

Victorian Wildlife Rehabilitation Guidelines

Part B: Reptiles and Amphibians

Acknowledgment

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.

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Energy,
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A photograph of a lizard, possibly a spiny-tailed lizard, resting on a weathered wooden log. The entire image is overlaid with a semi-transparent red filter. The lizard is positioned vertically, facing upwards. The wood grain of the log is clearly visible, showing various textures and knots.

Chapter 1. Lizards

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Photo credit: David Paul,
Museums Victoria



In Victoria, sick, injured or orphaned wildlife can only be rehabilitated by a wildlife shelter operator or foster carer who is authorised under section 28A of the Victorian *Wildlife Act 1975* (Wildlife Act). Wildlife rehabilitators are subject to strict conditions. The mandatory requirements that they must meet are set out in the Wildlife Shelter and Foster Carer Authorisation issued under the Wildlife Act. These conditions enforce the minimum standards required for the humane treatment and successful rehabilitation of wildlife in care. The Wildlife Rehabilitator Authorisation Guide: Things You Need To Know explains how wildlife rehabilitators can meet these mandatory requirements and can be found here: <https://www.vic.gov.au/wildlife-rehabilitation-shelters-and-foster-carers>.

The Victorian Wildlife Rehabilitation Guidelines have been developed to incorporate evidenced-based best practice in wildlife care and rehabilitation to equip rehabilitators to deliver positive welfare outcomes for individual animals in their care from first aid to post-release into the wild.

You must comply with the conditions of your authorisation. These guidelines must be read in conjunction with the conditions of your authorisation.

1.1 Introduction



Victoria is home to 87 species of lizards. This chapter addresses the husbandry, care and welfare of lizards that are commonly encountered in Victoria.

Eastern bearded dragon and Lace monitor are listed as threatened in Victoria.



STOP – If either of these species comes into care, please STOP and refer to your authorisation for mandatory conditions including notification and release requirements.

When lizards come into care, it is the responsibility of the rehabilitator to ensure that the five domains of animal welfare are satisfied. These include providing optimal nutrition (**Section 1.7**) and an environment appropriate to the lizard's stage of rehabilitation (**Section 1.6**). This is even more important for lizards than for some other species as the rehabilitator completely controls the lizard's environment while in care.

The focus should be on the lizard's return to health and release, which is facilitated through regular collaboration with a veterinarian. It is also important to consider the lizard's mental state and ability to exhibit normal behaviours without detrimentally affecting its recovery. Welfare may be temporarily compromised by the necessity of a gradual return to normal activity, depending on its stage of rehabilitation. Further information about the five domains of animal welfare can be found in Part A of these guidelines.


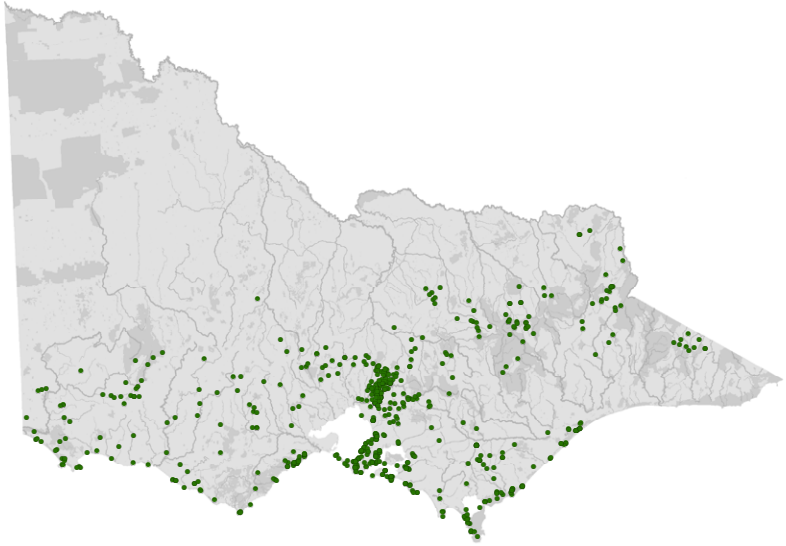
Exotic and native species non-endemic to Victoria **must not** be released into the wild. Non-endemic lizard species may escape their enclosures or find their way into Victoria in shipping containers or accidentally with returning international travellers. In cases where the animal is suspected to be an escaped pet, take the animal to a veterinarian to be scanned for a microchip. If an owner can be identified, the animal should be returned as soon as possible. If there is no microchip or if the person claiming ownership cannot produce a wildlife licence, contact DEECA on 136 186. Occasionally exotic lizard species may be encountered for example Asiatic house gecko (*Hemidactylus frenatus*). These species may be a prohibited pest animal and any possession or care is not allowed under any wildlife shelter or foster carer authorisation issued under the Wildlife Act. These animals must be euthanised as they are considered potential pests and pose a threat to native species. Notify Agriculture Victoria of all exotic lizards in the wild or any that come into care on 136 186 or email highrisk.invasiveanimals@agriculture.vic.gov.au.

1.2 Species information

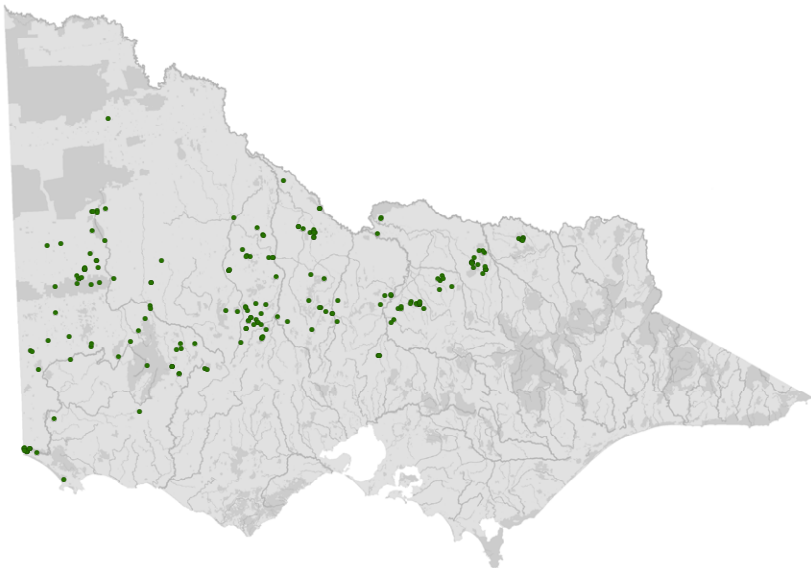


Profiles for the most common lizard species found in Victoria are detailed in the tables below. For assistance in identification of lizard species, refer to the recommended reading and reference material at the end of this chapter.

Table 1.1 Species profiles

Species	Blotched blue tongue lizard (<i>Tiliqua nigrolutea</i>)
 <p>Photo credit: David Paul, Museums Victoria</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
<p>General appearance</p>	<p>Brown to black with uneven blotches of colour on the back and a lack of black line behind the eye</p>
<p>Conservation status*</p>	<p>Common</p>
<p>Sexual dimorphism</p>	<p>Blotched blue tongue lizards cannot be accurately sexed on visual inspection. Measurements of weight, head width, trunk length and snout-to-vent length can be used to compare to published morphometric data to determine sex in this species</p>
<p>Adult morphometrics</p>	<p>Body weight: 300–500 g Length: 35–50 cm</p>
<p>Habitat</p>	<p>Suburban gardens, built-up areas, forest, grassland</p>
<p>Home range</p>	<p>0.5–2 ha</p>

Species	Blotched blue tongue lizard (<i>Tiliqua nigrolutea</i>)
Behaviour	Diurnal, territorial Solitary, terrestrial
Diet	Invertebrates: snails, slugs, grasshoppers, beetles Plant material: fruit, fungi, berries, flowers
Longevity	12–15 years
Sexual maturity	Male: >1 year Female: >2 years
Mating season	Spring
Gestation	3–5 months
Incubation	Live bearer
Litters per year	2–12
Young dispersal	From birth

Species	Eastern bearded dragon (<i>Pogona barbata</i>)
 <p>Photo credit: Ian R McCann, Museums Victoria</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Beard with spines. Grey colour
Conservation status*	Vulnerable

