jackson 1999.
<i>Gallinago hardwickii</i>	Latham's snipe	Summer migrant occasionally found in pastures and wetlands during summer. Identified as a species Requiring Monitoring (Vertebrate Advisory Group 1994) and a "wetland animal of interest" by Bryant & Jackson 1999.
<i>Haematopus longirostris</i>	Pied oystercatcher	This species is declining in numbers due to disturbance whilst nesting; lives and nests on sandy beaches and estuaries eg. The Neck beach, Adventure and Cloudy Bays. Identified as a species Requiring Monitoring (Vertebrate Advisory Group 1994) also identified as a "coastal animal of interest" by Bryant & Jackson 1999.
<i>Charadrius veredus</i>	Oriental plover	Summer migrant and very rare vagrant to Bruny eg Cloudy Bay beach 16 10 1999 (C. Lester pers. obs).
<i>Milvus sphenurus</i>	Whistling kite	Tasmania is the southern-most limit of this species' range and rare vagrant to Bruny eg "Inala" 5 2 1998 (J Beruldsen & T Cochran pers. obs.). Identified as a "wetland animal of interest" by Bryant & Jackson 1999.
<i>Accipiter cirrhocephalus</i>	Collared sparrowhawk	Occasionally seen soaring over pasture at various localities on Bruny Island.
<i>Circus approximans</i>	Swamp harrier	Summer migrant to Tasmania (Sep-Feb), where it breeds on the ground amongst rushes and long grass. Usually seen gliding over pasture. Identified as a species Requiring Monitoring (Vertebrate Advisory Group 1994) and a "wetland animal of interest" by Bryant & Jackson 1999.
<i>Falco peregrinus</i>	Peregrine falcon	Worldwide distribution; two nest sites recorded on Bruny Island (no data on breeding activity).
<i>Calyptorhynchus funereus</i>	Yellow-tailed black cockatoo	Commonly observed feeding on seedpods of banksias in heathlands eg. Lighthouse Road and Cape Queen Elizabeth walking track. Requires large tree hollows for nesting. Identified as a "wet/dry eucalypt animal of interest" by Bryant & Jackson 1999.

**Appendix 3 cont'd**

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<b>Species</b>	<b>Common name</b>	<b>Comments</b>
<i>Pezoporus wallicus</i>	Ground parrot	Ground-dwelling parrot that is threatened on mainland Australia. Rarely found in coastal heathlands near Cape Bruny. Identified as a "heathland & moorland animal of interest" by Bryant & Jackson 1999

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## Appendix 4

### A list of endemic Tasmanian plants found on Bruny Island

Species	Common name
<b>Gymnospermae</b>	
<i>Phyllocladus aspleniifolius</i>	Celery top pine
<b>Dicotyledonae</b>	
<i>Acacia riceana</i>	Spiny southern wattle
<i>Aciphylla procumbens</i>	Procumbent aciphylla
<i>Allocasuarina duncanii</i>	Duncan's sheoak
<i>Allocasuarina monilifera</i>	Necklace sheoak
<i>Anodopetalum biglandulosum</i>	Horizontal
<i>Anopterus glandulosus</i>	Native laurel
<i>Aristotelia peduncularis</i>	Heart berry
<i>Asterotrichion discolor</i>	Currajong
<i>Bedfordia linearis</i>	Slender blanket-leaf
<i>Bedfordia salicina</i>	Tasmanian blanket-leaf
<i>Billardiera longiflora alpina</i>	Alpine purple apple-berry
<i>Cenarrhenes nitida</i>	Native plum
<i>Cyathodes abietina</i>	West coast pink berry
<i>Cyathodes divaricata</i>	Divaricate cheeseberry
<i>Cyathodes glauca</i>	Cheeseberry
<i>Cyathodes parvifolia</i>	Pink mountain berry
<i>Cyathodes straminea</i>	False-whorled cheeseberry
<i>Epacris myrtifolia</i>	Thick-leaf coastal heath
<i>Epacris tasmanica</i>	Tasman heath
<i>Eucalyptus amygdalina</i>	Black peppermint
<i>Eucalyptus cordata</i>	Heart-leaved silver gum

