



# **Code of Practice for Injured, Sick and Orphaned Macropods**

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## Preface

The Code of Practice for Injured, Sick and Orphaned Macropods (the Code) is intended for everyone trained in the activity of rescuing, rehabilitating and releasing macropods. It has been developed to protect the welfare of macropods in care and to contribute to the conservation of macropods in the wild. The Code is designed to be read in conjunction with the Office of Environment and Heritage (OEH) Code of Practice for Injured, Sick and Orphaned Protected Fauna (General Code).

Compliance with the Code does not remove the need to abide by the requirements of the Prevention of Cruelty to Animals Act 1979, Poisons and Therapeutic Goods Act 1966, Veterinary Practice Act 2003, Local Government Act 1993, Firearms Act 1996 or any other relevant laws and regulations.

Compliance with the standards in the Code is a condition of a biodiversity conservation licence (BCL) to rehabilitate and release sick, injured and orphaned protected animals issued under the BC Act. A person who contravenes a condition of a BCL is guilty of an offence under section 2.14 (4) of this Act.

OEH is grateful to Shona Lorigan of the NSW Wildlife Council, the peak body for the wildlife rehabilitation sector for coordinating the development of this Code in consultation with veterinary specialists at Taronga Western Plains Wildlife Hospital, FAWNA (NSW) Inc. (For Australian Wildlife Needing Aid), Native Animal Trust Fund Inc. (NATF), Native Animal Rescue Group (NARG), NSW Wildlife Information, Rescue and Education Service Inc. (WIRES), Rescue and Rehabilitation of Australian Native Animals (RRANA), Sydney Metropolitan Wildlife Services Inc., Wildcare Queanbeyan Inc., Wildlife Aid Inc., Wildlife ARC Inc., and Wildlife Rescue South Coast Inc.(WRSC).

The Code is neither a complete manual on animal husbandry, nor a static document, and must be implemented by a person who has been trained in accordance with the enclosed standards. It will be periodically reviewed to incorporate new knowledge in animal physiology and behaviour; technological advances; developments in standards of animal welfare; and changing community attitudes and expectations about the humane treatment of macropods. OEH will consult with licence holders regarding potential changes to the Code and give written notice when the Code is superseded.

# 1 Introduction

This Code sets the standards for the care and housing of macropods that are incapable of fending for themselves in their natural habitat. It comprises both enforceable provisions and guidelines. Enforceable provisions are identified by the word 'Standards' and they must be followed.

## 1.1 Interpretations

### Objectives

Objectives are the intended outcome(s) for each section of this Code.

### Standards

Standards describe the mandatory specific actions needed to achieve acceptable animal welfare levels. These are the minimum standards that must be met. They are identified in the text by the heading 'Standards' and use the word 'must'.

### Guidelines

Guidelines describe agreed best practice following consideration of scientific information and accumulated experience. They also reflect society's values and expectations regarding the care of animals. A guideline is usually a higher standard of care than minimum standards, except where the standard is best practice.

Guidelines will be particularly appropriate where it is desirable to promote or encourage better care for animals than is provided by the minimum standards. Guidelines are also appropriate where it is difficult to determine an assessable standard. Guidelines are identified in the text by the heading 'Guidelines' and use the word 'should'.

### Notes

Where appropriate, notes describe practical procedures to achieve the minimum standards and guidelines. They may also refer to relevant legislation.

## 1.2 Definitions

In this Code:

**Experienced macropod rehabilitator** means someone who has an extensive knowledge of current rehabilitation techniques gained through training courses and many years of successfully caring for macropods.

**Macropods** are animals classified as members of the superfamily Macropodoidea. These are a group of herbivore marsupial mammals comprising kangaroos, wallabies, wallaroos, pademelons and rat kangaroos. All have long, flat, soft feet and weakly developed forelimbs. A list of NSW macropods is provided in [Appendix 1](#).

**Park** means a national park, historic site, state conservation area, regional park, nature reserve, karst conservation reserve or Aboriginal area, or any land acquired by the Minister under the [National Parks and Wildlife Act 1974](#).

**Protected animal** means any amphibian, reptile, bird or mammal (except dingoes) listed or referred to in [Schedule 5 of the BC Act](#) that is native to Australia or that periodically or occasionally migrates to Australia (including their eggs and young). All macropods are classified as protected animals.

**Wildlife rehabilitator** means someone who is either authorised by a wildlife rehabilitation group or zoological park or is individually licensed by OEH to rehabilitate and release protected animals.

**Wildlife rehabilitation** means the temporary care of an injured, sick or orphaned protected animal with the aim of successfully releasing it back into its natural habitat.

**Wildlife rehabilitation provider** means an incorporated wildlife rehabilitation group or individually licensed wildlife rehabilitator that is licensed by OEHL under the BC Act to rehabilitate and release protected animals.

**Zoonoses** are any diseases in an animal that can be transmitted to humans.

### 1.3 Stages of development in macropods

1. Pouch young:
  - a. pinkies – unfurred joeys
  - b. velvet – joeys are lightly furred
  - c. pouched fur – joeys have a substantial layer of fur
  - d. emerging joeys – joeys are fully furred and start to leave the pouch, going in and out of the pouch regularly
2. Young at foot – fully emerged joeys
3. Sub-adult – weaned macropods
4. Adult – sexually mature macropods
5. Geriatric – aged macropod with rear molars only.