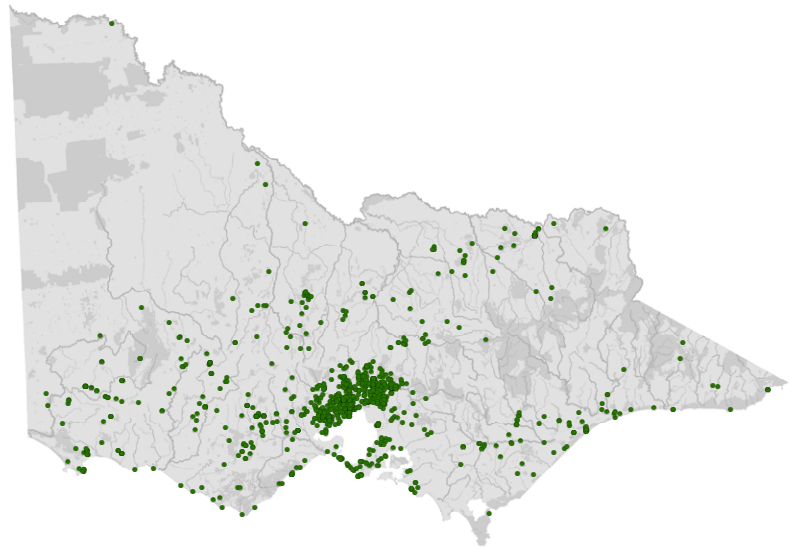
Species	Eastern bearded dragon (<i>Pogona barbata</i>)
Sexual dimorphism	Male bearded dragons have larger femoral pores on their thighs than females. Hemipenial bulges will also be apparent on the underside of the base of the tail in male
Adult morphometrics	Body weight: 300–500 g Length: 35–55 cm
Habitat	Wet to open forest, suburbia, arid area
Home range	Male: 0.3–4.5 ha Female: 0.1–2.0 ha
Behaviour	Diurnal, territorial Solitary, Semi-arboreal
Diet	Invertebrates and plants
Longevity	10–15 years
Sexual maturity	Male: 1–2 years Female: 1–2 years
Mating season	Spring
Gestation	Egg layer
Incubation	45–84 days
Litters per year	7–20 eggs
Young dispersal	From birth

Species

Eastern blue tongue lizard (*Tiliqua scincoides*)

Photo credit: Ian R McCann,
Museums Victoria


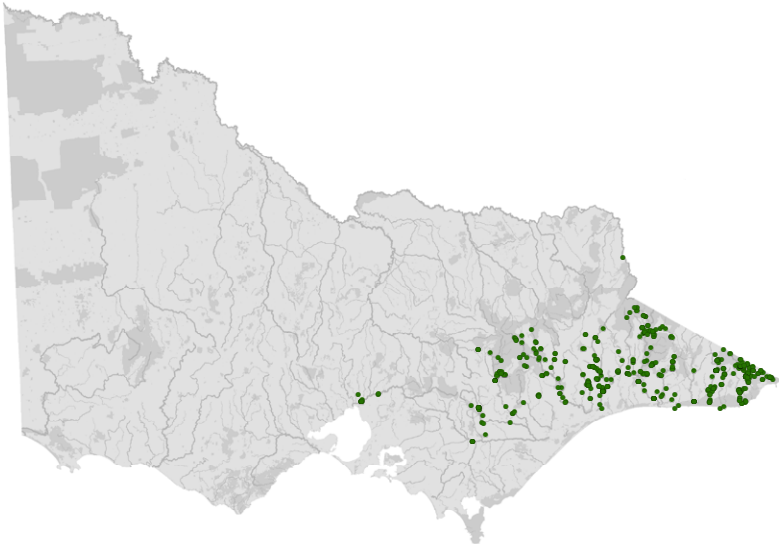
Distribution map




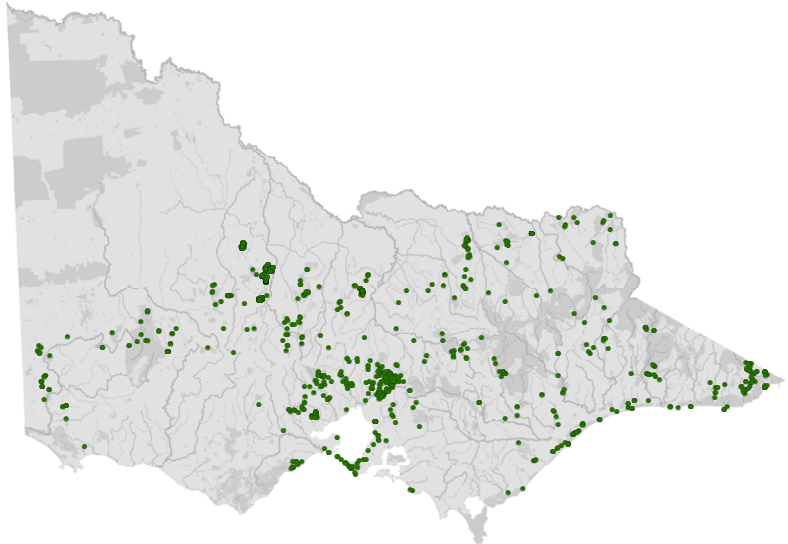
Data source: Victorian Biodiversity Atlas Jan 2023
www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

General appearance	Grey with brown stripes and a black line behind the eye
Conservation status*	Common
Sexual dimorphism	Eastern blue tongue lizards cannot be accurately sexed on visual inspection. Measurements of weight, head width, trunk length and snout-to-vent length can be used to compare to published morphometric data to determine sex in this species
Adult morphometrics	Body weight: 300–500 g Length: 45–55 cm
Habitat	Suburban gardens, built-up areas, forest, grassland
Home range	Male: 3–12 ha Female: 0.1–5 ha
Behaviour	Diurnal, territorial Solitary, terrestrial
Diet	Invertebrates: snails, slugs, grasshoppers, beetles, cockroaches Plant material: fruit, fungi, berries, flowers
Longevity	12–15 years
Sexual maturity	Male: >1 year Female: >2 years

Species	Eastern blue tongue lizard (<i>Tiliqua scincoides</i>)
Mating season	Spring
Gestation	3–5 months
Incubation	Live bearer
Litters per year	6–25
Young dispersal	From birth

Species	Gippsland water dragon (<i>Intellagama lesuerii howittii</i>)
 <p>Photo credit: David Paul, Museums Victoria</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Crest of scales along back. Green to grey body with stripes. No dark stripe between the ear and the eye (present in the eastern water dragon)
Conservation status*	Common
Sexual dimorphism	Male Gippsland water dragons are larger than females and have dark blue-green chests and streaks of yellow and blue around the neck and throat. They do not develop the red chest colouration found in eastern water dragons during the breeding season.
Adult morphometrics	Body weight: up to 1 kg Length: 50–90 cm
Habitat	Adjacent to watercourses

Species	Gippsland water dragon (<i>Intellagama lesuerii howittii</i>)
Home range	1 ha
Behaviour	Diurnal, males are territorial Semi-aquatic, arboreal. Overlapping home ranges
Diet	Insects, crustaceans, frogs, reptiles, small mammals, berries, fruits
Longevity	Up to 20 years
Sexual maturity	Male: 1–2 years Female: 1–2 years
Mating season	Late spring, early summer
Gestation	Egg layer
Incubation	85–120 days
Litters per year	6–18 eggs
Young dispersal	From birth

Species	Jacky lizard (<i>Amphibolurus muricatus</i>)
 <p>Photo credit: David Paul, Museums Victoria</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Brown with light patches on back
Conservation status*	Common

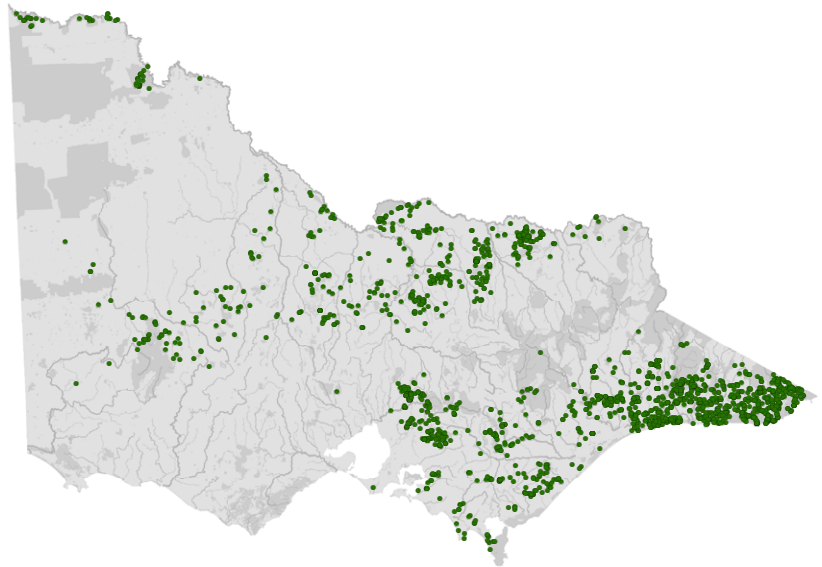
Species	Jacky lizard (<i>Amphibolurus muricatus</i>)
Sexual dimorphism	Generally males have a greater body size and relatively larger heads than females
Adult morphometrics	Body weight: 25–60 g Length: 25–35 cm
Habitat	Open forest, rocky ledges, coastal heath
Home range	<1 ha
Behaviour	Diurnal, territorial Solitary, semi-arboreal
Diet	Invertebrates: grasshoppers, beetles, flies, moths, spiders Greens
Longevity	4 years
Sexual maturity	Male: >1 year Female: >1 year
Mating season	Spring
Gestation	Egg layer
Incubation	42–55 days
Litters per year	3–10 eggs
Young dispersal	From birth

