

## **Recommended Guidelines for the Captive Management of Koalas (*Phascolarctos cinereus*) in South Australia.**

**Note:** The *Animal Welfare Act 1985* creates offences for persons who fail to provide appropriate and adequate, food, water, living conditions (whether temporary or permanent), or exercise, or fails to take reasonable steps to mitigate harm suffered by an animal in their care. In addition, the *National Parks and Wildlife (Wildlife) Regulations 2001* prescribes standards for keeping protected animals.

### **Disclaimer:**

This publication contains advisory information only. While considerable care has been taken in researching and compiling the information, neither the Department of Environment and Natural Resources nor the South Australian Government accepts responsibility for errors or omissions or for any decisions or actions taken on the basis of this document.

<b>CONTENTS</b>	<b>PAGE</b>
1. BACKGROUND INFORMATION	1
2. SCOPE	3
3. OBJECTIVES	3
4. GUIDELINE DETAILS	3
4.1 Koala Rehabilitation	3
4.2 Manner of Housing	5
4.3 Spatial Requirements	6
4.4 Enclosure Construction	6
4.5 Substrate and Drainage	6
4.6 Weather Protection	7
4.7 Gates, Doors and Slides	7
4.8 Enclosure Furniture	7
4.9 Electrical and Other Equipment	7
4.10 Indoor Housing of Animals	7
4.11 Hygiene	8
4.12 Behavioural Enrichment	8
4.13 Diet and Feeding	8
4.14 Adult Diet	9
4.15 Juvenile Diet	10
4.16 Hand Rearing Orphaned Joeys	11
4.17 Identification	13
4.18 Regular Health Checks	14
4.19 Carer and General Public Safety	14
4.20 Zoonotic Diseases	15
5. FURTHER INFORMATION	16
6. DEFINITIONS	18

**NOTE:** *These guidelines are to be read in conjunction with the “General Guidelines for the Management of Protected Wildlife in Captivity in South Australia”.*

## **1. BACKGROUND INFORMATION**

The Koala is a highly specialised arboreal marsupial which feeds primarily on *Eucalyptus* species. Other plant species may also be browsed depending on the age of the Koala, the location and the availability of preferred browse species. Because of the highly specialised feeding requirements and the unique physiology of Koalas, a person applying for a permit to hold a Koala must be able to show that they have had previous experience in caring for the species or that they will be supervised and assisted by a person with such experience and that they are capable of providing appropriate facilities and care.

Koalas were originally thought to be made up of three separate sub species, according to the State in which they occurred;

<i>Phascolarctos cinereus cinereus</i>	(New South Wales)
<i>Phascolarctos cinereus adustus</i>	(Queensland)
<i>Phascolarctos cinereus victor</i>	(Victoria)

Genetic studies have now shown that this assumption is incorrect and the variation in Koala populations is due to environmental conditions and that they are not separate sub species. However, the management of Koala populations has been split into two management units based on a number of genetic and physiological traits, with Koalas from NSW and Queensland being managed as a “Northern Management Unit” and the Victorian and South Australian populations being managed as a “Southern Management Unit”. The interbreeding of Koalas between the Northern and Southern populations is not allowed.

Wild Koala populations tend to be clustered around areas of “core” habitat which contain preferred food tree species, although food tree palatability is influenced by different soil conditions such as soil fertility, structure and moisture content. Adult Koalas generally live in discrete home range areas which vary in size depending on both the sex of the individual (males tend to have larger home ranges than females) and the quality of the habitat.

In South Australia Koalas were only found in the southeast of the State prior to European settlement, and were believed to have become locally extinct by 1920 due to hunting. Between 1920 and 1970 Koalas of Victorian provenance were introduced to a number of areas in South Australia, including Kangaroo Island, the Adelaide Hills, Eyre Peninsula and the Riverland.

Koala populations in Victoria also declined drastically during the early 1900s and by the 1930s the Koala on the Victorian mainland was thought to be confined to a few remnant populations in South Gippsland and the Mornington Peninsula. However, a few Koalas had been introduced to French Island and

Phillip Island in Western Port during the 1890s and early 1900s and those populations flourished.