## 2 Case assessment

### Objective

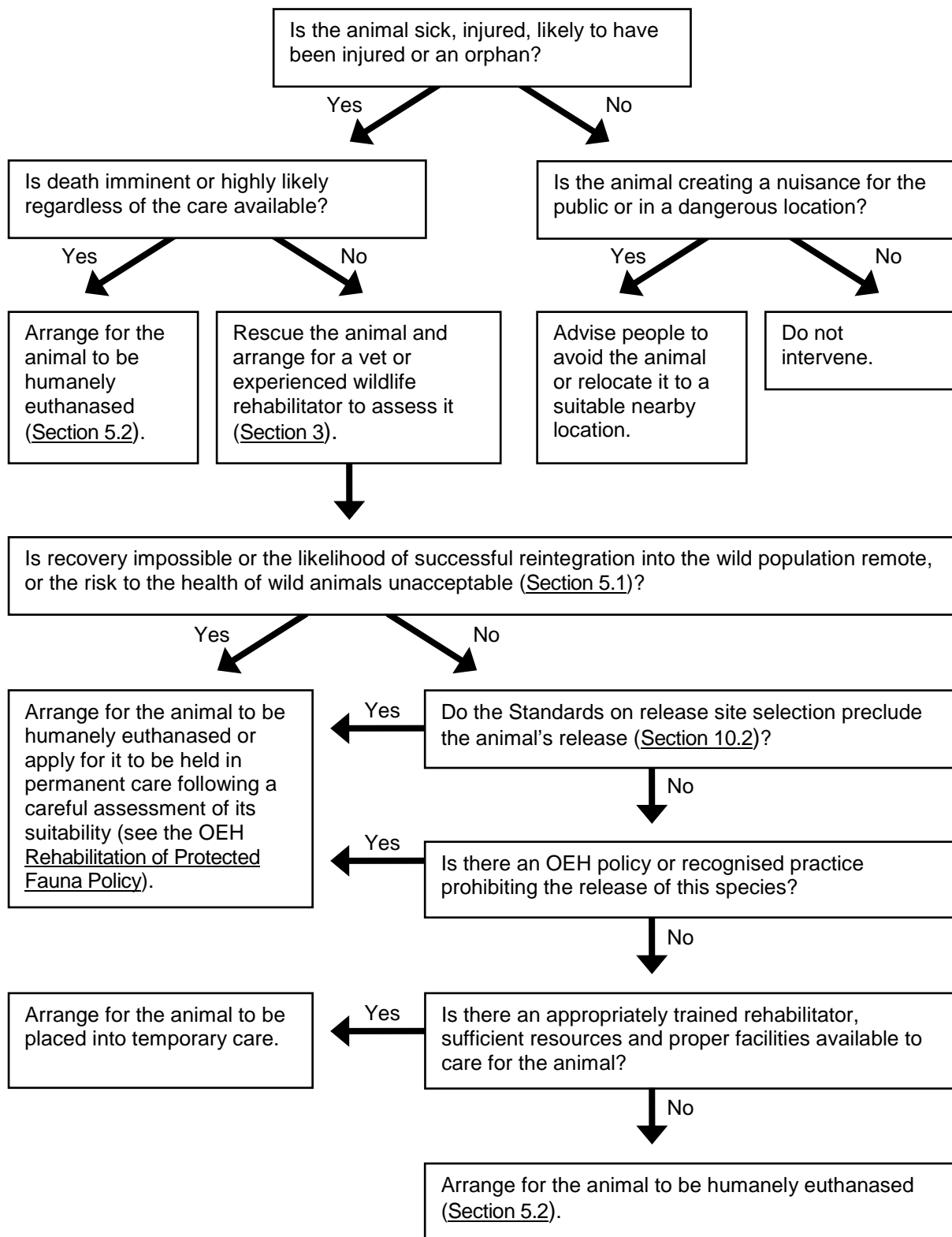
To assess a macropod to determine the type of intervention required. The primary objective of rehabilitation is the successful reintegration of the macropod into the wild population and all decisions made are in pursuit of this goal. This will mean that some macropods may benefit from rehabilitation whereas others will need to be euthanased.

### Standards

- 2.1.1 The decision tree in Figure 1 must be followed when determining how to respond to an encounter with a macropod.
- 2.1.2 Rescuers must arrange for a macropod to be assessed by a veterinarian or experienced wildlife rehabilitator within 24 hours of rescue to ensure accurate diagnosis and prompt treatment or euthanasia. If this is not possible due to the remoteness of the location, expert advice must be sought via telephone or email.

### Note

An animal creating a nuisance for the public generally refers to an animal that has entered a person's house and/or represents a human health risk, e.g. large kangaroos in residential areas. It does not include an animal defending its territory (e.g. a magpie) or exhibiting other normal behaviour (e.g. a brush turkey building a mound). OEHL has a range of policies guiding the response to aggressive wildlife.



**Figure 1 Decision tree for course of action when a macropod is encountered**



## 3 Rescue

### Objective

To conduct a macropod rescue so as to minimise further stress and injury to the animal.

### Standards

- 3.1.1 Prior to a rescue attempt, the rescuer must assess the risks to the macropod from environmental hazards and from capture.
- 3.1.2 Prior to a rescue attempt, the rescuer must assess the risks to themselves and members of the public.
- 3.1.3 Rescuers must employ the correct rescue equipment for the type and size of macropod and be trained in its use (see [Section 11 Training](#)).
- 3.1.4 Rescuers must not use hessian or plastic bags to contain a macropod.
- 3.1.5 The following methods must not be used to capture a macropod:
  - noosing with a rope
  - prolonged pursuit
  - legs must not be tied.
- 3.1.6 If attending a deceased female macropod:
  - look for a joey in the pouch
  - remove and contain a furred joey before it hops away
  - unfurred (pinkies) and lightly furred joeys may be attached to the teat and must be removed by applying gentle pressure to the sides of the joey's mouth to relinquish the teat or by cutting the teat close to the mother's body. This is to prevent damage to the joey's palate
  - all joeys must be removed by gently scooping with one hand under the joey's back. Avoid pulling on the tail or the limbs.
- 3.1.7 If the macropod is an injured female with signs of having a pouch young (e.g. elongated teat, stretched pouch), the surrounding area must be searched for the young and monitored regularly (e.g. daily for at least several days) if the joey is not immediately found.
- 3.1.8 Do not cut the pouch or teat of a live macropod.
- 3.1.9 Always approach a recumbent macropod from behind.
- 3.1.10 Rescuers must only attempt to rescue a macropod when a sufficient number of trained personnel for that species and size are involved.
- 3.1.11 Other than a mother and her pouch young, each macropod rescued must be contained in an individual rescue bag.

### Note

If the joey is removed whilst still attached to the teat a safety pin should be placed through the teat to ensure the joey does not swallow it.

### Guidelines

- 3.1.12 When the mother has died, a healthy young at foot macropod joey should be monitored and assessed by an experienced macropod rehabilitator to see if it will be at risk from predators and is able to remain with the mob, or needs to be taken into care.

- 3.1.13 The rescue of an adult macropod should not be attempted unless at least two trained personnel are involved.
- 3.1.14 When the injured macropod is a live female, the method of rescue should consider the reproductive status of the animal as follows:
- Injured females with a joey in the pouch should be assessed and rescued with the joey retained in the pouch.
  - Injured females with young at foot should be assessed and the joey captured and secured at the outset wherever possible.
- 3.1.15 Capture should be swift and effective with the goal of promptly containing the animal by a means that limits exposure to additional stressors such as onlookers, loud noises, other animals and extremes of temperature.
- 3.1.16 Macropods exposed to acute or prolonged stress (e.g. chased, fence wire entanglement, etc.) should, where possible, be brought into care for monitoring, as injuries may not be immediately apparent.

