

### Natural History / Behaviour

- Have a very powerful kick and can cause significant human injury
- Adult macropods difficult to restrain manually – should be chemically restrained for transport/treatment for safety
- Adult macropods have a poor prognosis following trauma-related incidents – assessment should be made quickly, and humane euthanasia sought if appropriate
- Macropods suffer from myopathy easily – minimise stress and refer to appropriate carer/facility immediately
- Orphaned macropods should be treated prophylactically for myopathy – refer to Injury and Disease section (below)
- Marsupials – always check for pouch young
- Never pull a joey off the teat, remove very gently or cut the teat and pin to the inside of a cotton pouch liner
- Unfurred joeys require regular feeding (every 3-4 hours)

### Common Species of South-east Queensland

Weights are average only and are for sub-adult to adult animals.

Red-necked Wallaby	<i>Macropus rufogriseus</i>	15 kg
Agile Wallaby	<i>Macropus agilis</i>	15 kg
Black-striped Wallaby	<i>Macropus dorsalis</i>	12 kg
Whiptail Wallaby	<i>Macropus parryi</i>	16 kg
Swamp Wallaby	<i>Wallabia bicolor</i>	15 kg
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	50 kg
Red-legged Pademelon	<i>Thylogale stigmatica</i>	5 kg
Red-necked Pademelon	<i>Thylogale thetis</i>	6 kg
Rufous Bettong	<i>Aepyprymnus rufescens</i>	3 kg
Long-nosed Potoroo	<i>Potorous tridactylus</i>	1 kg

### Basic Rescue Equipment and Emergency Housing

#### Adults / Sub-Adults

- Large strong bags (made from thick cotton or light-weight canvas) - 1m x 1m suitable for average-sized adult wallabies or small kangaroos
- Strong tie to secure bag
- Thick blankets to capture/restrain and as bedding for transport

**Note:** Adult macropods should not be transported in a vehicle unsedated – chemical restraint required. Contact Trauma Carer or veterinarian.

#### Orphaned Joeys

- Warm outer pouch (feather pouch, thick wool or cotton pouch)
- Inner pouches (liners) x 3 (lined within themselves)
- Plastic carry basket lined with towels or small baby blankets; or
- Hanging cotton bag (preferred for furred pouch young)
- Heat source: Hot water bottle, instant heat packs, Snugglesafe, electric heat pad or ICU
- Probe thermometer to monitor ambient pouch temperature

# OHS Considerations / Zoonoses

## Beware of

- Hind legs
- Front claws
- Teeth

## Known Zoonotic Diseases

- E. coli and Salmonella are shed in faeces. Shedding thought to increase during summer.
- Q Fever - (wear disposable gloves where blood present. There is a small risk of contracting Q Fever so wear protective equipment where possible.

## Handling

### Adult Macropods - Medium to Large

(Adult kangaroos and wallabies)

These need to be **chemically restrained** – contact a Trauma Carer or licensed person with dart/tranquilizer gun.

### Adult Macropods - Small

(Small wallabies, small kangaroos and pademelons)

Grab the base of the tail near the rump and lift off the ground directing the legs away from your body. Support the chest with the other hand and face the legs away from you and others.

Have someone else hold the bag open and place head first directing the body into a supine U-shape and secure the bag closed.

*Photo: Karen Scott*



## Orphans

Small joeys can be cupped in your hand and placed into a pouch. Keep joeys in a pouch at all times.

Older joeys can be handled in the same manner as adults above.



*Photo: Roy Webster*



*Photos: Wildcare Australia Inc.*

## Emergency Diet

Do not offer any food or water to an animal suffering from injury (e.g. vehicle hit, dog/cat encounter etc). Injured wildlife must be presented to a veterinarian for treatment before offering food or water. Alternatively, please consult with your relevant Species Coordinator.