Unfortunately, the stock used to found the French Island population around 1898 probably comprised between two and five animals, thereby creating a severe genetic bottleneck. Between 1923 and 1925, 18 Koalas from French Island were introduced to Kangaroo Island where they previously did not occur. Hence the Kangaroo Island Koala population has gone through a second severe genetic bottleneck and has very little genetic diversity. In the absence of natural predators and diseases, by 2001 the Kangaroo Island Koala population was estimated to have reached 27,000 animals and had caused severe defoliation of their preferred food trees.

In the 1960's about six Koalas were relocated from Kangaroo Island to the Mount Lofty Ranges and the Eyre Peninsula, and a further 19 Koalas from Kangaroo Island (and Queensland) were introduced to the Riverland. This has resulted in these populations being subjected to a third severe genetic bottleneck, with the Riverland population being made up of animals of mixed provenance. As a consequence, the level of genetic variation in South Australian Koala populations is significantly lower than that found in other States. This lack of genetic diversity means that they may be less likely to survive significant changes in their habitat, climate or disease status.



Releasing Koalas from French Island onto Kangaroo Island, 1925.

In the absence of natural predators and diseases, Koala populations have increased in some areas of mainland South Australia since their introduction. As a result, Koalas are frequently seen in suburban areas where they are subject to dog attack and vehicle accidents. Livestock may also harass and even kill Koalas that are attempting to cross paddocks. While these incidents do not significantly decrease Koala populations, they are of concern to

members of the public and create demands on the time of agency staff and wildlife carers.

## **2. SCOPE**

These guidelines apply to members of the public that apply for and/or obtain a DENR “rescue permit” for Koalas.

These procedures do not apply to Koalas held in;

- Zoological Institutions
- Veterinary Clinics
- Approved Research Programs
- Approved Population Management Programs

## **3. OBJECTIVES**

The objectives of these guidelines are to:

- Provide recommendations which protect Koala welfare, identify when it is not appropriate to return a Koala to the wild and to establish controls which assist in meeting conservation objectives; and
- Provide recommended guidelines for the maintenance of Koalas kept in captivity; and
- Ensure a consistent State wide process for the rescue, rehabilitation, release, captive holding and euthanasia of Koalas; and
- Provide a clear and consistent framework for DENR in developing and maintaining a partnership with wildlife rehabilitation groups and individuals in their approach to holding Koalas for any reason; and
- Ensure that holders of Koalas are appropriately endorsed and accountable for their activities, and that rehabilitation activities are undertaken in the most effective and efficient manner; and
- Contribute to the maintenance of biodiversity through the successful return of temporarily compromised Koalas to their natural environments where possible.

## **4. GUIDELINE DETAILS**

### **4.1 Koala Rehabilitation**

The Department of Environment and Natural Resources (DENR) Standard Operating Procedure for the Rescue and Release of Native Species states;

“There is no conservation value in releasing a common animal back to the wild, particularly if it is behaviourally, physically or otherwise impaired.”

However, this comment is qualified by the statement that;

“The welfare of an individual animal and the preservation of an individual animal’s life are intrinsically important.”

DENR recognises that the work of wildlife rehabilitators contributes to conservation through research, community education and promotion of a respect for native wildlife.

Rescue Permits for Koalas will only be issued to private individuals that can clearly demonstrate that they have the required expertise and resources available to them to effectively undertake the rehabilitation process.

All individual Koala Carers will be required to follow the directions and procedures provided to them by a Warden or other nominated DENR Officer. Under no circumstances may a private individual hold a Koala indefinitely.

Considerations for the keeping of orphaned, sick or injured Koalas include that carers must understand that:

- 1) The aim of keeping Koalas under a Rescue Permit is to rehabilitate and return the animals to prescribed habitat in the wild; and
- 2) Koalas are to be treated as wild animals and neither handled nor treated in a manner which domesticates or humanises them; and
- 3) If a Koala is unable to be rehabilitated to the wild it may need to be euthanased; and
- 4) Juvenile Koalas may be transferred to an approved zoological institution; and
- 5) A Warden may remove a Koala from private care at any time if legislative requirements are not being met or if the health or well-being of a Koala is compromised due to inappropriate care; and
- 6) The eventual fate of each Koala will be determined by a Warden or other nominated DENR Officer.