### Notes

Macropods are nervous, easily stressed animals with a highly developed flight response to perceived threat.

Covering a macropod's head at the first opportunity will reduce stress.

Dehydrated macropods may need rehydration prior to transport.

Stressed macropods should be carefully monitored for signs of capture myopathy and expert advice sought about the need for treatment and management.

## 4 Transport

### Objective

To minimise further stress and injury to a macropod during transport. This section applies to all movement of the macropod including from the point-of-rescue to a veterinary surgery and between rehabilitation facilities.

### Standards

- 4.1.1 Transport methods and container sizes must be appropriate for the species, size, strength and temperament of the macropod.
- For example, an uninjured orphaned pouch young requires a liner and outer artificial pouch, made from natural fibres, that is suspended securely within the transport vehicle.
- 4.1.2 Transport bags and containers must be designed, set up and secured to prevent injuries to the macropod. This may involve padding walls and covering floors with a non-slip, non-ingestible, tangle-free surface.
- 4.1.3 Transport bags and containers must be designed to prevent the macropod from escaping.
- 4.1.4 Macropods with suspected pelvic or spinal injuries must be transported lying flat and contained to reduce pain and prevent further injury. Transport must include sufficient cushioning to help stop rough vibrations and jerking.
- 4.1.5 A macropod in a transport bag or container must be positioned so its breathing is not restricted, and its pain or discomfort is minimised.

- 4.1.6 Transport bags and containers must be ventilated so air can circulate around the macropod.
- 4.1.7 Transport bags and containers must be kept at a temperature appropriate for the macropod's stage of development. For example:
- 32°C is appropriate for unfurred joeys (pinkies)
  - 30°C is appropriate for lightly furred joeys (velvet)
  - 28°C is appropriate for fully furred joeys.
- 4.1.8 The temperature and condition of the macropod must be regularly monitored during transport.
- 4.1.9 Containers must minimise light, noise (e.g. radio), and vibrations and prevent exposure to young children, pets and cigarette smoke.
- 4.1.10 A macropod must not be transported in the back of an uncovered utility vehicle, a car boot that is separate from the main cabin, or on the rescuer's lap.

### **Guidelines**

- 4.1.11 The use of medication to facilitate transport (sedation and/or analgesia) should be assessed and approved by a veterinarian.
- 4.1.12 Joeys should be transported to their final carer prior to emergence from the pouch.
- 4.1.13 Macropod transport should be the sole purpose of the trip and undertaken in the shortest possible time.
- 4.1.14 Transport of an adult macropod from the rescue site should be undertaken only if there is no other option and an experienced macropod rehabilitator has assessed the animal.

### **Note**

Artificial heat sources (e.g. a hot water bottle or heat pad) for unfurred pouch young are likely to be required. The heat source should be placed on the outside of the pouch to prevent the animal from coming into direct contact with it.

## **5 Euthanasia**

### **5.1 When to euthanase**

#### **Objective**

To end a macropod's life in situations where death is imminent; or recovery is impossible; or the likelihood of successful reintegration into the wild population is remote; or the macropod poses an unacceptable health risk to wild macropods.

#### **Standards**

- 5.1.1 A macropod must be euthanased without exception when:
- death is imminent or highly likely regardless of the treatment provided, or
  - it is suffering from chronic, un-relievable pain or distress, or
  - it is carrying an incurable disease that will pose a health risk to wild animals, or
  - its ability to consume food unaided is permanently impaired due to an injured jaw or missing/worn teeth.
- 5.1.2 A macropod must be euthanased (unless OEH has granted permission to hold it in permanent care) when:

- there is no suitable release location, or
- its ability to locomote, and its ability to escape predators, is permanently impaired due to a missing or injured hind limb, back bone or tail, or
- its ability to sense its environment (i.e. see, hear, smell, taste or feel) is permanently impaired due to a missing or injured organ (e.g. eye, ear or nose), or
- its ability to forage successfully is permanently impaired, or
- its advanced age renders it unable to survive in its natural habitat.

In certain exceptional circumstances, OEH may grant permission to hold such animals in permanent care or arrange placement with an authorised animal exhibitor licensed by the NSW Department of Primary Industries (DPI). See the OEH Rehabilitation of Protected Fauna Policy (DECCW 2010) for details.

- 5.1.3 OEH must be notified when a macropod listed as a threatened species (Appendix 1) has lost its ability to reproduce due to an injury, disease or procedure. This is to ensure the population is not compromised due to habitat competition if the macropod was to be released.

### **Guidelines**

- 5.1.4 A macropod should be euthanased if it is at a stage of development where it is unlikely to be successfully hand-reared to the point where it can be released.
- 5.1.5 The decision to euthanase should not be based on a macropod's weight at rescue.
- 5.1.6 The decision to euthanase should not be based on availability of carers within the rescue group. The group should liaise with other licensed groups to facilitate care if necessary.

## **5.2 How to euthanase**

### **Objective**

To induce death with minimal pain and distress to the macropod.

### **Standards**

- 5.2.1 A euthanasia method must be used which produces a rapid loss of consciousness immediately followed by death.
- 5.2.2 Death must be confirmed prior to disposal of the carcass. The absence of breathing and a heartbeat, and the loss of corneal and other reflexes, indicate death has occurred.

### **Guidelines**

- 5.2.3 Macropod rehabilitators should arrange for a veterinarian to perform euthanasia. Intravenous barbiturate overdose should be used, with sedation prior to euthanasia.
- 5.2.4 When a veterinarian is not available to perform euthanasia, a method appropriate for the species and circumstances should be employed to ensure minimal pain and suffering. This may include the following methods:
- shooting with an appropriate firearm by head or heart shot
  - blunt force trauma to the skull with a single blow
  - stunning immediately followed by decapitation (for smaller animals)
  - stunning followed by cervical dislocation.

- 5.2.5 Shooting should be undertaken by a licensed, skilled and experienced operator from within an appropriate agency, such as OEH, the wildlife rehabilitation provider, the RSPCA or NSW Police.
- 5.2.6 The following euthanasia methods should not be used on macropods:
- suffocation via drowning, strangulation or chest compression
  - freezing or burning
  - carbon dioxide in any form
  - poisoning with household products
  - air embolism
  - exsanguination or decapitation without prior stunning
  - electrocution or microwave irradiation
  - chloroform or strychnine
  - neuromuscular blocking agents.
- 5.2.7 A macropod that requires euthanasia should not be exposed to additional stressors such as large numbers of onlookers, people touching it, loud noises or extremes of temperature.