### Adults

- Grass and native herbs and vegetation
- Fresh water

**Note:** Adults will need to be kept sedated. Do not offer food when sedated.

### Orphans

- Water and Glucodin (initially for first 2 feeds); then
- Suitable milk replacer (Divetelact®, Biolac M100® or M150®) or Wombaroo® Kangaroo Milk Replacer)
- Grass and native herbs and vegetation – just-furred and onwards

## Myopathy

Reference: 'Medicine of Australian Mammals' 2008, CSIRO Publishing.

Captive and free-ranging macropods are highly susceptible to developing capture myopathy post capture or restraint. Capture myopathy results from muscle ischemia (secondary to sympathetic nervous system stimulation and reduced tissue perfusion during stress), lactic acidosis and depletion of muscle ATP (molecule responsible for energy in muscle cells). Muscle fibres break down and release their contents into the blood stream. As a consequence, high levels of potassium, a muscle protein "myoglobin" and other toxic compounds build up in the blood causing potentially fatal metabolic problems.

Conditions associated with capture myopathy include cardiovascular and circulatory collapse (sometimes sudden death due to heart muscle damage), muscular compartment syndrome and acute renal failure secondary to ischaemia and myoglobin release from damaged muscle cells that subsequently damages the kidney tubules and impairs their function.

Macropods that survive the initial episode may die per-acutely following a second exertion or stressful event.

Symptoms:

- Dyspnoea – difficulty or laboured breathing
- Increased respiration rate
- Rapid heart rate (tachycardia)
- Hyperthermia
- Muscle tremors and fasciculations
- Weakness
- Inability to hold head or stand
- Stiff gait
- Myoglobinuria (blood products in urine)
- Death can occur suddenly or days or weeks after the event

To reduce the risk of capture myopathy, all macropods should be effectively and quickly restrained and sedated (except pouch young) immediately for transportation, handling and examination.

**All sub-adult and adult macropods should be sedated at all times in veterinary care to reduce the risk of myopathy onset. Keeping sub-adult and adult macropods in cages or confined spaces is extremely stressful and is enough to trigger the onset of capture myopathy.**

It is advised that in most cases, adult macropods (particularly those rescued and transported without sedation) admitted to a veterinary clinic should be euthanised immediately on humane grounds due to the very high likelihood of capture myopathy and myopathy induced medical conditions.