Koalas do not cope well with stress or trauma and often die from seemingly minor injuries. For this reason, if a private individual rescues a Koala, it must be assessed by a veterinarian, DENR Officer or approved carer as a matter of urgency.

Experience has shown that Koalas are difficult to hand-rear, extremely selective in their dietary requirements and rarely recover from serious diseases or significant injuries from dog attacks or motor vehicle accidents. They are difficult to handle, to adequately house and to feed appropriately. For all these reasons private individuals find Koalas very difficult to maintain.

Potential Koala carers will need to meet a number of requirements before a Rescue Permit is issued to them and must be able to demonstrate that they:

- Have successfully cared for orphaned, sick or injured Koalas or have extensive experience in the care of other orphaned, sick or injured marsupial species; and
- Can provide appropriate housing and facilities for rescued Koalas; and

- Have guaranteed access to adequate fresh supplies of leaves from at least three suitable Koala food tree species; and
- Unless alternative arrangements are identified, can establish and maintain a eucalyptus plantation sufficient to meet the need of all Koalas being held; and
- Have an ability to identify preferred Koala food trees, and must be capable of monitoring Koala reaction to offered food and the early detection of any deterioration of Koala health or condition; and
- Have the resources to acquire all necessary feeds, materials, veterinary services, medical supplies and equipment associated with the care of orphaned, sick or injured Koalas; and
- Have the ability and willingness to maintain and submit accurate records as required.

Each Koala must be assessed by a veterinarian, Warden or other nominated DENR Officer and certified as fit to return to the wild before it is released.

Further information in relation to the rescue, holding and release of Protected Wildlife can be found in the “General Guidelines for the Management of Protected Wildlife in Captivity in South Australia”.

#### **4.2 Manner of Housing**

- 1) Each Koala must be housed in a manner which does not pose a risk to:
  - Its wellbeing; or
  - Wild animals; or
  - The safety of carers; or
  - Other persons.
- 2) The size and shape of the enclosure must provide for:
  - Freedom of movement for the Koala, both vertically and horizontally; and
  - Sufficient space to enable it to be protected from undue dominance and conflict with the same or other species; and
  - Appropriate exercise opportunities; and
  - Its husbandry needs; and
  - The minimisation of stress.
- 3) The enclosure must be inspected and evaluated when feeding and cleaning to monitor hygiene levels and to detect potential housing problems.

### 4.3 Spatial Requirements

The following minimum enclosure sizes for maintaining adult Koalas in South Australia are based on industry standards.

South Australian Minimum Koala (adult) Enclosure Sizes.

1 x Koala: Minimum Enclosure Area (m <sup>2</sup> )	2 x Koalas Minimum Enclosure Area (m <sup>2</sup> )	Each Additional Koala > 2 Minimum Additional Area (m <sup>2</sup> )	Minimum Enclosure Height (m)	
20	30	10	Open Enclosure (wall height) 1.5	Totally Enclosed 2.4

### 4.4 Enclosure Construction

There are a number of general principles that should be followed in order to satisfy minimum conditions for the keeping of Koalas in captivity. Conditions include:

- 1) An enclosure must be constructed such that:
  - a) A Koala cannot escape in circumstances that can reasonably be foreseen and guarded against; and
  - b) The risk of injury to the Koala is minimised; and
  - c) Animal carers are safe if they comply with directions and/or warning signage; and
  - d) Koalas are not exposed to excessive noise or vibration.
- 2) Walls must be a height of at least 1.5 metres and constructed to prevent the escape of captive Koalas and prevent entry of wild animals.
- 3) The enclosures can be of an open, semi-enclosed or totally enclosed design.
- 4) Each enclosure must protect Koalas from interference by wild animals, domestic pets or people.
- 5) Enclosures must be maintained in good repair.

### 4.5 Substrate and Drainage

- 1) The substrate must not be abrasive or irritating to the animals. Suitable substrates include soil, smooth surfaced concrete or sand. Leaf litter can be used however it should not be placed under perches because it accumulates faeces and urine.
- 2) The substrate must be easily cleaned or replaced to avoid the accumulation of faeces and urine.
- 3) An enclosure must have an effective drainage system.
- 4) Open drains should be inaccessible to the Koalas, unless they only carry surface water.