### Notes

For further information on appropriate euthanasia methods refer to:

The National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Non-Commercial Purposes (Commonwealth of Australia 2008). It contains conditions for euthanasing injured kangaroos and wallabies.

The Firearms Act 1996 specifies animal welfare as a genuine reason for having a firearms licence.

## 5.3 Disposal of carcasses and animal waste

### Objective

To dispose of waste so that the risks of disease transmission are minimised.

### Standards

- 5.3.1 Carcasses and organic waste suspected of disease contamination or that have been exposed to chemicals (e.g. barbiturates) must either be incinerated or buried at a depth that will prevent scavengers from reaching them.
- 5.3.2 Macropods that have died from disease or chemical means (e.g. barbiturate overdose) must not be fed to other animals.

### Note

Local councils have laws regulating the disposal of carcasses and other biological waste.

## 6 Care procedures

### 6.1 Monitoring

#### Objective

To determine the health status of macropods undergoing rescue and rehabilitation so that issues can be promptly identified and managed. The type and frequency of monitoring will vary with the age or stage of development, type of injury or illness and required treatment.

## Standards

- 6.1.1 A macropod must in the first instance be assessed by the closest and/or most appropriately trained macropod rehabilitator.
- 6.1.2 Macropods are sensitive animals and easily stressed by aspects of being in human care. Acute stress can result in flight response and injury/myopathy, chronic stress can result in increased susceptibility to disease. Macropod carers must be vigilant for signs of acute and chronic stress.
- 6.1.3 The species of macropod must be identified.
- 6.1.4 A macropod must be weighed and measured on admission.
- 6.1.5 On admission a macropod must be checked for:
- bleeding, wounds or swelling
  - bone fractures (use weight bearing assessment and gait assessment)
  - weakness or paralysis
  - rapid breathing or elevated heart rate
  - erratic eye movement or sunken eyes
  - hydration status
  - pale or cold gums
  - temperature
  - external parasites, e.g. ticks, lice and flat flies
  - discharge from the eyes, nostrils, mouth or cloaca
  - skin conditions or hair loss
  - odd smells
  - jaw alignment/broken teeth
  - diarrhoea.
- 6.1.6 Once identified, disease and injury problems need to be prioritised for management according to severity (triage). This may require veterinary input. Health management of macropods in care must always strive for optimal animal welfare. Recognition and management of pain is important.
- 6.1.7 Monitoring a macropod must include:
- visually assessing body condition and demeanour
  - checking for signs of injury, disease and parasites
  - assessing hydration by looking at the eyes (sunken eyes can suggest dehydration) and noting the quantity and quality of faeces and urine
  - looking for indications of activity
  - assessing the trend in weight, e.g. gain or loss.
- 6.1.8 All pouch young must be monitored at each feed.
- 6.1.9 All pouch joeys must be weighed daily until they show a stable weight gain and then they should be weighed as follows:
- unfurred joeys (pinkies) and lightly furred joeys (velvets) weighed every 2 days
  - pouch furred, emerging and fully emerged joeys must be weighed weekly.
- 6.1.10 All sub-adults (weaned joeys) must be monitored daily and weighed when required, if they can be caught without causing stress, as weaned animals have begun the dehumanising phase of their rehabilitation.

- 6.1.11 Wildlife rehabilitators must regularly monitor the temperature of any artificial heat source (e.g. blankets, hot water bottles and electric heat mats) within artificial pouches and enclosures containing thermal support, to ensure appropriate temperatures are maintained.

## 6.2 Controlling disease between animals

### Objective

To prevent the spread of diseases among macropods undergoing rehabilitation. Stressed animals are more susceptible to contracting and expressing infectious diseases.

### Standards

- 6.2.1 A newly arrived macropod must be isolated in separate areas until its disease status can be determined by a veterinarian or experienced macropod rehabilitator.
- 6.2.2 A macropod suspected of, or known to be carrying, an infectious disease must be kept under strict quarantine conditions throughout its illness. Signs of disease may include coughing, sneezing, abnormal respiration, discharge from the eyes or nose and diarrhoea.
- 6.2.3 Dedicated cleaning equipment must be used for enclosures housing macropods with a suspected or confirmed infectious disease.
- 6.2.4 All enclosures, transport containers, enclosure equipment, food and water containers must be thoroughly cleaned and disinfected after each occupant.
- 6.2.5 Macropods undergoing rehabilitation must be prevented from coming into contact with domestic pets.
- 6.2.6 Wildlife rehabilitators must wash their hands thoroughly with soap or disinfectant before and after handling each animal in care.
- 6.2.7 If a macropod is suspected to be carrying a new notifiable disease, the wildlife rehabilitator must immediately contact their species coordinator to notify the DPI Emergency Animal Disease Hotline (24 hours) on 1800 675 888 for immediate assessment of emerging health threats.

### Guidelines

- 6.2.8 When handling multiple animals, wildlife rehabilitators should start with the youngest and healthiest and finish with the oldest and sickest, to reduce the risks of disease transmission.
- 6.2.9 Different species undergoing rehabilitation should be kept in separate enclosures at all times.
- 6.2.10 Should it be necessary to house different species together care should be taken to minimise aggressive interactions.
- 6.2.11 Pest control is recommended for all rehabilitation facilities.

### Note

Wildlife rehabilitators should make every effort to reduce the risk of contracting zoonoses such as salmonellosis, Q fever, and fungal infections including ringworm.

## 7 Husbandry

### 7.1 Food and water

#### Objective

To ensure a macropod has a feeding and watering regime that encourages rapid recovery, supports growth in juveniles and assists with the maintenance of foraging behaviour necessary for survival in the wild.

#### Standards

- 7.1.1 Clean, fresh drinking water must be available at all times and water in containers must be changed daily.
- 7.1.2 Water containers must be designed and positioned so as to avoid spillage, contamination and extremes of temperature and must be appropriate for a macropod's species, size, age of development and mobility.
- 7.1.3 If bathing water is required, it must be in a separate area from drinking water.
- 7.1.4 Macropods must be provided with a balanced and complete diet that supports growth and development and is appropriate for the species, size, age, stage of development, mobility and physiological status of the animal.
- 7.1.5 Food that is available in the wild must form the basis of the macropod's diet.
- 7.1.6 Hand-reared macropods must be fed a lactose free milk formula that is appropriate for the species and stage of development.
- 7.1.7 Maintenance fluid requirements vary depending on a large number of factors. Careful attention must be paid to the total fluid intake to avoid dehydration. The amount required will depend on the stage of development, environmental conditions and the presence of illness or injury.
- 7.1.8 For dependent pouch young water may need to be offered between formula feeds depending on formula type, feeding frequency, health status and stage of development.
- 7.1.9 Hand-reared macropods must be fed milk formula from a bottle and teat until they are weaned. In some situations, bettongs can be fed milk formula by lapping rather than a bottle and teat.
- 7.1.10 Unfurred joeys (pinkies) must be fed over a 24-hour period with an evenly spaced feeding schedule.