Species

Lace monitor (tree goana) (*Varanus varius*)

Photo credit: Ian R McCann,
Museums Victoria


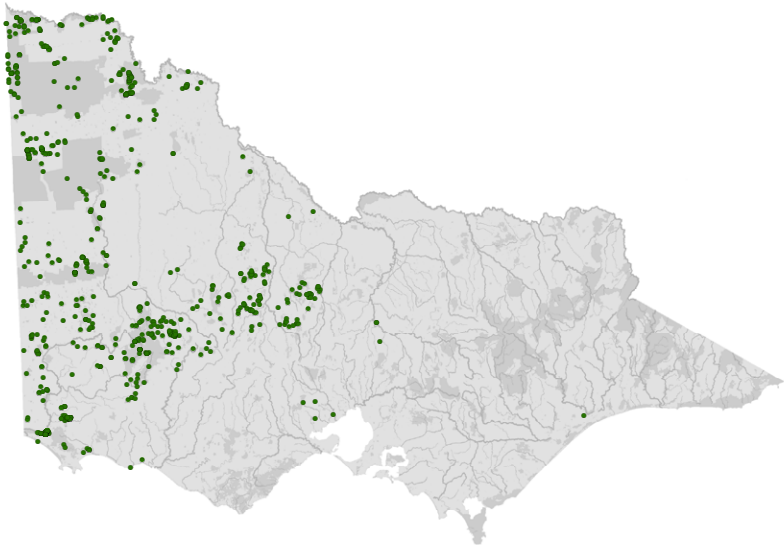
Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023
www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

General appearance	Lace monitor may have yellow dots and stripes or solid colouring
Conservation status*	Endangered
Sexual dimorphism	Mature lace monitor males have ossified hemipenes, which can be detected by X-ray. Mature male lace monitors also have a broader nose and will show bulging at the base of the tail indicating the presence of hemipenes
Adult morphometrics	Body weight: Up to 20 kg Length: 100–200 cm
Habitat	Open to wet forest
Home range	15–125 ha
Behaviour	Diurnal, territorial Solitary, arboreal, terrestrial
Diet	Small mammals, birds, reptiles, carrion
Longevity	Up to 40 years
Sexual maturity	Male: 2–3 years Female: 2–3 years

Species	Lace monitor (tree goana) (<i>Varanus varius</i>)
Mating season	Spring
Gestation	Egg layer
Incubation	190–230 days
Litters per year	8–11 eggs
Young dispersal	From birth

Species	Shingle back lizard (<i>Tiliqua rugosa</i>)
 <p>Photo credit: Mark Norman, Museums Victoria</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Pine cone scales, short tail
Conservation status*	Common
Sexual dimorphism	Immature and underweight shingleback lizards can be difficult to sex. Females have a narrower head and wide tail whereas males have a wide head and narrow tail
Adult morphometrics	Body weight: 600–900 g Length: 120–200 cm
Habitat	Drier forest
Home range	1–6 (average = 4)

Species	Shingle back lizard (<i>Tiliqua rugosa</i>)
Behaviour	Diurnal, territorial May share refuges, overlapping home range, pair bonds
Diet	Berries, fruit, herbaceous vegetation, flowers, fungi, carrion, invertebrates
Longevity	20–25 years
Sexual maturity	Male: >1 year Female: >1 year
Mating season	Spring
Gestation length	5 months
Incubation	Live bearer
Litters per year	1–4
Young dispersal	From birth

*From the *Flora and Fauna Guarantee Act 1988* Threatened List June 2023. This list is updated regularly throughout the year. For the most current list, please visit <https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list>.

1.3 Animal and human safety considerations



In general, animals in the wild have limited contact with people, pets, and the hustle and bustle of our daily lives. When sick, injured or orphaned wild animals come into care this unnaturally close contact can carry risks to the health and safety of both people and animals. For general information on biosecurity and approaches to minimise these risks see Part A of these guidelines. Specific information on enclosure hygiene and biosecurity for lizards is in **Section 1.6.2**.

The following information relates to the human and animal health and safety considerations specifically related to the rehabilitation of lizards.

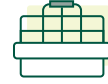
1.3.1. Human safety considerations

- Wash hands with soap and water after handling frogs to minimise the risk of infection with zoonotic disease agents such as *Salmonella*.
- Lizards can give a painful bite which may puncture the skin and cause localised bleeding and bruising.
- Lace monitors are dangerous animals to handle. Their large jaws cause a painful bite that can become infected. Monitor species also have venom which, when injected into a wound through a bite, can cause pain and tissue damage. Long claws can also tear clothing and human skin. Even the skin on their tail is abrasive enough to break human skin.

1.3.2. Animal safety considerations

- Do not pick lizards up by their tail. Blue tongue lizards can drop their tail and spinal damage can occur in other species.

1.4 Capture, restraint, and transport



STOP – A visual examination must be done **BEFORE** the animal is captured. This applies to the initial capture from the wild as well as prior to captures which occur during time in captive care. See Section 1.4.1 for information on what to look for when conducting a visual health assessment.

Refer to Part A of these guidelines for general advice on wildlife welfare, biosecurity and hygiene, and record requirements. The following information relates to the capture, restraint, and transport of sick, injured and orphaned lizards.

1.4.1 Visual observations

Visual observations of wildlife should be conducted prior to any attempts to capture the animal. This is just as important prior to the first capture from the wild as it is before any capture conducted while an animal is in captive care. Observations should be conducted quietly, by

one person, and from a distance which provides a clear view of the animal with as little disturbance as possible. Visual observation should focus on the animal's demeanour, behaviour, movement and posture. Check for evidence of injury/severe disease or deterioration and assess their breathing as demonstrated in the following table.

Table 1.2 Visual health observations in lizards

What to look for	
Demeanour	<ul style="list-style-type: none"> • Reactive to being approached • May adopt a threat posture
Behaviour	<ul style="list-style-type: none"> • Smaller lizards often hide in a nest box, under vegetation or under newspaper • May be sitting under the heat lamp
Movement and posture	<ul style="list-style-type: none"> • Able to use all four legs without dragging any of them • Alignment of spine appears straight/normal
Breathing	<ul style="list-style-type: none"> • Nostrils are clear and open, free from discharge • Breathing is regular • If threatened, blue tongue lizards can inhale large amounts of air and expand their bodies

1.4.2. Equipment

- **Noose pole** may be used to catch a lace monitor that needs to be removed from a tree.
- **A towel, calico bag or pillowcase** can be used to pick up and restrain a small lizard. Ensure any pillowcases or calico bags are turned inside out so that there are no loose threads on the inside that could entangle lizards or catch nails.
- **Cardboard box or a solid-walled container such as a bucket or ice-cream container** (with ventilation added).
- **Hessian bag or plastic rubbish bin with a clipped/secured lid**: Due to their size, lace monitors need to be transported in a larger container.
- Many species are agile climbers and so the transportation unit needs to have a secure lid.

Figure 1.1 Transport container suitable for a small lizard.



Photo credit: Zoos Victoria

Figure 1.2 Soft pet packs can be used to transport reptile species.



Photo credit: Zoos Victoria

1.4.3. Technique

It is beyond the scope of these guidelines to outline techniques for every situation that may be encountered. Examples of techniques for some specific situations are outlined in the following section.

In addition to this information, for further advice please also refer to the recommended reading list, zoological institutions, veterinarians and/or wildlife experts. Inexperienced rescuers should request assistance where possible.

- Restrain smaller lizards by holding them behind the head with one hand and supporting the body with the other hand. They can then be wrapped in a towel or placed in a bag.
- Lace monitors should only be handled by experienced rehabilitators due to the high risk of injury. They can be restrained with a towel. Place the towel over the head and then hold the neck behind the head in one hand and hold the hind legs together with the tail using the other hand. Hold the lace monitor facing away from your body.

1.4.4. Transport

- Transport lizards in a well-ventilated container.
- Secure the container in the vehicle so that it cannot slide or roll over.
- Food and water do not need to be provided.
- In hot weather, transport the lizard in an air-conditioned vehicle.

Figure 1.3 a. A water dragon is restrained behind the head with one hand while the other holds the tail. **b.** A blotched blue tongue lizard is restrained in the hand by gently restraining behind the head.