#### **4.6 Weather Protection**

- 1) Sufficient shelter must be provided to allow protection from wind, rain and extremes in temperature.
- 2) Access to adequate shade during warm weather (i.e.  $>25^{\circ}\text{C}$ ) must always be provided. Consideration should be given to providing misting or other cooling techniques if ambient temperatures exceed  $30^{\circ}\text{C}$ .
- 3) Access to adequate sunning areas should be provided to allow the Koalas the opportunity to warm themselves during cold weather.

#### **4.7 Gates, Doors and Slides**

- 1) Entrances to an enclosure must be designed to minimise the potential for escape of enclosed Koalas or the entry of wild animals.
- 2) Entrances should facilitate ease of delivery and removal of feed, substrate and perching materials.
- 3) Entrances should be lockable to prevent unauthorised access to the enclosure.

#### **4.8 Enclosure Furniture**

- 1) Each enclosure must be fitted with stout branches and/or tree limbs with at least two resting forks per Koala not less than 1.5m above the ground and no closer than 0.9m to the next fork.
- 2) All supports and branches must give sufficient traction for Koalas to climb easily and safely.
- 3) Horizontally aligned limbs at a minimum height of 1.5 metres off the ground may also be used to connect the resting forks.

#### **4.9 Electrical and Other Equipment**

Electrical apparatus and other plant and fixed equipment must be installed so that:

- a) It does not endanger the animals or carers; and
- b) The animals cannot disrupt its operation; and
- c) It does not pose a fire risk.

**Note:** *No heating is required for Koalas unless they are held at temperatures that are constantly below  $0^{\circ}\text{C}$ .*

#### **4.10 Indoor Housing of Animals**

- 1) Lighting in indoor enclosures must be adequate to facilitate proper cleaning and to undertake routine health, hygiene and maintenance checks.

- 2) Indoor lighting should only be switched on for around 11 to 13 hours a day to simulate natural day-length.
- 3) Indoor housing for Koalas must be ventilated such that:
  - a) The health of the Koala is maintained; and
  - b) Undue draughts, odours and moisture condensation are minimised.
- 4) Adult Koalas are not to be housed in domestic dwellings.

#### **4.11 Hygiene**

- 1) Excrement and other animal waste, leftover food, rubbish and foreign objects should be removed daily to minimise vermin infestation, disease hazards and to prevent the ingestion of potentially harmful objects.
- 2) Soil and sand substrates should be raked daily and concrete substrates should be hosed daily to remove faecal and urine contamination.
- 3) Contaminated substrate material must be removed and replaced as necessary.
- 4) Supports and branches should be replaced as necessary and be maintained in a clean and hygienic condition, free from the accumulation of faeces and urine.
- 5) All gum pots should be emptied and refilled daily to keep the water fresh.
- 6) When disinfecting solid surfaces within the enclosure these surfaces should be rinsed before animals come in contact with them again. The disinfectants are to be of a kind approved by, and used in compliance with, veterinary advice or label instructions.

#### **4.12 Behavioural Enrichment**

Koalas generally don't display stereotypic behaviour, however some individuals may pace near the enclosure entrance prior to being fed.

Movement of individual Koalas can be maximised and conflict minimised by ensuring adequate forks for feeding and resting and a number of cross branches.

#### **4.13 Diet and Feeding**

It can be difficult to provide captive Koalas with adequate fresh eucalypt leaves. Some carers have harvested eucalypt from remnant eucalypt forest close to their facility which has led to excessive pruning of significant vegetation remnants. A permit is required to collect vegetation from Parks and Reserves.

Koalas eat about 10% of their body weight in eucalypt leaves every day, and a large male can consume up to 1.5kg of leaves every day.

- 1) A person applying for a permit to hold Koalas must demonstrate that they have guaranteed access to adequate supplies of fresh leaves from at least three suitable Koala food tree species. This is important because different species can be susceptible to insect attack at particular times of the year.
- 2) Unless alternative arrangements are identified, applicants must establish and maintain a eucalyptus plantation sufficient to meet the needs of all Koalas to be held.
- 3) A person proposing to care for Koalas must be able to identify preferred Koala food trees, monitor Koala reaction to the food that is offered and quickly detect any deterioration of Koala health or condition.
- 4) The frequency of leaf cutting and the operation of leaf storage facilities must ensure that Koalas receive palatable, uncontaminated and nutritionally adequate eucalypt leaves.
- 5) The preferred species of eucalypt should be supplemented with a variety of different species as a precaution against local or seasonal differences in digestibility and palatability of the leaves. Both young and mature leaves should be provided.
- 6) A sufficient quantity of eucalypt leaves must be within reach of Koalas sitting in the resting forks. This browse must be secured with the cut ends in clean water and be replaced at least once daily.
- 7) Either fresh soil (but not around the base of perches) or a mineral salt lick must be provided to supplement the mineral intake of the Koalas.