# Assessment Checklist – Macropods

Clinical Signs	Healthy / Normal	Sick / Injured
<b>Demeanour</b>	<ul style="list-style-type: none"> <li>Bright, alert and looking around</li> <li>Responsive (struggles strongly when handling)</li> <li>Responsive to stimuli (e.g. noises)</li> <li>Conscious</li> <li>Vocalises aggressively</li> <li>Tries to kick</li> </ul>	<ul style="list-style-type: none"> <li>Quiet / depressed</li> <li>Distressed</li> <li>Reduced response when handled</li> <li>Not responding to stimuli</li> <li>Unconscious</li> <li>Teeth grinding</li> <li>Crying (orphans)</li> <li>Licking forearms (<i>overheated / stress</i>)</li> <li>Excessive salivation (<i>stress/myopathy</i>)</li> </ul> <p>(Indicative of shock, dehydration, injury, stress myopathy)</p>
<b>Mobility / Limbs</b>	<ul style="list-style-type: none"> <li>Able to move all limbs and stand</li> <li>No bruising or swelling</li> <li>No obvious abnormalities or lack of symmetry</li> </ul>	<ul style="list-style-type: none"> <li>Abnormalities in movement (e.g. unable to stand, only using front legs, unable to weight bare on a back leg, dragging a limb, falling over, swaying)</li> <li>Floppy head/neck (<i>myopathy</i>)</li> <li>Muscle twitching (<i>myopathy</i>)</li> <li>Legs and spine stiff (<i>myopathy</i>)</li> <li>Head tilted to one side (<i>head injury</i>)</li> <li>Paralysis (<i>trauma</i>)</li> <li>Swelling (<i>trauma or old injury</i>)</li> </ul> <p>(Indicative of trauma related injury)</p>
<b>Body Condition</b>	<ul style="list-style-type: none"> <li>Good body condition</li> <li>Good muscle tone (note – pouch young will not have much muscle tone yet)</li> <li>Fur in good condition</li> <li>Non-odorous smell</li> </ul>	<ul style="list-style-type: none"> <li>Open wounds</li> <li>Puncture wounds</li> <li>Poor body condition (<i>malnourished</i>)</li> <li>Lack of muscle tone</li> <li>Offensive odour (chronic disease or old wounds)</li> <li>Missing fur (<i>trauma</i>)</li> <li>Bruising (<i>trauma</i>)</li> <li>Wart-like lesions (<i>pox virus</i>)</li> </ul> <p>(Indicative of trauma or chronic illness/disease)</p>
<b>Breathing</b>	<ul style="list-style-type: none"> <li>Normal (handling may result in increased respiration rate)</li> </ul>	<ul style="list-style-type: none"> <li>Open-mouthed breathing</li> <li>Laboured (noticeable effort to breath)</li> <li>Audible breathing sounds (clicking, ticking, gurgling sounds)</li> <li>Sneezing or coughing</li> <li>Shaking head (<i>possible obstruction or head injury</i>)</li> </ul> <p>(Indicative of trauma related injury, poisoning)</p>
<b>Head</b>	<ul style="list-style-type: none"> <li>Symmetrical</li> </ul>	<ul style="list-style-type: none"> <li>Abnormal symmetry</li> <li>Indentations</li> <li>Swelling</li> <li>Crepitation</li> <li>Lacerations/abrasions</li> </ul> <p>(Indicative of trauma related injury)</p>
<b>Eyes</b>	<ul style="list-style-type: none"> <li>Bright and clear</li> <li>Shiny</li> <li>Eyes open</li> </ul>	<ul style="list-style-type: none"> <li>Dull (<i>pain/dehydration</i>)</li> <li>Sunken (<i>dehydrated</i>)</li> <li>Closed (<i>pain/dehydration</i>)</li> <li>Protrusion (<i>trauma</i>)</li> <li>Swelling (<i>trauma</i>)</li> <li>Clear fluid (<i>trauma</i>)</li> <li>Nystagmus (<i>head trauma</i>)</li> <li>Unequal pupil(s) (<i>trauma</i>)</li> <li>Unreactive pupil(s) (<i>trauma</i>)</li> <li>Purulent discharge (<i>infection</i>)</li> </ul>

## Assessment Checklist – Macropods (continued)

Clinical Signs	Healthy / Normal	Sick / Injured
<b>Nose</b>	<ul style="list-style-type: none"> <li>• Straight</li> <li>• No discharge or bleeding</li> </ul>	<ul style="list-style-type: none"> <li>• Distorted (<i>trauma - fracture</i>)</li> <li>• Blood or other discharge (purulent infection) from nostrils (<i>trauma</i>)</li> <li>• Abrasions (<i>trauma</i>)</li> <li>• Swelling (<i>trauma</i>)</li> </ul>
<b>Mouth</b>	<ul style="list-style-type: none"> <li>• No discharge</li> <li>• Symmetrical</li> <li>• Teeth and tongue undamaged</li> </ul>	<ul style="list-style-type: none"> <li>• Misaligned jaw (<i>trauma</i>)</li> <li>• Broken teeth (<i>trauma</i>)</li> <li>• Blood (<i>trauma</i>)</li> <li>• Swelling (<i>trauma</i>)</li> <li>• Crepitation (<i>trauma</i>)</li> <li>• Pale mucous membrane (<i>shock/dehydration</i>)</li> <li>• Slow capillary refill time (<i>shock/dehydration</i>)</li> </ul>
<b>Ears</b>	<ul style="list-style-type: none"> <li>• No discharge</li> <li>• Lice (small quantity normal)</li> </ul>	<ul style="list-style-type: none"> <li>• Blood</li> <li>• Clear fluid</li> </ul> <p>(Indicative of trauma related injury)</p>
<b>Fur</b>	<ul style="list-style-type: none"> <li>• Shiny and in good condition</li> </ul>	<ul style="list-style-type: none"> <li>• Dull, matted fur (<i>chronic condition</i>)</li> <li>• Patchy or missing fur (<i>dog attack, road trauma</i>)</li> <li>• Wet patches of fur (<i>dog attack</i>)</li> <li>• Fungal infections (<i>chronic illness</i>)</li> </ul>
<b>Cloaca (vent) Pouch / Scrotum</b>	<ul style="list-style-type: none"> <li>• Clean</li> <li>• Free from discharge</li> <li>• Penis not protruding</li> </ul>	<ul style="list-style-type: none"> <li>• Blood (<i>trauma</i>)</li> <li>• Lacerations (<i>trauma</i>)</li> <li>• Swelling (<i>trauma</i>)</li> <li>• Pouch – check for joeys</li> <li>• Penis – protruding (<i>trauma</i>)</li> </ul> <p>(Indicative of trauma related injury)</p>
<b>Tail</b>	<ul style="list-style-type: none"> <li>• Straight</li> <li>• Good muscle tone (particularly for kangaroos)</li> </ul>	<ul style="list-style-type: none"> <li>• Swelling</li> <li>• Lacerations, abrasions (<i>trauma</i>)</li> <li>• Lack of movement (<i>old injury</i>)</li> <li>• No movement (<i>lower spine injury</i>)</li> </ul> <p>(Indicative of trauma related injury)</p>
<b>Parasites</b>	<ul style="list-style-type: none"> <li>• Some ticks are normal</li> <li>• Some flat flies are normal</li> </ul>	<ul style="list-style-type: none"> <li>• Overabundance of ticks, flat flies and/or lice (<i>chronic illness</i>)</li> <li>• Fly blown/maggots (<i>trauma</i>)</li> </ul>