#### Guidelines

- 7.1.11 Food in storage should not be accessible to pets, pests and wild animals and should be protected from contamination and nutritional loss.
- 7.1.12 Nutritional and fluid support is vital for adult macropods in the intensive and intermediate care stages if their appetite is depressed and/or they are dehydrated. A variety of blended products and commercial formulae suitable for herbivores can be used for this purpose.
- 7.1.13 Contaminant-free dirt, leaf-litter, grass, hay (but not chaff) and native grasses and shrubs should be offered to all macropods from the furred pouch joey stage of development.
- 7.1.14 Contaminant-free dirt, leaf-litter, grass, hay (but not chaff, oats or lucerne) and native grasses and shrubs should be offered to all macropods in intermediate and pre-release stages and should comprise the bulk of the diet.



- 7.1.15 Supplementary feed (e.g. pellets) should be offered to macropods in rehabilitation. Products that mimic the nutrient composition of the wild diet as closely as possible are preferred (i.e. forage-based, high fibre pellets manufactured for native herbivores such as kangaroos with low–moderate protein (less than 14%) and low Vitamin D levels).
- 7.1.16 Foods such as dog biscuits and other high energy foods should be avoided as they do not mimic the wild diet, contain excess sodium and as such do not promote normal dental wear and the development of normal gastrointestinal and nutritional health.
- 7.1.17 Carrots should not be fed to macropods.
- 7.1.18 Food and water guidelines for dependent macropods:
- Unfurred joeys (pinkies) should be fed milk 6–8 times a day.
  - Lightly furred joeys (velvet) should be fed milk 4–6 times a day.
  - Pouched fur joeys should be fed milk 3–4 times a day.
  - Emerging joeys should be fed milk 3–4 times a day.
  - Fully emerged joeys should be fed milk 2 times a day.
  - As a joey approaches weaning, the milk feed should be dropped to once a day then ceased. Supplementary food is needed, and water should be topped up daily.

### Notes

Joeys of the same age and stage of development can vary significantly in the quantities of formula ingested at each feed.

Gently stimulating the cloaca of joeys that have not emerged from the pouch, before or after each feed will encourage voiding of faeces and urination.

Milk is a feed; water is a fluid drink.

## 7.2 Hygiene

### Objective

To maintain clean rehabilitation facilities so diseases are prevented or contained.

### Standards

- 7.2.1 Faeces and uneaten food must be removed on a daily basis and disposed of to ensure other animals cannot consume them (e.g. in closed garbage or compost bins).
- 7.2.2 Food and water containers must be cleaned on a daily basis. Cleaning involves the use of water, a detergent and the physical removal of all residues.
- 7.2.3 Bottles and teats used for feeding 'pinkies' must be sterilised prior to every feed.
- 7.2.4 Water used to mix milk formula for (pinkies and velvet) joeys must be cool pre-boiled water. At sea level water needs to be boiled for one minute to sterilise.
- 7.2.5 Enclosure furniture, bedding, weighing bags and pouches must be cleaned when soiled.
- 7.2.6 A macropod must be cleaned when soiled with faeces, urine or uneaten food.
- 7.2.7 Wildlife rehabilitators must minimise the disturbance to macropods when cleaning.
- 7.2.8 Wildlife rehabilitators must wash their hands and clean all food preparation surfaces and equipment prior to preparing macropod food.

## **Guidelines**

- 7.2.9 Equipment used for cleaning animal enclosures, containers and furniture should be separate from those used domestically.
- 7.2.10 In affected areas, preventative treatment for coccidiosis and intestinal worms should also be a consideration whilst caring for macropods.

## **7.3 General care**

### **Guidelines**

- 7.3.1 The buddying of macropods based on stage of development is recommended for the development of natural behaviours and to minimise stress. Wildlife rehabilitation providers should liaise with other providers to facilitate buddying where possible.
- 7.3.2 All husbandries should be covered in macropod specific training (see [Section 11 Training](#)).
- 7.3.3 Each macropod should have a husbandry plan.
- 7.3.4 Macropods are very prone to imprinting and humanisation. All care should be taken, particularly after weaning, to minimise social interactions with humans and natural behaviours should be allowed to develop.

## **8 Housing**

### **8.1 General requirements**

#### **Objective**

To ensure a macropod undergoing rehabilitation is housed in enclosures that keep it safe, secure and free from additional stress.

#### **Standards**

- 8.1.1 Enclosures must be escape-proof.
- 8.1.2 Housing must be made safe for macropods to live in by excluding hazards that might harm them.
- 8.1.3 Housing must be designed and/or positioned so as to protect macropods from physical contact with wild animals, domestic livestock and pests.
- 8.1.4 Housing must be designed so rehabilitators can readily access the macropods.
- 8.1.5 Housing must be positioned so the macropod is not exposed to strong vibrations, noxious smells (e.g. wood smoke) or loud noises (e.g. radios and televisions, barking dogs).
- 8.1.6 Housing must be constructed from non-toxic materials that can be easily cleaned and disinfected.
- 8.1.7 If multiple macropods are kept within a single enclosure, there must be sufficient space for individuals to avoid undue conflict or harm from each other.

#### **Guidelines**

- 8.1.8 Enclosures should be at least the size specified in intensive care, intermediate and pre-release housing for the species and stage of rehabilitation. These dimensions are suitable for average-sized adults. Smaller individuals may not require the space specified and larger individuals may require more space.

- 8.1.9 Housing should be designed and/or positioned so that macropods cannot see domestic pets.

**Note**

The failure to recognise pet species as predators will preclude rehabilitated macropods being released into the wild.

## **8.2 Intensive care housing**

**Objective**

To reduce activity for a short period of time to facilitate frequent monitoring, treatment and feeding. It is suitable for severely injured or diseased adults and orphaned pouch young.