#### **4.14 Adult Diet**

The nutritional value of eucalypt leaves is very low, so Koalas need to eat a lot of it to meet the nutritional requirements. Because of the low energy output of their diet, they sleep around 14 hours per day to conserve energy. Koalas also have low body fat reserves and a loss of appetite for any reason can lead rapidly to loss of body condition, dehydration and susceptibility to secondary infections. It is therefore critical that an adequate diet is provided at all times.

Koalas have a highly developed sense of smell which allows them to select leaves based upon their scent. Of the estimated 600-800 species of eucalypt in Australia, Koalas will only browse from 40-50 species, and this number becomes even more limited in local areas. Eucalypt species known to be suitable as Koala food in South Australia include;

- Brown Stringybark (*Eucalyptus baxterii*)
- River Red Gum (*E. camaldulensis*)
- Cup Gum (*E. cosmophylla*).
- Tasmanian Blue Gum (*E. globulus*)
- SA Blue Gum (*E. leucoxylon*)
- Narrow-leafed Black Peppermint (*E. nicholii*)

- Messmate Stringybark (*E. obliqua*)
- Peppermint Box (*E. odorata*)
- Swamp gum (*E. ovata*)
- Manna Gum (*E. viminalis*)
- Rough-barked Manna Gum (*E. viminalis cygnetensis*)

All browse should be fed out as fresh as possible, with no obvious signs of wilting. Browse should be stored for a maximum of one week or until the condition of the leaves has deteriorated. Browse should be stored in clean water (changed at least weekly) either in a refrigerated area at 4 to 5°C, or in an enclosed location that is shaded and has an overhead sprinkler system.

Leaves must be changed daily, preferably in the afternoon to prevent them from drying out during the day. This is particularly important during hot weather as the Koalas generally won't feed until the temperature cools down in the evening.

Eucalyptus leaves contain tannins and other compounds that are toxic to most animals, however Koalas have evolved a unique digestive process that allows them to digest the leaves without harm. Eucalyptus leaves contain large amounts of cellulose, a complex carbohydrate that is difficult to digest. Chewed leaves pass to the stomach where non-cellulose particles are digested. The cellulose residues then pass through the 2 metre long caecum which contains bacteria that ferment the cellulose, breaking it down into simpler products that the Koala can then absorb.

Part of the skill of successfully maintaining Koalas involves knowing which species of gum is the most appropriate to feed at different times of the year. Factors that appear to be involved in the palatability of different species of eucalypts include the fibre content of the leaves and the level of eucalypt oils, phenols and other toxic compounds found in the leaves. Winter poses nutritional stress on Koalas, as there is very little new growth available and most of the leaves are older and fibrous. It is important at this time to supply as wide a choice of species available as possible.

Koala kidneys conserve water very efficiently whilst extracting the toxic tannins and other compounds that are found in eucalyptus leaves. Koalas usually obtain all of their fluid requirements from the leaves they eat, and will quickly become dehydrated if they do not consume enough leaves to meet their moisture requirements. Dehydration results in the kidneys becoming stressed and not being able to function as effectively and the Koala may drink water and urinate in large volumes. This generally indicates that the Koala is suffering from renal failure and will require veterinary attention or euthanasia. Koalas may also drink water in excessively hot weather.

#### **4.15 Juvenile Diet**

Around six months of age a juvenile Koala will consume pap from the cloaca of its' mother. Pap is a form of semi digested faeces that inoculates the gut of the juvenile with the microbes necessary to digest eucalypt leaves.

Juvenile Koalas are normally dependant upon their mothers until they are around 12 months of age when they become fully weaned and capable of living independently.