# Assessment Parameters

## Vital Signs

Heart Rate	60 - 150 beats per minute
Respiration Rate	10 - 30 breaths per minute
Core Body Temperature	35°C – 36.5°C

## Preferred Ambient Temperature

Adults and Sub-Adults	28°C
Orphans – Just furred to furred	28°C - 30°C
Orphans – Unfurred	32°C

## Signs of Stress

- Vocalisation
- Flinching
- Attempting to escape
- Thumping ground with hind feet
- Excessive salivation
- Trembling body
- Shaking head
- Licking of forearms
- Attacking
- Teeth grinding

## Signs of Pain

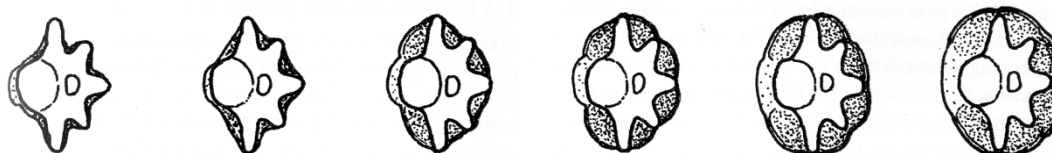
- Teeth grinding
- Ear flicking
- Aggressive behaviour
- Laying in lateral or dorsal recumbency
- Reduced level of alertness
- Closed eyes
- Heavy breathing
- Repetitive behaviour
- Shaking head

## Signs of Dehydration

- Dry tacky mucous membranes
- Dull eyes
- Sunken eyes
- Lack of skin elasticity
- Lethargy

## Assessment of Body Condition

**Base of tail** - feel for good muscle coverage (see key below)  
**Scapula (shoulder blade) and spine** – feel for good muscle coverage.  
**Pectoral region** – feel for good muscle coverage. Male kangaroos will develop more muscle in that area than females or wallabies.  
**Fur** – uniform thick fur, no missing fur



Condition score of macropods, felt at the base of the tail.

The white structure is the tail bone, and the dark structure is the muscle mass.

Source: *Australian Mammals: Biology Captive Management* – originally adopted from Speare (1988)

## Drug Administration (preferred routes)

Oral	Adults:	Use a 2.5mL or 5mL syringe (not suitable when sedated)
	Orphans:	Use a macropod teat (dependent on species/age) with a glass feeding bottle.
Intramuscular	Dorsal lumbar muscles, cranial and caudal thigh, upper arm.	
Subcutaneous	Loose skin at lateral neck/shoulders, side of abdomen or over thigh area.	
Intravenous	Cephalic, saphenous or lateral tail vein.	