**Standards**

- 8.2.1 Intensive care housing must provide sufficient space for the macropod to maintain a normal posture and to stretch its body and limbs, but not enough space to hop and jump.
- 8.2.2 Pouched young must be positioned in the artificial pouch in a way that mimics the natural position it would be in its mother's pouch; however, some injuries will require the pouched young to lie flat.
- 8.2.3 Intensive care housing must provide a constant temperature appropriate to the species, stage of development and nature of the illness or injury.
- 8.2.4 The temperature in intensive care housing must be regularly monitored using a thermometer, with minimal disturbance to the macropod.
- 8.2.5 Electrical heat sources must be regulated by a thermostat.
- 8.2.6 Macropods (excluding unfurred joeys) in intensive care housing must experience a light–dark cycle that replicates outside conditions. If an artificial light source is used, it must be separate from any artificial heating.
- 8.2.7 Intensive care housing must be designed and/or positioned so that visual and auditory stimuli are reduced (e.g. by covering with a towel and placing in a quiet room).
- 8.2.8 Intensive care housing must be adequately ventilated without allowing excessive draughts.
- 8.2.9 Substrate used in intensive care housing must be soft, non-slip material and replaced when soiled.

**Guidelines**

- 8.2.10 Intensive care housing for small macropods (e.g. bettongs) should be a minimum of 1 metre long, 1 metre wide and 1 metre high.
- 8.2.11 Intensive care housing for medium-sized macropods should be a minimum of 1.5 metres long, 1.5 metres wide and 1.5 metres high.
- 8.2.12 Intensive care housing for large-sized macropods should be a minimum of 2 metres long, 2 metres wide and 1.8 metres high.
- 8.2.13 Artificial pouches should mimic the mother's pouch and be snug but also allow enough room for the joey to turn sideways, tumble and stretch.
- 8.2.14 Artificial pouches should be made from natural fibres and have no loose threads.
- 8.2.15 Intensive care housing should permit easy access for the carer to clean the facility and medicate and assess the animal.

## 8.3 Intermediate care housing

### Objective

To provide a mobile macropod with enough space to allow some physical activity while enabling it to be readily caught for monitoring or treatment.

### Standards

- 8.3.1 Intermediate care housing must provide sufficient space for the macropod to move about freely while being conveniently sized for quick capture.
- 8.3.2 If an artificial heat source is provided, the macropod must be able to move to a cooler section of the enclosure. A thermostat must regulate electrical heat sources.
- 8.3.3 Macropods in intermediate care housing must experience a light–dark cycle that replicates outside conditions. This may be achieved by placing the enclosure in a well-lit room or in a sheltered area outside.

### Guidelines

- 8.3.4 Intermediate care housing for small macropod (e.g. bettongs) should be a minimum of 2 metres long, 2 metres wide and 2 metres high.
- 8.3.5 Intermediate care housing for medium-sized macropods should be a minimum of 3 metres long, 3 metres wide and have fencing 1.8 metres high.
- 8.3.6 Intermediate care housing for large-sized macropods should be a minimum of 10 metres long, 3 metres wide and have fencing 1.8 metre high.
- 8.3.7 Intermediate care housing should have shade and shelter to allow the macropod to escape extremes of temperature.
- 8.3.8 Hand-reared macropods should be exposed to members of the same species or family during the intermediate care stage.
- 8.3.9 Small macropods (e.g. bettongs) should have housing that is predator-proof (e.g. from pythons and birds of prey) and may require wire-mesh roofing.

## 8.4 Pre-release housing

### Objective

To give a macropod the opportunity to regain its physical condition, acclimatise to current weather conditions and practise natural behaviour. At this stage of rehabilitation, interactions between the macropod and humans will be greatly reduced.

### Standards

- 8.4.1 Pre-release housing must provide sufficient space for the macropod to move about freely and express a range of natural behaviours.
- 8.4.2 Pre-release housing must provide areas where the macropod can gain exposure to prevailing weather conditions, and also areas where it can shelter.
- 8.4.3 Pre-release housing must contain habitat that enables the macropod to perform a range of natural behaviours. For example, kangaroos require open areas, locations for dust bathing, native vegetation for hiding and obstacles to jump over.
- 8.4.4 Pre-release housing must be designed and/or positioned so that exposure to humans is kept to the minimum required for observation, feeding and cleaning.
- 8.4.5 An area must be provided for pouches to be hung under cover.
- 8.4.6 Fresh clean water must be available at all times.

## Guidelines

- 8.4.7 Pre-release housing for small macropods (e.g. bettongs) should be a minimum of 6 metres long, 6 metres wide and have fencing 1.2 metres high.
- 8.4.8 Pre-release housing for medium-sized macropods should be a minimum of 30 metres long, 20 metres wide and have fencing 1.8 metres high (maximum 10 macropods). For each additional macropod in the enclosure over the maximum, increase the housing footprint by 60 square metres.
- 8.4.9 Pre-release housing for large-sized macropods should be a minimum of 60 metres long, 40 metres wide and have fencing 1.8 metres high (maximum 10 macropods). For each additional macropod in the enclosure over the maximum, increase the housing footprint by 240 square metres.
- 8.4.10 Pre-release housing for bettongs and potoroos should have an inward-facing overhang to stop the macropod from climbing.
- 8.4.11 Small macropods (e.g. bettongs) should have housing that is predator-proof (e.g. from pythons and birds of prey) and may require wire-mesh roofing.

## 9 Suitability for release

### Objective

To ensure the macropod is physically fit and has the appropriate survival skills prior to its release. Preparations for release will start at the time of rescue and continue throughout the rehabilitation process. Many species will gradually lose their survival skills in captivity, so it is vital their time in care is kept to a minimum.

### Standards

- 9.1.1 A macropod must not be released until it is physically ready.
- This status has been achieved when:
- it has recovered from any injury, disease and/or veterinary procedure
  - its weight and condition (i.e. body score) is within the appropriate range for that species, age and sex
  - it has appropriate fitness levels as determined by both passive observation and active assessment (e.g. by encouraging the macropod to exercise and noting recovery time)
  - it has acclimated to prevailing climatic conditions.
- 9.1.2 A macropod must not be released until it is behaviourally ready.
- This status has been achieved when:
- it can recognise and consume appropriate, naturally-available food and water
  - it can recognise and successfully avoid predators (including pets)
  - it is not attracted to humans (i.e. humanised) or to sights, sounds or smells that are specific to captivity (i.e. not imprinted)
  - it can navigate effectively through its natural environment
  - it can recognise and interact normally with other members of the same species (social species only).
- 9.1.3 A macropod's readiness for release must be confirmed by either a veterinarian or experienced macropod rehabilitator.