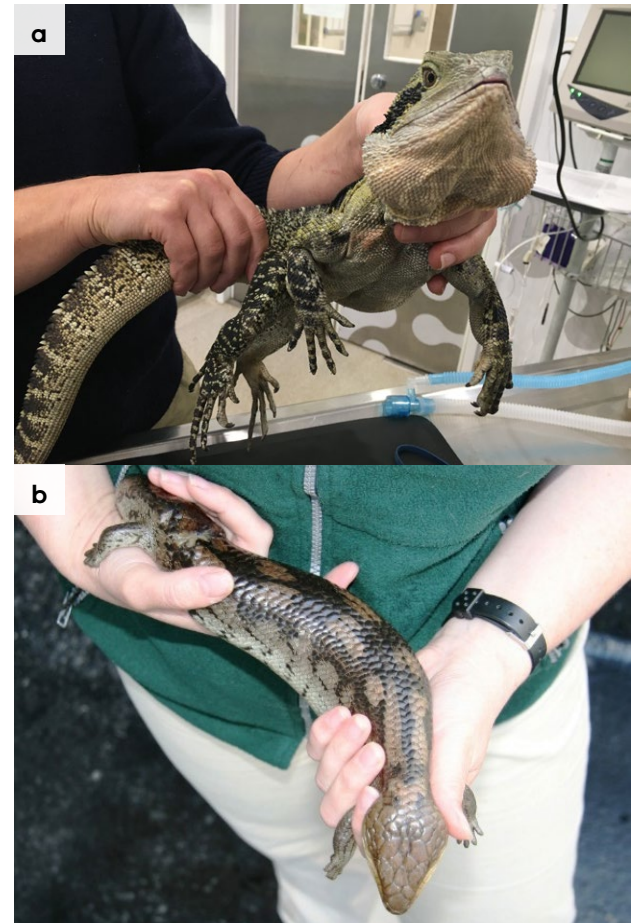


Photo credit: Zoos Victoria (a) and Anne Fowler (b)

1.5 Monitoring animal health and welfare



The goal of wildlife rehabilitation is to address health and welfare concerns quickly and effectively so wildlife can be released back to the wild as soon as possible. Decision-making from the time of capture through to release should be guided by an accurate understanding of the animal's true state of health and welfare. Careful monitoring throughout the rehabilitation period ensures that significant issues, or deterioration in health condition, are identified immediately and rapidly addressed.

It is preferred that all sick, injured or orphaned wildlife be assessed by a veterinarian to ensure that non-obvious signs of trauma or disease can be assessed and treated as soon as practicable. No medication should be provided prior to this assessment, as this can mask clinical signs and make an accurate health assessment by the veterinarian very difficult.

Templates for record-keeping visual and physical observations and daily care can be found in Part A of these guidelines.

This section provides guidance on health assessments on arrival and on effective monitoring of the health and welfare of individuals in care through minimising human-animal interactions and stress to the animal to maximise successful release back to the wild.

1.5.1 Physical examination

Once visual observations are complete, and the animal is stable enough to withstand capture and handling, a basic physical examination should be conducted. This can be repeated when required any time the carer has the animal in the hand, such as for an enclosure change. However, if a full physical exam is not conducted, body condition and weight should be assessed every time the animal is in the hand for other reasons. Carers should make sure scales are available and ready to use before capturing the animal. Physical examinations are also required if the carer notices any changes suggestive of deteriorating health or an injury.

Always record the physical examination findings so that you can compare findings as the animal's rehabilitation progresses. This ensures any health concerns are identified as soon as possible, and the carer can plan release as soon as this is appropriate. **A template for recording physical examination findings can be found in the appendices to Part A of these guidelines.**

Examinations should be conducted in a quiet location, away from any domestic animals. Only one person should handle the animal, while a second person takes notes. All other people should move away, and noise kept to a minimum. Handling should also be kept to a minimum.

Species specific considerations:

- Lizards can usually be examined while conscious, under manual restraint. However, for painful conditions, deep injuries, or potentially dangerous lizards, examination under sedation or anaesthesia is required. Lizards have strong jaws. A tongue depressor can be used to carefully open the mouth of larger lizards such as blue tongues, shinglebacks or bearded dragons. A guitar pick or credit card can be used for smaller lizards, such as jacky lizards. Care is required to avoid damaging teeth and gums or causing a jaw fracture.

Table 1.3 Physical examination of lizards

What to look for	
Body weight	<ul style="list-style-type: none"> Record body weight on arrival and at least weekly whilst in care. A greater than 10% change in body weight is cause for concern, and the carer should seek veterinary advice. It is important to know the species' expected body weight as smaller species will have less tolerance for weight loss.
Body condition	<p>Body condition is assessed by examining the musculature around the pelvis (See Figure 1.4). In the skink species, fat may be stored in the tail, which can also help in the assessment of body condition:</p> <ul style="list-style-type: none"> Under condition: Spine and hip bones prominent. Ideal condition: Hips are covered with muscle but the points of the hips can still be felt. Over condition: Points of the hips cannot be felt. Tail is thick and rounded.
Hydration status	<ul style="list-style-type: none"> Check skin tenting along the body wall. This can be difficult to evaluate in lizards with tightly adherent skin, such as blue tongues. The eyes should be bright and shiny, not sunken. The skin should be bright and taut.
Eyes	<ul style="list-style-type: none"> Eyes should both be open, shiny and clear, with no bubbles or discharge. Basic internal structures of eyes (e.g. pupil, iris) appear symmetrical.
Cloaca	<ul style="list-style-type: none"> Pink. Free of faeces and urates (not caked on).
Mouth	<ul style="list-style-type: none"> Gums are pale pink or light yellow. No bleeding. No broken or missing teeth. Jaw/mouth aligned normally, no evidence of displacement or fracture.
Skin condition	<ul style="list-style-type: none"> Scales appear normal for species. Inspect ear canals for the presence of ticks. If present, gently remove ticks. Normal skin shedding (ecdysis) is patchy and shedding skin easily comes away from healthy underlying scales.
Limbs, feet and tail	<ul style="list-style-type: none"> Can stand, walk. Tail is present – thickness indicates condition. No missing legs, toes or claws.

Figure 1.4 Body condition scoring. a. An extremely underweight lace monitor. Note the prominent spine and hip bones. b. A bearded dragon in ideal body condition. c. an overweight shingleback lizard. The area over the hips is rounded and the tail is thick and rounded.



Photo credit: Zoos Victoria (a,b) and Shane Simpson (c)

1.5.2. Ongoing monitoring of health and welfare

The aim of wildlife rehabilitation is to ensure animals recover and can be released back to the wild as quickly as possible. Careful, daily monitoring is required to ensure that animals are responding as expected to the treatment being provided and so that any deterioration or welfare concerns can be identified and addressed as soon as possible. Rehabilitators should ensure that record-keeping is a priority to maximise positive welfare outcomes. Templates to assist wildlife rehabilitators to record and monitor wildlife health and welfare can be found in the appendices to Part A of these guidelines. These records will be valuable tools to share with veterinarians to support decision-making.

The following is recorded daily:

- demeanour
- food consumption
- faecal/urine output
- behaviour observed
- medical treatment provided
- evidence of overnight activity.

The following is recorded weekly:

- weight
- body condition.

Over time, regular monitoring will also help to develop carer skills and knowledge, as regular observations and recording will result in a deep understanding of the expected behaviour and response to treatment for the species in care.

Species specific considerations:

- The lizard should be observed at least daily.
- Note the lizard's demeanour and behaviour every time food is introduced or taken away, the animal is medicated or the enclosure is cleaned. Pay particular attention to any changes that have occurred since the previous day.
- Note faecal consistency daily. The lizard should pass solid brown faeces, pasty white urates and liquid urine, which may not be detectable if it has soaked into the substrate. If diarrhoea is noticed, a faecal sample should be collected and submitted to the veterinarian for assessment as soon as possible. Do not treat on suspicion of a bacterial or parasitic infection, as this can make definitive diagnosis very difficult and potentially prolong the course of the disease.

1.5.3. Common presenting injuries and clinical signs of emerging health conditions

Clear guidance on conditions that may require euthanasia can be found in Part A of these guidelines.

Table 1.4 lists common clinical signs and possible causes of injury/disease. Carers should be aware that these are not exhaustive. Aside from first aid, carers should avoid administering medications prior to the provision of veterinary advice.

Unusual clinical signs or mass mortality events – a number of animals dying or found dead at the same time, with similar signs – may indicate an emergency animal disease, an emerging/new infectious disease or an environmental/

human related toxicity which needs further investigation. Report these immediately to the Emergency Animal Disease Watch Hotline on 1800 675 888 (24 hours).

Table 1.4 Common injuries and clinical signs of emerging health conditions seen on presentation or during care

Injury or clinical signs	Possible causes	Carer observations and response
<p>Note: Do not provide pain relief or other medication, including antibiotics, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. Use of antibiotics when not indicated can contribute to antimicrobial resistance and reduce drug efficacy.</p>		
<p>Fracture</p>	<p>Motor vehicle Lawn mower or whipper snipper accident Predator attack</p>	<ul style="list-style-type: none"> • Seek urgent veterinary attention. Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Move animal to a small transport box to restrict movement. Ensure temperature is appropriate for the species and minimise stress. • Do not attempt to stabilise fractures as this is very painful and risks making the injury worse. Fracture stabilisation should only be attempted by a veterinarian following physical examination, x-rays and under general anaesthesia. • Do not provide pain relief, or other medication, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. • Animals with mouth injuries may require assisted feeding with a suitable liquid diet such as Hills a/d or Lafeber's EmerAid. • House the lizard in a quiet area, away from domestic species.
<p>Head trauma</p>	<p>Motor vehicle Lawn mower or whipper snipper accident Predator attack</p>	<ul style="list-style-type: none"> • Seek urgent veterinary attention. Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Move animal to a small transport box to restrict movement. Ensure temperature is appropriate for the species and minimise stress. • Do not provide pain relief, or other medication, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. • House the lizard in a quiet area, away from domestic species.