## Common Injuries, Diseases and Conditions

### Adults

- **Road trauma injuries** (head injury, fractured limbs, spine, pelvis, internal injuries, myopathy)
- **Dog** (puncture wounds, evisceration, internal injuries, capture/exertion myopathy)
- **Shooting** (open wounds, large puncture wounds, internal bleeding)
- **Trapped** (capture/exertion myopathy)
- **Myopathy** – common after any stressful event (including those listed above)

**Note:** Adult macropods do not cope with being in captivity and generally succumb to myopathy very quickly. In most instances, euthanasia is the most humane option.

### Orphans

- **Dehydration** – (level dependent upon length of time without maternal nutrition)
- **Myopathy** – common after orphaning process, being housed with domestic animals or being over-handled
- **Fractures** (from road trauma – particularly of the hind legs, spine and tail)
- **Hypothermia** (particularly unfurred joeys and in colder months)
- **Hypoglycaemia**
- **Dog attack** (puncture wounds, internal bleeding, fractured limbs)
- **Wounds** (from being thrown from pouch, associated with road trauma)

**Note:** Most orphaned macropod joeys will need to be treated for myopathy due to stress as a result of orphaning. Refer to Suggested Drugs and Dose Rates (below) or refer to Macropod Coordinator immediately.



**Photos Above:** Compound fractures are the most commonly found in adult kangaroos and wallabies. Bruising and fractures in unfurred joeys is easily discernible. Any evidence of bruising should be investigated to rule out fractures.

*Photos: Mark Alexander and Karen Scott*

## Euthanasia (preferred methods)

Euthanasia methods stated to assist veterinary staff.

Wildlife volunteers must not euthanise unless trained to do so or they hold appropriate approvals.

- Injection of sodium pentobarbitone (Lethabarb) after induction with Isoflurane or Zoletil (strongly preferred):
  - Intravenous
  - Intracardiac (must be anaesthetised first)
  - Intraperitoneal (dilute with water 50:50)
- Blunt force trauma to the head (very small unfurred joeys only) – **only if trained to do so**

## Suggested Drugs and Dose Rates

This information is provided for **VETERINARY USE ONLY** to assist veterinary staff with the **initial assessment** and **emergency treatment** of sick, injured and orphaned wildlife. Suggested drugs and doses are those commonly used by the wildlife hospitals in South-east Queensland and are for routine treatment only. Recommendations may vary between individual veterinarians. Culture and sensitivity results would indicate the most appropriate antibiotic regime. Most drugs are used off-label.

For more information see 'Current Therapy in Medicine of Australian Mammals' by Vogelnest and Portas (2019).

### Anaesthetic

Drug	Composition	Dose Rates
Isoflurane ®	Isoflurane 100%	5% for induction and 2-3% for maintenance with oxygen flow rate of 1-2 litres per minute
Alfaxan CD RTU ®	Alphaxalone	3 to 5 mg/kg (IM) - for small macropods and joeys only
Pamlin ®	Diazepam	0.5 – 1mg/kg (IV or IM)
Zoletil ®	Tiletamine and Zolazepam	Small to medium – 10mg/kg IM – <i>Pademelons, small to medium wallabies and small kangaroos</i> Medium to large – 5mg/kg IM – <i>Large wallabies and kangaroos</i>

### Analgesic

Drug	Composition	Dose Rates
Methone ®	Methadone hydrochloride 10mg/mL	0.3 to 0.5 mg/kg - 4 to 6 hourly (IM or SC)
Temgesic ®	Buprenorphine hydrochloride 0.3mg/mL	0.01mg/kg - 8 to 12 hourly (IM or SC)
Rimadyl ®	Carprofen	<u>Day 1</u> - 4mg/kg SID (SC or IM) <u>Days 2 – 5</u> - 2mg/kg SID (SC or IM)
Metacam ®	Meloxicam	<u>Day 1</u> - 0.2mg/kg SID (IM or SC) <u>Days 2 – 5</u> - 0.1mg/kg SID (IM or SC)
Painstop ®	Paracetamol 24mg/mL Codeine 1mg/mL	15mg/kg of Paracetamol component - 8 hourly (PO)
Infant Panadol Drops ® (1 month to 2 years)	Paracetamol 100mg/mL	15mg/kg - 4-6 hourly (PO)