- 9.1.4 In cases where an animal is determined to be non-releasable, the wildlife rehabilitation provider must:
- consider euthanasia (see Section 5 Euthanasia), or
  - if euthanasia is not considered appropriate, contact OEH and apply for permanent care, or
  - notify OEH to arrange placement with an authorised animal exhibitor licensed by DPI.

#### **Guidelines**

- 9.1.5 Species that manipulate their physical environment (e.g. bettongs make a nest in grass, wallabies hide in native vegetation) should begin to exhibit this behaviour prior to release.

## **10 Release considerations**

### **10.1 Timing of release**

#### **Objective**

To ensure a macropod is released as soon as it is ready and at a time that minimises stress and maximises its chances of survival in its natural habitat.

#### **Standards**

- 10.1.1 Once a macropod is deemed ready for release, it must be released as soon as conditions are suitable (see Paragraphs 10.1.2 – 10.1.5 for suitable conditions).
- 10.1.2 A hand-reared macropod must be released based on both stage of development and its weight, and before sexual maturity. This will vary between species.
- 10.1.3 Social species that are hand-reared (e.g. kangaroos, wallaroos/euros) must be released near or into a mob.
- 10.1.4 A macropod must not be released during extremes of temperature and storms.
- 10.1.5 A macropod must be released at a time of day with adequate residual daylight to enable it to visually investigate its environment.

#### **Guidelines**

- 10.1.6 A macropod should be released at a time of year that facilitates survival and reintegration into the wild population. For example:
- Juvenile animals should be released during their natural dispersal period.
  - Omnivorous species (bettongs and potoroos) should be released during periods of high insect abundance (e.g. spring and summer).

### **10.2 Release site selection**

#### **Objective**

To ensure the wild population and natural environment are not negatively impacted by the release of the macropod and the released macropod has the highest likelihood of survival.

## Standards

- 10.2.1 If the exact location where the macropod was found is known and it is a suitable environment for release, it must be released there. A suitable environment for release is one that:
- contains appropriate habitat and adequate food and water resources
  - is occupied by members of the same species
  - does not place the animal at risk of injury or disease
  - has infrastructure for post-release support for macropods if required (see 12.3 Release techniques)
  - has no evidence of infection or health issues, e.g. babesia, within the wild population.
- 10.2.2 If the exact location where the macropod was found is known but it is an unsuitable environment for release, it must be released in a suitable environment as near as possible to this location.
- 10.2.3 If there is no information about where the macropod was found, it must not be released.
- 10.2.4 In cases where there is no suitable release site, the wildlife rehabilitation provider or licensed individual rehabilitator must:
- consider euthanasia (see Section 5 Euthanasia), or
  - if euthanasia is not considered appropriate, contact OEH and apply for permanent care, or
  - notify OEH to arrange placement with an authorised animal exhibitor licensed by DPI.
- 10.2.5 A macropod can only be released in a park if:
- it was originally encountered in that location
  - the release has written consent from the relevant Parks and Wildlife Area Manager (issued under clause 9 of the National Parks and Wildlife Regulation 2009)
  - the release complies with the relevant OEH policy on translocation.

These conditions also apply to the release of a macropod in a location where it might reasonably be expected to enter a park (e.g. on a road adjoining a park).

## Guidelines

- 10.2.6 A macropod should be released in an area that is connected to other suitable habitat.

## Note

Macropod rehabilitators who propose to release a macropod outside of these standards and guidelines may require a translocation approval from OEH. If the rehabilitator is unsure whether a translocation approval is required, they should contact OEH.

## 10.3 Release techniques

### Objectives

The use of release techniques that facilitate successful reintegration into the wild population.

The collection of information regarding the fate of a rehabilitated macropod after release so that the relative merits of different rehabilitation and release techniques can be compared.

## Standards

- 10.3.1 Hand-reared macropods that have been in care for extended periods of time and sedated for transport to a 'hard' release site must be monitored until all signs of sedation have worn off, to protect them from predators.

## Guidelines

- 10.3.2 Hand-reared macropods that have been in care for extended periods of time should be provided with temporary post-release support ('soft' release). This may include supplementary feeding, shelter provision or protection from predators.
- 10.3.3 Hard release is not the preferred release technique; however, if used the release site should be monitored after release.
- 10.3.4 Social species should be released with members of the same species.
- 10.3.5 Macropod rehabilitators should not release large numbers of individuals at a single location, as increased competition is likely to have a detrimental effect on the existing population.
- 10.3.6 Wildlife rehabilitators should arrange for macropods to be tagged, and/or microchipped for individual identification prior to release. Wildlife rehabilitation providers and zoological parks are encouraged to participate in post-release monitoring programs to determine survivorship.

## Notes

Fluphenazine decanoate (Modecate®) must not be used for macropods that are being hard released.

All research involving protected animals requires a BCL and approvals as specified in the *Animal Research Act 1985*.

# 11 Training

## Objective

To ensure wildlife rehabilitators are in possession of the appropriate knowledge and skills to safeguard the welfare of macropods in their care.

## Standards

- 11.1.1 New wildlife rehabilitators must undertake an introductory training course.
- 11.1.2 Wildlife rehabilitators must undertake specialist training, including the requirements of this Code, prior to caring for the species listed in Appendix 1.
- 11.1.3 All wildlife rehabilitators must attend a refresher training course every four years.
- 11.1.4 Training courses must:
- teach the standards and guidelines described in this Code
  - focus on what a person will be able to do as a result of completing the course (i.e. be competency-based)
  - teach the health and safety issues associated with macropod rehabilitation (e.g. disease transmission, managing hazardous chemicals and operating in dangerous locations and times)
  - have a written assessment component.
- 11.1.5 Wildlife rehabilitators must be assessed as competent in the relevant areas before undertaking rescue, rehabilitation or release of particular species.



- 11.1.6 Training must be accompanied by ongoing in-field support from an experienced macropod rehabilitator.

### **Guidelines**

- 11.1.7 Wildlife rehabilitators should have an understanding of:
- the objectives of macropod rehabilitation
  - wildlife ecology (e.g. population dynamics, habitat selection, competition, and predator–prey interactions)
  - animal behaviour (e.g. feeding, predator avoidance and social interactions)
  - how to keep accurate records.
- 11.1.8 Wildlife rehabilitators should be proficient in:
- species identification
  - macropod handling techniques
  - first aid for injured macropods
  - recognising the signs of disease, stress and recovery
  - animal husbandry.
- 11.1.9 All macropod rehabilitators should attend a macropod advance training seminar or advanced online course every three years.