## Appendix 4 cont/..

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<i>Eucalyptus delegatensis tasmaniensis</i>	Gum or white-topped stringy bark
<i>Eucalyptus johnstonii</i>	Tasmanian yellow gum
<i>Eucalyptus nitida</i>	Smithton peppermint
<i>Eucalyptus pulchella</i>	White peppermint
<i>Eucalyptus tenuiramis</i>	Silver peppermint
<i>Eucryphia lucida</i>	Leatherwood
<i>Euphrasia fragosa</i>	Shy eyebright
<i>Euphrasia striata</i>	Streaked eyebright
<i>Hakea epiglottis</i>	Beaked hakea
<i>Leptospermum glaucescens</i>	Smoky tea-tree
<i>Leptospermum grandiflorum</i>	Mountain tea-tree
<i>Leptospermum nitidum</i>	Shiny tea-tree
<i>Lomatia polymorpha</i>	Variable guitar plant
<i>Lomatia tinctoria</i>	Guitar plant
<i>Nematolepis squamea retusa</i>	Satinwood
<i>Nymphoides exigua</i>	Marshwort
<i>Olearia persoonioides</i>	Geebung daisy-bush
<i>Olearia phlogopappa angustifolia</i>	Dusty daisy- bush
<i>Olearia tasmanica</i>	Tasmanian daisy-bush
<i>Orites diversifolia</i>	Variable orites
<i>Ozothamnus antennaria</i>	Sticky everlasting
<i>Ozothamnus costatifructus</i>	Ribseed everlasting
<i>Ozothamnus reticulatus</i>	Reticulate everlasting
<i>Ozothamnus scutellifolius</i>	Scale-leaf everlasting

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## Appendix 4 cont/..

<b>Species</b>	<b>Common name</b>
<i>Persoonia juniperina brevifolia</i>	Prickly geebung
<i>Phyllota diffusa</i>	Tasman phyllota
<i>Pimelea cinerea</i>	Grey rice-flower
<i>Pimelea nivea</i>	Round-leaf rice-flower
<i>Pultenaea gunnii baeckeoides</i>	Golden bush-pea
<i>Richea dracophylla</i>	Dragon-leaf richea
<i>Richea pandanifolia</i>	Pandani
<i>Richea procera</i>	Lowland richea
<i>Telopea truncata</i>	Waratah
<b>Monocotyledonae</b>	
<i>Acion hookeri</i>	Wooly-glume cord-rush
<i>Acion monocephalum</i>	Smooth-glume cord-rush
<i>Astelia alpina alpina</i>	Pineapple grass
<i>Austrodanthonia dimidiata</i>	Tasmanian wallaby-grass
<i>Austrostipa aphylla</i>	Tall spear-grass
<i>Blandfordia punicea</i>	Christmas bells
<i>Caladenia atrata</i>	Dark caladenia
<i>Chiloglottis gunnii</i>	Tall bird orchid
<i>Diplarrena latifolia</i>	Western flag iris
<i>Lepidosperma globosum</i>	Sword sedge
<i>Lepidosperma oldfieldii</i>	Oldfield's rapier-sedge
<i>Pentapogon quadrifidus parviflorus</i>	Five-awn spear-grass
<i>Prasophyllum concinnum</i>	Trim leek orchid
<i>Prasophyllum truncatum</i>	Truncate leek orchid
<i>Pterostylis aphylla</i>	Leafless greenhood
<i>Xyris muelleri</i>	Mueller's yellow-eye

## Appendix 5

Species of flora considered in the “Forest Botany Module 6. D’Entrecasteaux Region” (Forest Practices Board 2000b) to have a high priority for conservation.

Species	Common name	Comments
<i>Lindsaea trichomanoides</i>	Oval wedge-fern	Recorded from Lockleys Road near Adventure Bay. Occurs in dark, moist, sheltered situations as a terrestrial species but is also found on rotting logs and as a low epiphyte of myrtles ( <i>Nothofagus cunninghamii</i> ) and Huon pines ( <i>Lagarostrobos franklinii</i> ), or in man-made structures such as railway cuttings and ditches (Garrett 1996).
<i>Cyathea cunninghami</i>	Slender tree fern	
<i>Sticherus lobatus</i>	Spreading fan fern	
<i>Tmesipteris elongata</i>	Narrow fork fern	
<i>Phyllota diffusa</i>	Tasman phyllota	
<i>Selaginella gracillima</i>	Tiny selaginella	
<i>Agrostis aemula</i> var. <i>aemula</i>	Blown grass	
<i>Xanthorrhoea australis</i>	Grass tree	Recorded from a number of locations on north Bruny, especially "Murrayfield". Occurs on sandy soils in coastal or near-coastal areas (Curtis & Morris, 1994).

## Appendix 6

### Documenting Significant and Threatened Species Records

The Threatened Species Unit (DPIWE) welcomes records of threatened and significant species. These records are incorporated into departmental databases and assist in increasing the knowledge of species distributions and management practices. Any records can be forwarded to the Threatened Species Unit and should include as much of the following information as possible.

- Species Name
- Date
- Recorders name
- Location (including grid reference)
- Estimated accuracy of the location/grid reference
- Altitude
- Any habitat features eg. landscape, rock type, soil type, vegetation and aspect
- Any other useful comments.



MANAGING THREATENED SPECIES AND COMMUNITIES ON BRUNY ISLAND



*Photo: Tom J Ulrich*