Injury or clinical signs	Possible causes	Carer observations and response
Nose trauma	<p>Motor vehicle</p> <p>Lawn mower or whipper snipper accident</p> <p>Predator attack</p> <p>Rubbing nose on the glass walls of the enclosure</p>	<ul style="list-style-type: none"> • Seek veterinary attention. Seek attention urgently if fracture is suspected, severe trauma or for bleeding wounds. • Move animal to a small transport box to restrict movement. Ensure temperature is appropriate for the species and minimise stress. • Do not provide pain relief, or other medication, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. • Block the glass with a piece of cardboard or something similar to create a visual barrier and stop the lizard from rubbing. Provide a variety of shelters throughout the enclosure. • Mild cases of rostral trauma can be cleaned with diluted iodine applied to the affected area. • House the lizard in a quiet area, away from domestic species.
Skin wounds Bleeding	<p>Motor vehicle</p> <p>Lawn mower or whipper snipper accident</p> <p>Predator attack</p>	<ul style="list-style-type: none"> • Seek urgent veterinary attention. Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Move animal to a small transport box to restrict movement. Ensure temperature is appropriate for the species and minimise stress. • Do not provide pain relief, or other medication, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. • House the lizard in a quiet area, away from domestic species.
Burns	<p>Bushfire</p> <p>Enclosure heat pad or lamp</p>	<ul style="list-style-type: none"> • Seek urgent veterinary attention. • Burn injuries are very painful. To ensure good welfare, animals must be assessed by a veterinarian as soon as possible. • Treatment may require multiple visits to a veterinarian for bandage changes under anaesthesia, and to ensure adequate pain management. • Burn injuries may result in scars that may impact future skin shedding. • If the burn is enclosure-related, modify the enclosure to prevent it happening again. • House the lizard in a quiet area, away from domestic species.

Injury or clinical signs	Possible causes	Carer observations and response
<p>Discharge from the eyes or nostrils</p> <p>Rapid breathing</p>	<p>Bacterial or viral respiratory tract infection</p>	<ul style="list-style-type: none"> • Seek urgent veterinary attention. • Ongoing care may require cleaning of discharge away from eyes and nostrils as directed by the treating veterinarian. • Ensure medications are administered as prescribed by a veterinarian. • Nidovirus is an emerging respiratory disease agent found in blue tongues and shinglebacks. Discuss the diagnosis and implications of infection with a veterinarian. • House the lizard in a quiet area, away from domestic species.
<p>Inflammation in the mouth</p> <p>Red, bleeding gums</p> <p>Missing or broken teeth</p> <p>Cheesy material in the mouth</p>	<p>Poor husbandry</p> <p>Disease</p> <p>Trauma</p> <p>Stomatitis</p>	<ul style="list-style-type: none"> • Seek veterinary attention. • Administer treatment as prescribed by the veterinarian. • Clean away any discharges from the mouth as directed by a veterinarian. • Provide a complete diet that is similar to that which the species would have in the wild. Avoid providing fruits to dragons as this is a factor in them developing dental disease. • Animals with mouth injuries may require assisted feeding with a suitable liquid diet such as Hills a/d or Lafeber's EmerAid. • House the lizard in a quiet area, away from domestic species.
<p>Retained pieces of skin, particularly common around the toes</p>	<p>Abnormal pattern of shedding of the dead skin</p> <p>Dysecdysis</p>	<ul style="list-style-type: none"> • Seek veterinary attention as required. • Identify housing issues that may contribute to dysecdysis such as low temperature and humidity. • Place coarse rocks in the enclosure to provide surfaces for the animal to rub against while shedding. • Individuals can be soaked for 10–30 minutes in a shallow bowl of luke-warm water. • Assist shedding after the soaking period. Carefully peel any retained skin away from around the toes as it can cause constriction and toe loss. • House the lizard in a quiet area, away from domestic species.

Injury or clinical signs	Possible causes	Carer observations and response
<p>Lameness</p> <p>Reluctance to move</p> <p>Soft rubbery jaw</p>	<p>Metabolic bone disease as a result of poor nutrition and/or inadequate UV light, causing calcium and/or vitamin D deficiencies</p>	<ul style="list-style-type: none"> • Seek veterinary attention for guidance on nutritional support. Additionally, severely affected animals may have one or more fractured bones. • Diurnal lizards kept indoors should be provided with adequate UV light (UV-B). If possible, take the lizard out into natural sunshine for 5–10 hours each week, but do not leave it in full sunshine. • Provide the lizard with an area of shade. Water should always be available. • Provide a diet that contains natural foods, such as snails. Ensure snails are free of snail bait by holding for 24 hours before feeding. • Ensure insects are gut loaded before feeding, using Vetafarm Herpagrub or Wombaroo Insect Booster, or dust insects with calcium powder just prior to being fed. • Mix Wombaroo Reptile supplement into any fruits and vegetables that are offered. • Oral calcium (Calcium Sandoz or Vetafarm Calcivet) may also be given as indicated. • House the lizard in a quiet area, away from domestic species.

Injury or clinical signs	Possible causes	Carer observations and response
Ectoparasites	Mites, ticks	<ul style="list-style-type: none"> • Seek veterinary advice. • Animals with heavy burdens of parasites should be presented for veterinary examination to ensure the parasite infestation is not secondary to another disease or injury. • Ticks can be carefully removed with tweezers while the lizard is restrained in the hand. • The enclosure may be treated with pyrethrin sprays e.g. Callington Reptile Enclosure Insecticide (formerly Top of Descent). Use as directed on the label. Rinse the enclosure thoroughly before returning animals. • Remove water bowls for up to 24 hours when treating enclosures to ensure no incidental ingestion of mite treatment. • In severe cases individuals can be directly treated with Frontline flea spray (active ingredient fipronil). Be careful of eyes and eye area. A cotton tip is useful for applying the Frontline solution to these areas (spray a cotton tip and wipe around the eye area). • After spraying, animals should be held in a clean tub or bin for 15 minutes. Following this they should be gently rinsed and returned to the treated enclosure. • During treatment the enclosure can be placed in a water bath to prevent mites spreading to other enclosures. Disinfect or discard any cage furniture. • The lizard should be visibly free of mites prior to release into the wild. • House the lizard in a quiet area, away from domestic species.
Tail loss in skinks	May occur in skinks that are restrained by their tail	<ul style="list-style-type: none"> • Seek veterinary advice. • Keep in a fly free enclosure for two weeks while repair occurs. Do not treat with any topical agents as these may slow repair. • House the lizard in a quiet area, away from domestic species.

Figure 1.5 Blue tongue lizard. Abnormal posture indicates that it may be in pain



Photo credit: Zoos Victoria

Figure 1.6 Bearded dragon with a fractured jaw.



Photo credit: Zoos Victoria

Figure 1.7 Blue tongue lizard with head trauma.



Photo credit: Zoos Victoria

1.5.4. Administering treatment

- Oral medication can be delivered by opening the mouth of the skink or dragon using a tongue depressor or guitar pick. For lace monitors, it is preferable to place the medication in a food item as it is dangerous to attempt to open a lace monitor's mouth.
- If an injectable agent is required, the needle should be inserted between scales. Do not attempt to inject through scales as they are too hard and will blunt or bend the needle.
- Injections can be given in a back leg or front leg. If administering regular injections, the injection site should be recorded and rotated at each treatment, so as not to repeatedly inject in the same limb each time.

1.6 Housing

Below are several key considerations when housing lizards in care.

1.6.1. General housing information for lizards

All lizards should be housed within their 'preferred body temperature zone' (PBTZ) during their time in care (see **Table 1.6**).

Intensive and intermediate housing are identical and should be used for all sick and growing lizards. Pre-release housing is not always necessary as most small lizard species can be moved from an intensive/intermediate enclosure directly to the release site.

1.6.2. Enclosure hygiene and biosecurity

General information about hygiene and biosecurity can be found in Part A of these guidelines. New diseases emerge frequently and sick and injured animals in care are often more susceptible to picking up pathogens from the environment. It is important to maintain the highest levels of hygiene and biosecurity to avoid inadvertently transferring diseases between animals and from humans, and to protect the wild population where the animal will eventually return to.

Species specific considerations:

- Wash hands with soap and water after handling lizards to minimise the risk of infection with zoonotic disease agents such as *Salmonella*.
- Ideally examination gloves should be worn and changed between handling each animal.
- Left-over food and faecal matter should be spot cleaned daily from enclosures to ensure good levels of hygiene are maintained.
- Enclosures used to house sick/injured lizards, should be cleaned and disinfected between inhabitants.
- Substrate should be completely replaced and furniture, such as branches or boxes made of unsealed wood, should be discarded as they cannot be effectively disinfected.
- Enclosures should be cleaned with hot soapy water and then disinfected with products such as F10 SC or bleach, used at appropriate concentrations and contact times. If using bleach, it must be thoroughly rinsed before returning the lizard to the enclosure.