## **12 Record keeping**

### **Objectives**

To maintain a database of macropods that have entered rehabilitation. Records of macropod admissions represent a vital resource for wildlife rehabilitation providers, OEH and research institutions. They can be used to develop better treatments, educate rehabilitators, identify statewide trends in incidents, identify threats and inform success of threat mitigation actions.

### **Standards**

- 12.1.1 Licensed wildlife rehabilitation providers must maintain a current register of all macropods reported, encountered or rescued.
- The register must contain the following information on each animal:
- encounter details (date, location, encounter circumstances, the animal's condition and unique ID number)
  - species data (species name, sex, stage of development, initial weight and pouch condition)
  - care providers (name and address of the initial assessor (see Paragraph 2.1.1), name and address of the macropod rehabilitator)
  - fate details (date, final disposition, location and any permanent marking).
- These records must be submitted to the Biodiversity and Wildlife Unit of OEH ([wildlife.licensing@environment.nsw.gov.au](mailto:wildlife.licensing@environment.nsw.gov.au)) in an approved electronic format on an annual basis.
- 12.1.2 Macropod rehabilitators must record the weight of macropods in their care so changes can be quickly identified (weighing frequency will depend on the type of care provided; see [Section 6.1](#) Monitoring).
- 12.1.3 When an individual macropod is transferred to another wildlife rehabilitator or organisation for any reason, copies of its records must be transferred with it.

- 12.1.4 If a macropod that is listed as threatened under the BC Act is identified ([Appendix 1](#)), the rehabilitation provider should enter the record on the OEH [BioNet](#) and notify the local OEH office.

### **Guidelines**

- 12.1.5 Macropod rehabilitators should record the following additional information at the time of rescue:
- who discovered the macropod (name and contact details)
  - when the macropod was discovered (time of day)
  - any treatment or food provided prior to transport.
- 12.1.6 Macropod rehabilitators should record the following additional information at the time of assessment by a veterinarian or experienced macropod rehabilitator:
- details of wounds, injuries, diseases and external parasites
  - details of mobility
  - details of abnormal behaviour
  - recommended management (e.g. care plan/treatment or euthanasia)
  - details of any treatments prescribed.
- 12.1.7 Macropod rehabilitators should record the following additional information at the time of entry into a rehabilitation facility:
- standard length measurements
  - identifying features if it is to be housed communally
  - housing (e.g. intensive care, intermediate) (see Section 8 Housing).
- 12.1.8 Macropod rehabilitators should record the following daily care information:
- details about the type and quantity of food/liquid ingested
  - details of treatment (e.g. medication, therapy)
  - details of instructions from veterinarians and species coordinators
  - details of changes to general fitness and behaviour
  - details from enclosure cleaning (e.g. quantity and quality of faeces/urine).
- 12.1.9 Macropod rehabilitators should record the following additional information regarding fate:
- if released, details about the type of release (hard or soft)
  - if released, details about the condition of the animal (e.g. weight).
- 12.1.10 Macropod rehabilitators should keep duplicates or backups of records to avoid information being lost.
- 12.1.11 If the death of a macropod is suspected to be the result of an act of cruelty the macropod rehabilitator should immediately contact their wildlife rehabilitation provider who will then advise the appropriate authorities.
- 12.1.12 If the death of a macropod is suspected to be the result of a serious disease outbreak, the macropod rehabilitator should immediately contact their group's Species Coordinator or relevant Executive Committee member to ascertain whether tissue analysis or a necropsy is required.

## 13 Recommended reading

Commonwealth of Australia 2008, *National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Non-commercial Purposes*, Department of the Environment, Water, Heritage and the Arts, Canberra ACT.

Dawson TJ 1995, *Kangaroos: Biology of the Largest Marsupials*, Cornell University Press, Ithaca, NY, USA.

DECCW 2010, *Rehabilitation of Protected Fauna Policy*, NSW Department of Environment, Climate Change and Water, Sydney NSW.

Frith HJ and Calaby JH 1969, *Kangaroos*, CSIRO Division of Wildlife Research, Cheshire Publishing Pty Ltd, Melbourne Canberra Sydney.

Hume ID 1999, *Marsupial Nutrition*, Cambridge University Press, Cambridge UK.

Richardson K 2012, *Australia's Amazing Kangaroos: Their Conservation, Unique Biology and Coexistence with Humans*, CSIRO Publishing, Collingwood VIC.

Tyndale-Biscoe H and Renfree M 1987, *Reproductive physiology of Marsupials*, Cambridge University Press, Cambridge UK.

Vogelneust L and Woods R (eds) 2008, *Medicine of Australian Mammals*, CSIRO Publishing, Collingwood VIC.

## Appendix 1: Macropod species relevant to this Code of Practice

Common name	Scientific name	BC Act 2016 NSW listing	EPBC Act 1999 <sup>1</sup> Federal listing
Western grey kangaroo	<i>Macropus fuliginosus</i>		
Eastern grey kangaroo	<i>Macropus giganteus</i>		
Red kangaroo	<i>Macropus rufus</i>		
Parma wallaby	<i>Macropus parma</i>	Vulnerable	
Whiptail wallaby	<i>Macropus parryi</i>		
Brush-tailed rock wallaby	<i>Petrogale penicillata</i>	Endangered	
Black-striped wallaby	<i>Macropus dorsalis</i>	Endangered	
Common wallaroo	<i>Macropus robustus</i>		
Euro	<i>Macropus robustus erubescens</i>		
Red-necked wallaby	<i>Macropus rufogriseus</i>		
Red-legged pademelon	<i>Thylogale stigmatica</i>		
Red-necked pademelon	<i>Thylogale thetis</i>		
Swamp wallaby	<i>Wallabia bicolor</i>		
Yellow-footed rock wallaby	<i>Petrogale xanthopus</i>	Endangered	Vulnerable
<b>Bettongs/Potoroos</b>			
Rufous bettong	<i>Aepyprymnus rufescens</i>	Vulnerable	
Tasmanian bettong <sup>2</sup>	<i>Bettongia gaimardi</i>	Presumed extinct	
Boodie, burrowing bettong (mainland) <sup>2</sup>	<i>Bettongia lesueur graii</i>	Presumed extinct	
Brush-tailed bettong (south-east mainland) <sup>2</sup>	<i>Bettongia penicillata</i>	Presumed extinct	
Northern bettong <sup>2</sup>	<i>Bettongia tropica</i>	Presumed extinct	
Long-footed potoroo	<i>Potorous longipes</i>		
Long-nosed potoroo	<i>Potorous tridactylus</i>		

<sup>1</sup> Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

<sup>2</sup> presumed extinct in NSW