From six to 12 months of age juvenile Koalas will increasingly consume more leaf material and less milk from its mother. Around this age they may consume the leaves of other non-eucalypt species such as *Acacia*, *Leptospermum*, and *Melaleuca*, and eat the bark of species such as Messmate (*Eucalyptus oblique*). The inclusion of these items in the diet of juveniles may be due to a lack of experience or it may assist in the establishment of the gut flora required to digest eucalypt leaves.

#### **4.16 Hand Rearing Orphaned Joeys**

Juvenile Koalas are normally dependant upon their mothers until they are about 12 months of age. If a juvenile is separated from its mother before it is mature enough to survive on its own, intervention will be required to support it until it can live freely in the wild.

Rearing orphaned Koalas is a specialised skill that requires a thorough knowledge of their development stages, their changing needs and normal behaviour. Joeys are often injured if their mother suffered traumatic injuries and require very close observation and treatment to be rehabilitated.

Koala joeys are more difficult to hand rear than other marsupial species, and prior to being considered as a Koala carer an applicant must have experience with rearing other marsupials to gain an understanding of both the process and likely problems. Many orphaned joeys fail to survive.

A potential carer must also have;

- The ability to listen, learn and seek advice from more experienced carers; and
- Daily access to fresh, suitable eucalyptus species; and
- Dedication to the role of hand raising an orphan which can be a 24 hour task for up to eight months.

Koala joeys will not be entrusted to inexperienced carers. To gain the skills required, all potential carers must work with a Koala carer experienced in hand rearing joeys. The smaller the orphan the more difficult it is to rear successfully and all carers need to gain experience with older animals before attempting to rear smaller ones.

The age and condition of the Koala coming in to care is the primary consideration when matching animals to suitable carers. The following is a guide to the experience required to be considered as a Koala carer;

- Independent animal no less than 2.5 kg in weight (approximately 12 months of age) - first time Koala.
- After success with above – joeys between one and 1.5 kg in weight (approximately nine to 12 months of age).

- After success with above – joeys between 500 and 1000 grams in weight (approximately six to nine months of age).
- Less than 500 grams in weight (approximately six months of age) – only very experienced carers.

Koala joeys have been reared from as little as 39 grams, but to rear them from this age is very difficult and should only be undertaken by a Koala carer who is highly experienced in rearing unfurred joeys.

All potential Koala carers should begin with an independent animal to learn to differentiate normal from abnormal behaviour, before attempting to rear a joey. Joeys that are not thriving may need to be transferred to a more experienced carer.

Hand reared Koala joeys must be able to survive after they are released back into their natural habitat. Joeys that have been hand reared inappropriately are often unsuitable for release, and unless a place can be found for it within an accredited Zoo or Wildlife Park the animal may have to be euthanased. The private keeping of a Koala is not permitted in South Australia without a Zoo licence.

Koala joeys require a low lactose milk formula, such as Di-Vetelact, Biolac or Wombaroo Koala Replacer (see [Further Information](#)). The use of cows' milk is not an acceptable substitute, however Koala joeys have been successfully raised on human infant soymilk formulas. It is considered by many carers that Biolac and Di-Vetelact may be better products for new time carers, however Wombaroo gives better growth rate and hair quality than any other milk formulas.

The quantity of milk replacer required depends on the age of the joey, the quantity of leaves being eaten, and the ease with which the joey is taking the milk. Manufacturers' directions must be followed to ensure that the correct milk formula, concentration and amounts are fed, all of which are dependant on accurately assessing the age of the joey. As a general rule, a joey should gain about 50-100g per week. Failure to gain weight could indicate illness, or under nourishment.

When a joey comes into care it is important to identify whether or not it has consumed pap already. Generally if a young Koala has started eating leaves, it has already eaten pap from its mother. A way of determining if a Koala has consumed leaves (and therefore pap) is by checking for green/brown staining on the erupted cheek teeth or plant cell walls in faecal smears.

If the joey has not consumed pap, it is important that at about six months of age it is offered substitute pap from a female Koala with a pouch young of similar age. If pap is not available, fresh faeces from a healthy adult Koala can be collected, mixed into a slurry and fed to the joey.