1.6.3. Housing types

Different set ups are required for animals at different stages of treatment and care. **Table 1.5** describes the housing type, suggested dimensions and requirements at each stage of care. Juvenile lizards have the same requirements as adults.

Table 1.5 Rehabilitation housing for adult lizards

Intensive care and intermediate housing		
Indications for use	Suggested min. dimensions	Suggested requirements
<p>Intensive veterinary treatment – frequent medication, oxygen supplementation, temperature control.</p> <p>Provision of daily medication, close monitoring once animal is stabilised and no longer requires intensive care.</p>	<p>Jacky lizard: Enclosure: 0.30 x 0.17 m (0.05 m²) x 0.30 m</p> <p>Blue tongue lizard, bearded dragon, water dragon, shingle backs: Enclosure: 0.60 x 0.30 m (0.18 m²) x 0.60 m</p> <p>Lace monitor: Enclosure: 2 x 1 m (2 m²) x 1 m</p>	<p>ENCLOSURE CONSTRUCTION</p> <ul style="list-style-type: none"> • Glass fish tanks can be used but wooden enclosures or marine ply are preferred as they retain more heat. Polystyrene sheets can be used to increase thermal properties of glass tanks. Lace monitors may be housed outside. Solid walls to a height of at least 1.2 m, constructed of tin or wooden panels, are required to prevent damage to the nose by the lace monitor pushing against the wire or attempting to climb the wire. <p>ENCLOSURE FURNISHING</p> <ul style="list-style-type: none"> • Newspaper provides suitable flooring for short-term housing. Coco peat, bark, grasses or leaf mulch are used for longer term housing and will also provide enrichment. Sand should be avoided as accidental ingestion can cause impaction. Substrate for lace monitors may be leaf mulch or earth. It should be replaced when soiled. • A natural rock may be placed in the enclosure to provide a surface for climbing and basking. The lizard may use the rock to rub against while shedding. All lizards need a place to hide. Cardboard boxes are suitable as hides as they are cheap and disposable (which helps avoid disease transmission between animals). Branches or perching material should be provided for lace monitors. <p>ENVIRONMENTAL VARIABLES</p> <ul style="list-style-type: none"> • A 12-hour day/night light cycle should be provided with a full-spectrum basking light, or a combination of lamps to provide both visible and UV light. These should be replaced as per the manufacturer’s guidelines. This is important as the UV degrades over time. UV meters are available commercially to measure UV output. Nothing should be positioned between the lizard and the light source. Glass and most plastics filter out UV light, while metal mesh decreases the amount of UV light that reaches the lizard by 30–50%.

Intensive care and intermediate housing

Indications for use	Suggested min. dimensions	Suggested requirements
		<ul style="list-style-type: none"> • Ceramic heat lamps or heat globes may be used. Be aware that some products are designed to provide light, rather than heat, and vice versa. The heat lamp should be placed at one end of the enclosure to provide a gradient of heat across the enclosure, allowing the lizard to regulate its body temperature by moving through the gradient. A thermostat can be linked to the heater to regulate the temperature, but should not be solely relied upon to provide accurate temperatures as they can be prone to error. A thermometer should be used to monitor the heating that is provided. Ideally one thermometer should be placed at each end of the enclosure to accurately assess the temperature gradient. <p>PROVISION OF FOOD/WATER</p> <ul style="list-style-type: none"> • A wide, shallow water bowl should be provided.

Pre-release

Indications for use	Suggested min. dimensions	Suggested requirements
<p>No longer require regular handling/medication.</p> <p>Development of fitness/strength prior to release.</p> <p>Monitoring/assessment of behaviour (foraging, digging, nest building).</p> <p>Pre-release assessment.</p>	<p>Jacky lizard, Blue tongue lizard, bearded dragon, water dragon, shingle backs:</p> <p>Enclosure: 1 x 1 m (1 m²) x 1 m. Increase floor area for each additional animal: 0.5 m²</p> <p>Lace monitor:</p> <p>Enclosure: 3.0 x 1.5 m (4.5 m²) x 2.0 m. Increase floor area for each additional animal: 2.0 m²</p>	<p>As above.</p>

Table 1.6 Preferred body temperature zone (PBTZ) and basking temperatures for lizards

Species	PBTZ (°C)	Basking temp (°C)
Jacky lizard	25–32	35–40
Blue tongue lizard	28–32	30–40
Shingleback lizard	28–32	35–40
Bearded dragon	28–36	35–40
Eastern water dragon	25–35	32–40
Lace monitor	22–28	45

Figure 1.8 a. Shows the cage furniture for a jacky lizard. A cardboard box is used as a hide and a rough rock is present to assist with shedding. Note the thermometer placed on the back wall. b. A cardboard box is used as a hide in a kimani incubator. Note the wide, shallow water bowl.



Photo credit: Anne Fowler (a) and Andrea Bromley (b)

Figure 1.9 a. Enclosure for an eastern blue tongue lizard. b. A solid-walled enclosure used to house a lace monitor. Note branches for climbing up to the heat lamps.

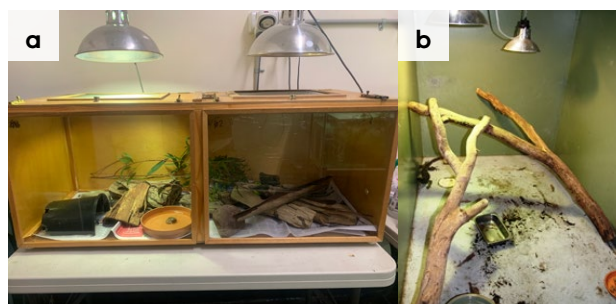


Photo credit: Zoos Victoria (a) and Andrea Bromley (b)

1.7 Feeding and nutrition

Keeping daily records of food offered (item and volume fed) and food consumed is good practice and will allow the rehabilitator to observe how an animal is responding to food on offer and inform future choices.

Please note: Food suppliers and specific products mentioned in these guidelines are intended as examples only. Other suitable products may also be available.

This section refers to feeding and nutrition of lizards in rehabilitation.

Juvenile lizards have the same feeding requirements as adults.



STOP – Please refer to your authorisation for mandatory conditions regarding live feeding.

Table 1.7 Feeding and diet guide for lizards during rehabilitation

	Captive diet	Feeding frequency
Eastern blue tongue lizard	Invertebrates* : snails, slugs, mealworms, cockroaches Vegetable mix [#] Small mice	5–10% of body weight. Feed daily if recovering from burns. Feed every two to three days if growing, sick or injured. Otherwise, adults are fed three times a week in summer, twice a week in autumn/spring and once a week in winter unless they are cooled down for brumation. Unwell lizards should not be allowed to brumate as healing cannot occur outside of their PBTZ.
Blotched blue tongue lizard	Invertebrates : snails, slugs Vegetable mix Small mice	
Shingleback lizard	Invertebrates : snails, slugs, mealworms Vegetable mix Small mice	
Lace monitor	Meat, mice, rats, young chickens	
Eastern bearded dragon	Invertebrates : mealworms, crickets, cockroaches, moths, snails, earthworms Pinkie mice	
Eastern water dragon	Invertebrates : mealworms, crickets, cockroaches, moths, snails Mice, rats	
Jacky lizard	Invertebrates : mealworms, crickets, cockroaches	

	Captive diet	Feeding frequency
Unsuitable foods	<ul style="list-style-type: none"> • A fruit-only diet in dragons due to the risk of stomatitis. • Commercially available bearded dragon pellets as they are not recognised as food by wild lizards. • Canned and dry dog and cat food as they have high protein levels that may lead to kidney disease. • Restrict mealworm quantity as they are high in fat and can cause gut impaction in dragon species. 	
Emergency foods	Hills a/d or Wombaroo Reptile Supplement mixed into a slurry with warm water. Oxbow Critical Care for skinks and bearded dragons.	

* All insects should be offered Wombaroo Insect booster or Vetafarm Herpagrub for **at least** two to three days and preferably for seven to 14 days before being fed to ensure that they are high in nutritional value. Invertebrates should additionally be dusted with a calcium carbonate powder, or commercially available reptile specific vitamin supplement from a pet shop.

See **Table 1.8** for lizard vegetable mix composition. 10 g Wombaroo Reptile supplement should be mixed through 50 g vegetables. A small number of mealworms can be added to the mix to stimulate eating due to their movement. Items such as celery, lettuce, cos lettuce and corn are rarely fed because of their high water content and low nutritional value. Beetroot, spinach and silver beet can bind calcium, preventing its absorption from the gut, while brassicas such as broccoli and cauliflower are goitrogenic and can interfere with thyroid function.