## Suggested Drugs and Dose Rates (continued)

### Antibiotics

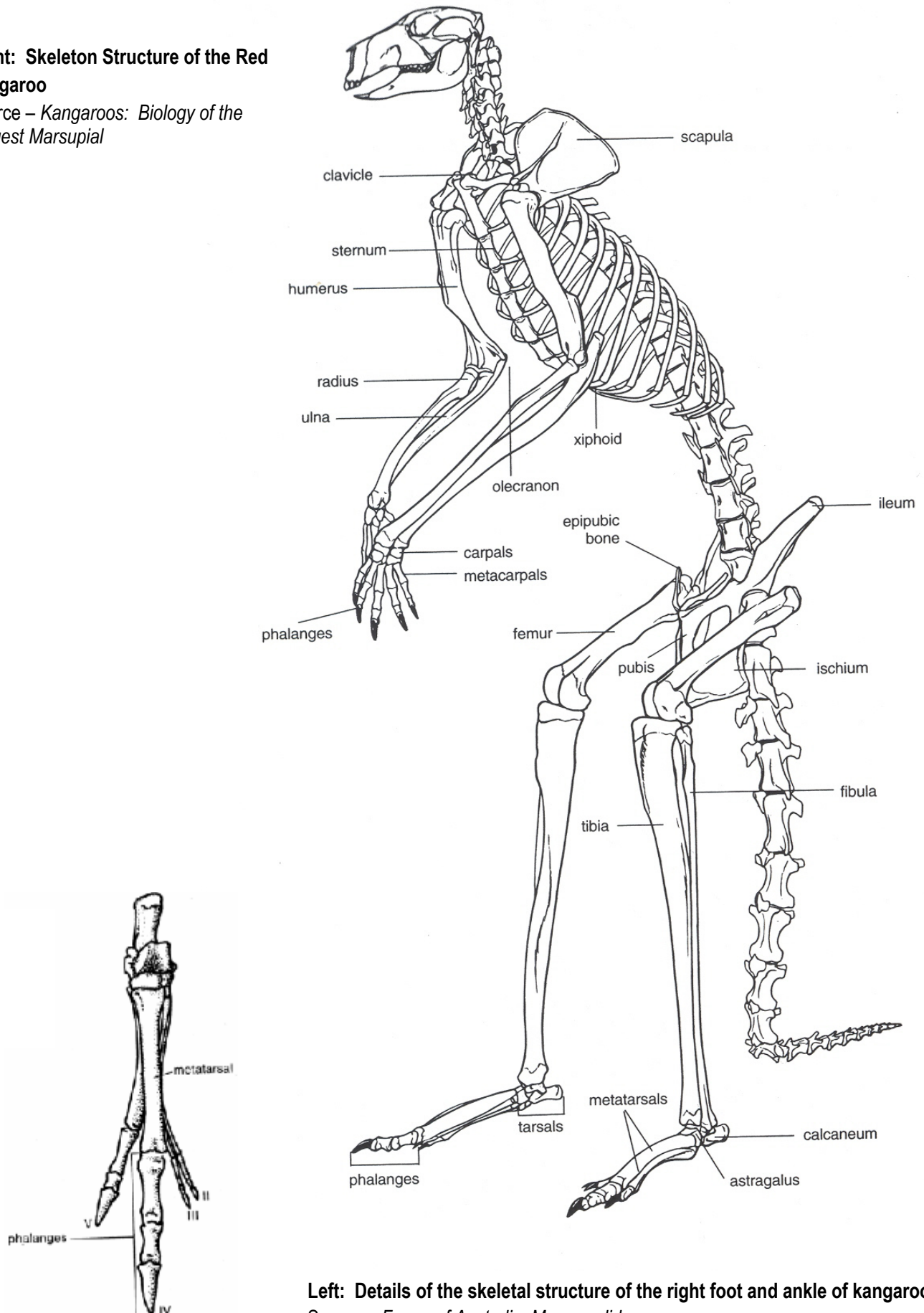
Drug	Composition	Dose Rates
Clavulox ® Injectable	Clavulanic acid 35mg/mL Amoxycillin 140mg/mL	12.5 to 15mg per kg combined drugs SID (SC or IM)
Trivetin ®	Trimethoprim 50mg/mL and Sulfamethoxazole 200mg/mL	25mg/kg SID (SC or IM)
Septin ® / Bactrim ®	Trimethoprim and Sulfamethoxazole Suspension	3 to 5 mg per kg of Trimethoprim component BID (PO)
Baytril ®	Enrofloxacin	5 to 10mg/kg SID (SC or IM diluted with sterile water)