A Koala carer must establish and maintain a record sheet for each Koala. Basic records should include at least the following information;

- Date of receipt
- Age at time of receipt
- Weight on receipt and at least twice weekly thereafter
- Body measurements on receipt and at least twice weekly thereafter
- Sex
- Distinguishing marks (if any)
- Parentage (if known) and location of rescue
- Housing (pouches, heat source, cages etc)
- Detailed records of treatments and veterinary medications

Daily records should also include items such as time fed, quantity given, any change in formula or introduction of solids, frequency of urine and faeces, consistency of faeces, and behavioural notes. Records are to be submitted on a weekly basis to assess and identify any issues as quickly as possible.

Joeys under 6-7 months of age require an artificial pouch to simulate, as closely as possible, the security and warmth of a natural pouch. The housing and temperature requirements are dependant upon the age of the joey. Pouch young should be placed in an artificial pouch near a heat source and placed in a quiet location. Furred young should be kept at around 28<sup>0</sup>C and furless young at around 30<sup>0</sup>C.

Good hygiene is critical to the survival of a Koala joey. This includes;

- Personal hygiene
- Wash hands between feeding different joeys
- Boiled water should be used when making up formulas for young joeys
- Spilt milk formula, faeces and urine should be cleaned from the joeys skin and fur as soon as possible then dried
- Clean pouch lining at all times
- All feeding equipment should be washed with detergent after use, then rinsed, then soaked in a suitable disinfectant until the next feed, then rinsed again before being refilled
- Milk should only be heated up once and leftovers discarded
- Contact with other animals should be avoided
- Stimulate to toilet before or after feeding
- Water containers must be cleaned and replenished daily

#### **4.17 Identification**

Unless distinguishing marks or features are documented in the animal records, it may not be easy to identify an individual animal housed with others of the same species. A permanent method of identification may be required for individual animals. The preferred method of identification is a microchip implanted subcutaneously between the scapulae and to the left of the spine. This can be undertaken by an experienced carer or veterinarian.

#### **4.18 Regular Health Checks**

- 1) The health of each Koala must be checked each day.
- 2) In particular, a record should be made if an animal shows:
  - a) Obvious under-nourishment or weakness; or
  - b) Keratoconjunctivitis; or
  - c) Pneumonia; or
  - d) Discharges from the nose, eyes or cloaca; or
  - e) Dermatitis or bare spots in fur; or
  - f) Persistent diarrhoea or no faeces being passed; or
  - g) Heat stress or dehydration; or
  - h) Wetness of the cloaca or rump; or
  - i) Excessive, smelly or cloudy urination; or
  - j) Sores or open wounds; or
  - k) Broken bones, limps or other physical injury.
- 3) A potential carer must be able to recognise signs of pain and ill-health in a Koala.
- 4) If a Koala is in poor physical health, all reasonable steps must be taken to treat the condition. If treatment is not possible or unlikely to succeed, the Koala must be euthanased. Treatment or euthanasia must be on the recommendation of a veterinarian, Warden or other nominated DENR Officer.

Koalas of all ages show few signs of illness and/or stress. Very sick Koalas will often curl up in a ball and sit very quietly even when approached. People that are inexperienced in Koala husbandry and management often believe that the animal is “lovely and quiet” and will want to pat them. This adds to the stress levels that a sick animal is experiencing and will hasten its’ demise.

Koalas are prone to heat stress during summer and may become lethargic and develop loose, very dry skin on the nose. Koalas should be checked frequently when temperatures exceed 30°C. Heat stress can be reduced by placing a sprinkler where it will spray the perches in approximately one-third of the enclosure.

Chlamydia is a genus of bacteria that is responsible for reproductive diseases in a range of mammals, and in other states it has been implicated in a number of signs of diseases in Koalas including infertility, rhinitis, pneumonia, urinary cystitis, nephritis, cystic ovaries, conjunctivitis and keratoconjunctivitis. These infections are often associated with the "wet bottom" or "dirty tail" syndrome.

#### **4.19 Carer and General Public Safety**

Enclosures shall be constructed of such materials and be maintained in sufficiently good repair to ensure that they will contain the animals at all times and are to be safe for the animals and carers.

Perches and other branchwork in the enclosure should be placed in such a manner as to avoid hazards for the carers and Koalas held.