Table 1.8 Lizard vegetable mix

VEGETABLES Grated or finely chopped, should make up 5–15% of the mix (% by weight)		
STAPLE	OCCASIONAL	RARELY/NEVER
Pumpkin, squash, parsnip, snap peas, green beans, okra, prickly pear	Carrot, capsicum, zucchini, sweet potato, tomatoes	Beetroot, broccoli, cauliflower, celery, silver beet, sweet corn, celeriac
LEAFY GREEN VEGETABLES Chopped and shredded, should make up 85–95% of the mix (% by weight)		
STAPLE	OCCASIONAL	RARELY/NEVER
Endive, chicory, escarole, watercress, dandelion greens/flowers, milk thistle, mustard greens, turnip greens	Alfalfa	Lettuce, cos lettuce, bok choy, Chinese cabbage

Figure 1.10 Lizard vegetable mix and crickets.

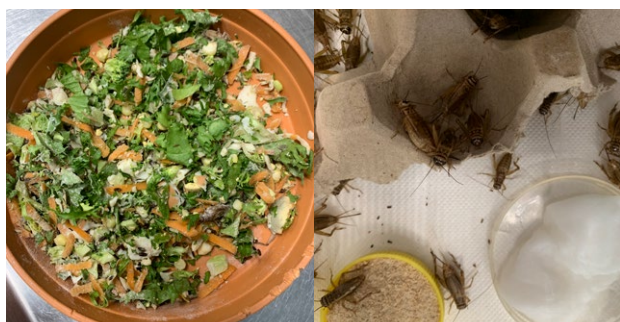


Photo credit: Zoos Victoria

Figure 1.11 Feeding lizard from a spoon.



Photo credit: Zoos Victoria

1.8 Release protocol

Ideally, wild animals will be rehabilitated and released in a short timeframe. If this is not possible and the animal is in care for significant extended periods, ensure that the animal is regularly assessed against the five welfare domains to support decision-making. Animals in care for extended periods may have a reduced ability to survive in the wild. Talk to your veterinarian and consider whether euthanasia will provide the best welfare outcome for such individuals.

1.8.1. Pre-release assessment

Pre-release assessment of animals in care is essential to support improved outcomes once back in the wild. Animals should be assessed based on body condition, fitness and the ability to engage in natural species-specific behaviours prior to release.

The following check list should be used to guide decision-making regarding release suitability for lizards:

- ☑ Lizard is in a state of good health – presenting injury/sickness is completely resolved (consider a pre-release veterinary check).
- ☑ Lizard is within a healthy weight range and appropriate body condition (refer to **Table 1.1**).
- ☑ Lizard displays ability to actively forage for and consume natural foods.
- ☑ Arboreal lizards can climb branches.

1.8.2. At the release site

Post release survival will be maximised by ensuring that both the release site and the way in which the animal is released are carefully considered.

Lizards require the following:

- A supply of invertebrates and food plants.
- A variety of shelters, such as rocks, fallen wood, small caves or bushes.

For more information on the ecological characteristics and requirements of lizards that may help with their release, please refer to **Table 1.1**.

1.8.3. Release checklist

Check all of the requirements of your authorisation are being met, and consider the following:

Release location

- ☑ Release where the lizard was found. If the site no longer provides sufficient food, water or shelter, the lizard can be released at a nearby location within its home range.
- ☑ Suitable vegetation is available, including grasses and dense lower story vegetation.
- ☑ Ample foraging areas.

Release Procedure

- ☑ Limit the number of people at the release.
- ☑ Appropriate timing: Lizards should be released during the warmest time of the day, when the weather forecast temperatures are expected to be at or above 20°C for at least three days.
- ☑ Open transport container near dense cover, ensuring that people are standing behind the animal's flight zone.
- ☑ Allow the lizard to leave in its own time.
- ☑ Place the lizard on the ground and walk away.

1.9 Key references and additional reading

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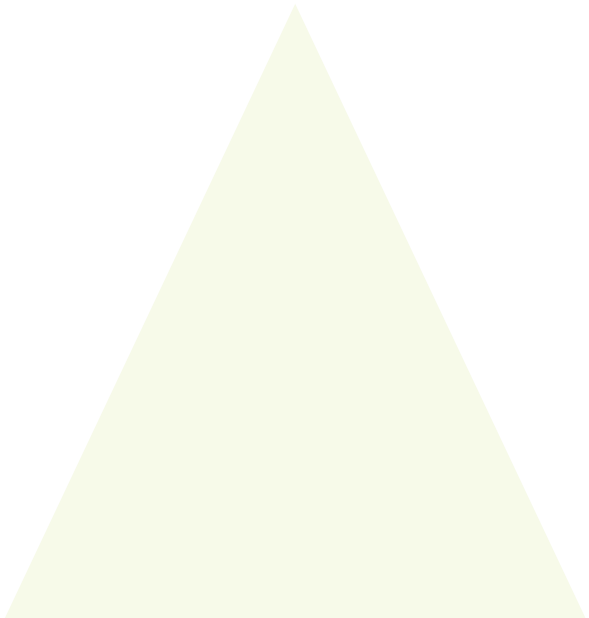
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Chapter 2. Snakes



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In Victoria, sick, injured or orphaned wildlife can only be rehabilitated by a wildlife shelter operator or foster carer who is authorised under section 28A of the Victorian *Wildlife Act 1975* (Wildlife Act). Wildlife rehabilitators are subject to strict conditions. The mandatory requirements that they must meet are set out in the Wildlife Shelter and Foster Carer Authorisation issued under the Wildlife Act. These conditions enforce the minimum standards required for the humane treatment and successful rehabilitation of wildlife in care. The Wildlife Rehabilitator Authorisation Guide: Things You Need To Know explains how wildlife rehabilitators can meet these mandatory requirements and can be found here: <https://www.vic.gov.au/wildlife-rehabilitation-shelters-and-foster-carers>.

The Victorian Wildlife Rehabilitation Guidelines have been developed to incorporate evidenced-based best practice in wildlife care and rehabilitation to equip rehabilitators to deliver positive welfare outcomes for individual animals in their care from first aid to post-release into the wild.

You must comply with the conditions of your authorisation. These guidelines must be read in conjunction with the conditions of your authorisation.

This chapter also lists some non-endemic and introduced species of snakes. These species pose a threat to native species through predation and the introduction of new animal diseases and should be reported. Notify DEECA or Agriculture Victoria of all exotic snakes in the wild or any that come into care on 136 186 or email **highrisk.invasiveanimals@agriculture.vic.gov.au**.

2.1 Introduction

Victoria is home to 27 species of snakes. The majority of these are venomous and potentially dangerous. Wildlife rehabilitators should not attempt to handle or capture snakes unless they have had suitable training and experience. If bitten by a snake, dial 000 immediately. Wild snakes brumate (becoming sluggish or inactive) over the winter months in southern Australia, but they also often emerge on sunny days in the colder months, and therefore can be encountered in winter. They seek refuge in rocks, logs or leaf litter, often within a few hundred metres of water. This chapter addresses the husbandry, care and welfare of snakes that are commonly encountered in Victoria.

When snakes come into care it is the responsibility of the rehabilitator to ensure that the five domains of animal welfare are satisfied. These include providing optimal nutrition and an environment appropriate to the stage of rehabilitation. This is even more important for snakes than for some other species as the rehabilitator completely controls the snake's environment while in care. The focus should be on the snake's return to health and release, which is facilitated through regular collaboration with a veterinarian. It is also important to consider the snake's mental state and ability to exhibit normal behaviours without detrimentally affecting its recovery. Welfare may be temporarily compromised by the necessity of a gradual return to normal activity, depending on its stage of rehabilitation. Further information about the five domains of animal welfare is in Part A of these guidelines.





STOP – If a threatened species comes into care, please STOP and refer to your authorisation for mandatory conditions including notification and release requirements.


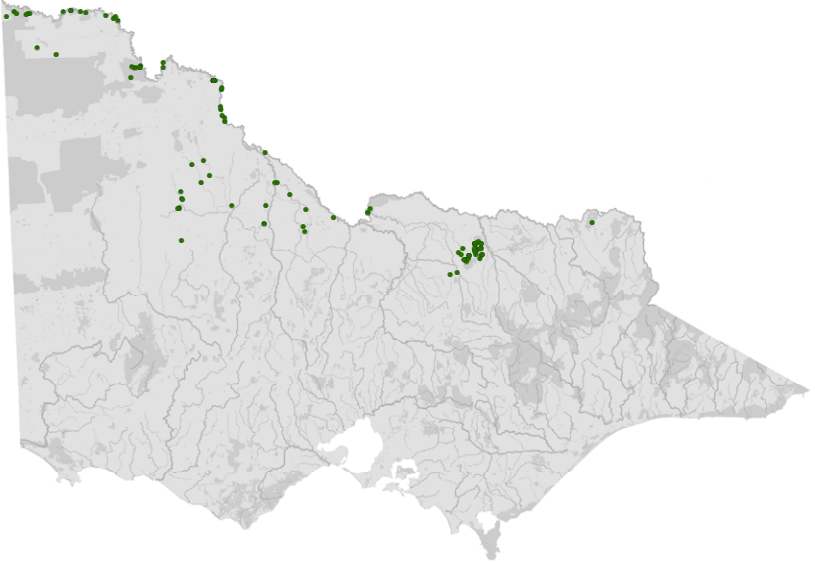
2.2 Species information

Profiles for the most common snake species found in Victoria are detailed in the tables below. It does not describe all the snake species in Victoria. For assistance in identification of snake species, refer to the recommended reading and reference material at the end of this chapter.