### Myopathy

Drug	Composition	Dose Rates
Haloperidol	Haloperidol decanoate	4-6mg/kg IM (can last up to 30 days. Effect variable)

## Right: Skeleton Structure of the Red Kangaroo

Source – *Kangaroos: Biology of the Largest Marsupial*



Left: Details of the skeletal structure of the right foot and ankle of kangaroo.  
Source – *Fauna of Australia: Macropodidae*

# Common Species of South-east Queensland

## Eastern Grey Kangaroo

Weight: Males to 80kg and females to 40kg.  
Grey-brown; slightly paler on hind legs and belly.  
End of feet and paws dark grey to black.  
Ears dark brown outside and pale grey inside.



*Photos: Karen Scott and Gail Gipp*

## Red-necked Wallaby

Weight: Males to 27kg and females to 16kg.  
Upper parts grey-brown grizzled with cream.  
Back of ears, neck and shoulders rusty brown.  
Whitish stripe along upper lip (not bold or clearly defined).  
Hands black merging to grey-brown limbs.  
Underpart whitish.  
Tail pale grey, darker at tip.



*Photos: Karen Scott*

## Swamp Wallaby

Weight: Males to 20kg and females to 15kg.  
Dark, coarse fur.  
Dense, blackish above flecked with pale grey, yellow and rufous.  
Underparts pale yellow or rufous-orange.  
Stripe from upper lip below eye towards ear; varies from white through pale grey or yellow to almost non-existent.  
Paws, feet and wrists black.  
Tail blackish, thick and not strongly tapered, sometimes with a white tip.



*Photos: J Hanger (left) and Terri Eather (right)*



## Common Species of South-east Queensland (con't)

### Whiptail Wallaby

Weight: Males to 26kg and females to 15kg.  
Slender, long muzzle, distinctive pale colour.  
Upperparts pale grey-brown; underparts including limbs and all but tip of tail, whitish.  
Bold white face stripe contracts with dark brown head.  
Ears long and distinctly tricoloured outside, blackish tip then broad white stripe above brown base.  
Paws blackish.  
Distinct pale hip stripes merge into tail.



Photos: Gail Gipp and Karen Scott

### Red-necked Pademelon

Weight: Males to 7kg and females to 4kg.  
Upperparts brown flecked grey except for neck, shoulders and forehead which are rich rufous.  
No obvious facial markings but ring of reddish bare skin around eye.  
Chin, throat and chest whitish; rest of underparts cream.  
Tail short, thick, grey.



Photos: J Hanger

### Red-legged Pademelon

Weight: Males to 6.5kg and females to 4.2kg.  
Short stiff fur.  
Back and rump grizzled brown-grey.  
Neck, shoulders and forelegs grey grading to rich rufous face, flanks and hindlegs.  
White cheek stripe, dark midline to forehead and crown.  
Buff hip stripe.  
Underparts whitish.  
Tail grey above, buff below. Tail short and thick.



Photos: J Hanger and Karen Scott

Information extracted from *A Field Guide to the Mammals of Australia* (Menkhorst & Knight).