Members of the public who find an injured Koala are usually eager to help it. However, Koalas are powerful animals and can cause serious injury if handled by inexperienced people. Male Victorian Koalas reach an average weight of 12.0kg (9.5 – 14.9kg) and adult females average 8.5kg (7.0 - 11.0kg). They have strong jaws and sharp claws and can inflict painful wounds which can lead to infections. Even a sub adult Koala can inflict considerable damage. Any wound should be cleaned and covered as soon as possible and, if it is significant, medical assistance should be sought. If a person is inexperienced or not confident to handle the Koala, they should contact the “Koala Hotline” for advice (see [“Further Information”](#)) and not attempt to handle it.

If the situation is dangerous for humans as well as the Koala, (e.g. in the middle of the freeway or in the vicinity of fast moving traffic), people should leave the Koala where it is and contact made with the “Koala Hotline” for further advice (see [“Further Information”](#)). People have been killed when attempting to help Koalas in such situations, and human safety must be the primary consideration at all times.

#### **4.20 Zoonotic diseases**

Zoonotic diseases are diseases which can be transferred from animals to humans. Animals infected with zoonotic diseases do not always show symptoms and may not appear to be sick.

Zoonotic diseases recorded in Koalas include;

- Salmonellosis
- Cryptococcus
- Ectoparasites

Some zoonotic diseases are extremely serious and potentially life-threatening, while others cause only transient, mild disease. Carers should become familiar with the signs of infectious disease and ensure that hygiene protocols are in place to restrict the spread of any infectious outbreak.

## 5. FURTHER INFORMATION

### **Captive Husbandry:**

Koala Husbandry Manuals and Guidelines;

<http://www.australasianzookeeping.org/Husbandry%20Manuals%20-%20Mammals.htm>

Behavioural Enrichment Guidelines;

<http://www.australasianzookeeping.org/Husbandry%20Manuals%20-%20Rearing,%20Training%20&%20Enrichment.htm#Enrichment>

Hand Rearing Guidelines;

<http://www.australasianzookeeping.org/Husbandry%20Manuals%20-%20Rearing,%20Training%20&%20Enrichment.htm#Rearing>

### **Contacts:**

Koala Hotline

(08) 8273 5110

DENR Fauna Permit Unit

1 Richmond Road,

Keswick, SA, 5035.

Phone: (08) 8124 4972

Fax: (08) 8124 4939

<http://www.environment.sa.gov.au/biodiversity/faunapermits/>

### **List of Suppliers:**

Biolac.

(Hand Raising Formula and Equipment)

P.O. Box 93,

Bonnyrigg Plaza, New South Wales, 2177.

Ph: (02) 9823 9874

Fax: (02) 9823 9874

Email: [biolac@optusnet.com.au](mailto:biolac@optusnet.com.au)

Web: <http://www.biolac.com.au/>

Sharpe Laboratories Pty Ltd.

(Di-Vetelact Hand Raising Formula)

12 Hope Street,

Ermington, New South Wales, 2115.

Ph: (02) 9858 5622

Fax: (02) 9858 5957

Email: [admin@sharpelabs.com.au](mailto:admin@sharpelabs.com.au)

Web: <http://www.sharpelabs.com.au/>

Wombaroo Food Products  
(Hand Raising Formula and Equipment)  
P.O. Box 151,  
Glen Osmond, South Australia, 5064.  
Ph: (08) 8391 1713  
Fax: (08) 8391 1713  
Email: [Wombaroo@adelaide.on.net](mailto:Wombaroo@adelaide.on.net)  
Web: <http://www.wombaroo.com.au/>

**Other:**

Koala Browse Plantation Guide  
Compiled by Colin Knight (2004).  
The Koala Browse Plantation Guide provides information on planning,  
establishing and maintaining a Koala browse plantation.  
Price: AU\$33 (incl. GST)  
Order from: <http://www.arazpa.org.au/publication-order/default.aspx>

## **6. Definitions**

### **Carer:**

An individual who has responsibility for the care and rehabilitation of a native animal under a rescue permit, or that has responsibility for the care of a native animal under a permit to keep.

### **Zoonoses:**

Any disease or infection that is naturally transmissible from vertebrate animals to humans and vice-versa. They are caused by all types of agents: bacteria, parasites, fungi, viruses and unconventional agents.