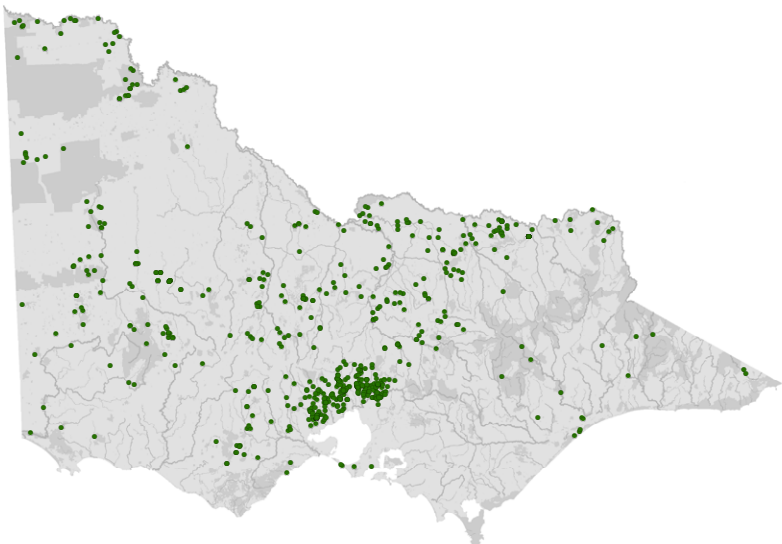
Table 2.1 Species profiles

Species	Diamond python (<i>Morelia spilota spilota</i>)
 <p data-bbox="129 1335 392 1357">Photo credit: Ian McCann</p>	<p data-bbox="560 775 772 797">Distribution map</p>  <p data-bbox="560 1406 1286 1451">Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Olive black with cream spots
Snout vent length	150–400 cm
Venomous	No
Conservation status*	Critically endangered
Habitat	Wet to dry forests, also found in heathland, woodland, coastal rock outcrops
Home range	2–20 ha
Foraging style	Ambush
Diet	Mostly mammals

Species	Diamond python (<i>Morelia spilota spilota</i>)
Roost or hide	Tree hollow, burrows, rock crevices, dense vegetation
Peak activity	Mainly diurnal
Territorial	Yes
Sexual maturity	2.5–3 years
Give birth/lay eggs	Summer
Incubation	6–12 weeks
Litters per year	Average 25 eggs per clutch (9–54 recorded in the wild). Females do not breed every year

Species	Carpet python (<i>Morelia spilota metcalfei</i>)
 <p>Photo credit: David Paul, Museums Victoria</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Closely related to the diamond python, but has grey and black patches over back with elongated patches along sides
Snout vent length	170–300 cm
Venomous	No
Conservation status*	Endangered
Habitat	River red gum forests and blackbox woodlands along major watercourses; rocky hills (often within woodlands) mallee shrublands and freshwater swamps

Species	Carpet python (<i>Morelia spilota metcalfei</i>)
Home range	30–150 ha
Foraging style	Ambush
Diet	Small mammals (>50% rabbit) and birds; juveniles eat mostly lizards
Roost or hide	Tree hollow, burrows, rock crevices
Peak activity	Mainly nocturnal
Territorial	Yes
Sexual maturity	2.5–3 years
Give birth/lay eggs	Summer
Incubation	50–60 days
Litters per year	1 clutch of 20 eggs every 3–4 years

Species	Eastern brown snake (<i>Pseudonaja textilis</i>)
 <p>Photo credit: Ian McCann</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Eastern brown snake. The colour may vary from pale to dark brown. Top and bottom of snake is the same colour. Note the bars on the head in the bottom image, indicating a juvenile animal
Snout vent length	150–250 cm
Venomous	Yes, fatal

Species	Eastern brown snake (<i>Pseudonaja textilis</i>)
Conservation status*	Common
Habitat	Dry, rocky hillsides to wet forest
Home range	4–6 ha
Foraging style	Search
Diet	Wide variety, includes rats and mice
Roost or hide	Burrows, hollow logs
Peak activity	Diurnal
Territorial	Yes
Sexual maturity	3 years
Give birth/lay eggs	Summer
Incubation	36–95 days
Litters per year	10–35

Species	Highland copperhead (<i>Austrelaps ramsayi</i>)
 <p>Photo credit: Nick Clemann, DEECA</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Reddish brown to dark grey; prominently barred lips

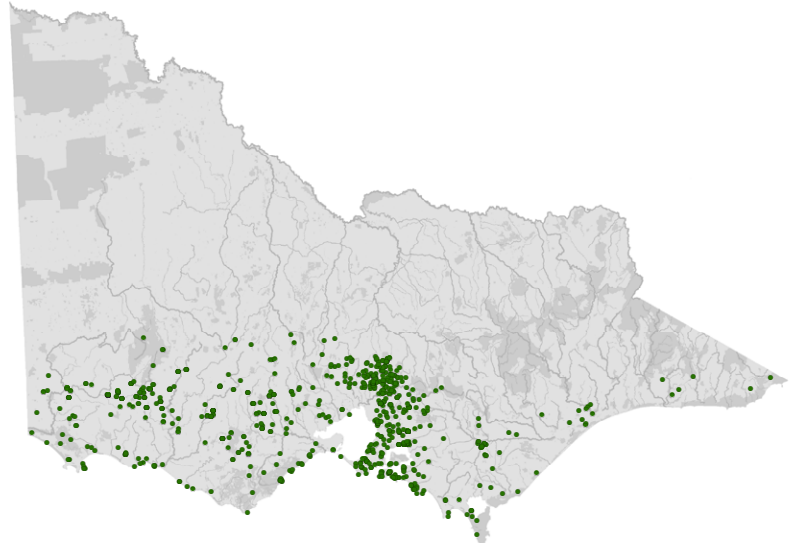
Species	Highland copperhead (<i>Austrelaps ramsayi</i>)
Snout vent length	Males SVL 58.8 cm Females SVL 54.5 cm
Venomous	Yes, fatal
Conservation status*	Common
Habitat	Woodlands and open forest near high altitude creeks, marshes, wetlands
Home range	Unknown
Foraging style	Search
Diet	Lizards (mostly skinks), frogs, snakes
Roost or hide	Logs, rocks, tussocks
Peak activity	Diurnal
Territorial	Yes
Sexual maturity	Males SVL 58.8 cm Females SVL 54.5 cm
Give birth/lay eggs	Summer
Incubation	Live bearer
Litters per year	9–31

Species

Lowland copperhead (*Austrelaps superbus*)

Photo credit: Colin Silvey,
Museums Victoria

Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023
www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

General appearance	Brown to black; barred colour on lips. Often has vermillion/copper coloured belly
Snout vent length	Males SVL 47.7 cm Females SVL 43.6 cm
Venomous	Yes, fatal
Conservation status*	Common
Habitat	Marshes, swamps
Home range	Unknown
Foraging style	Search
Diet	Lizards (mostly skinks), frogs, snakes
Roost or hide	Wooden logs, rocks, tussocks
Peak activity	Diurnal
Territorial	Yes
Sexual maturity	Males SVL: 47.7 cm Females SVL: 43.6 cm

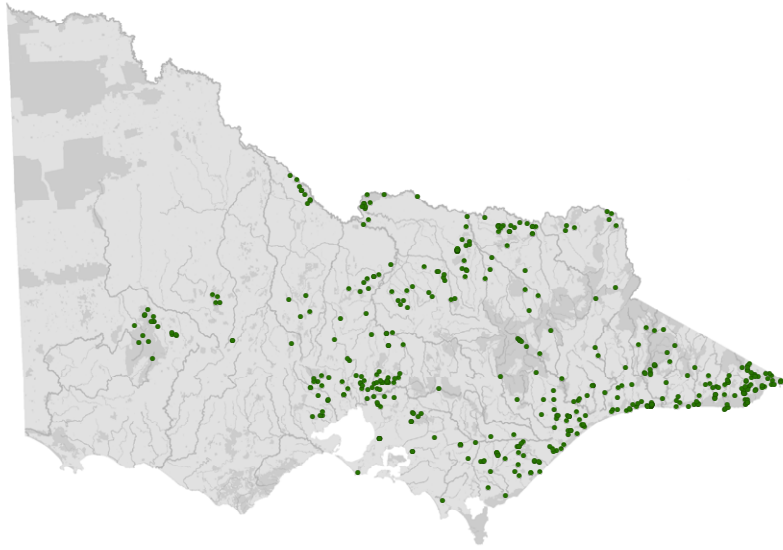
Species	Lowland copperhead (<i>Austrelaps superbus</i>)
Give birth/lay eggs	January–March
Incubation	Live bearer
Litters per year	9–45

Species	Red-bellied black snake (<i>Pseudechis porphyriacus</i>)
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Photo credit: David Paul, Museums Victoria



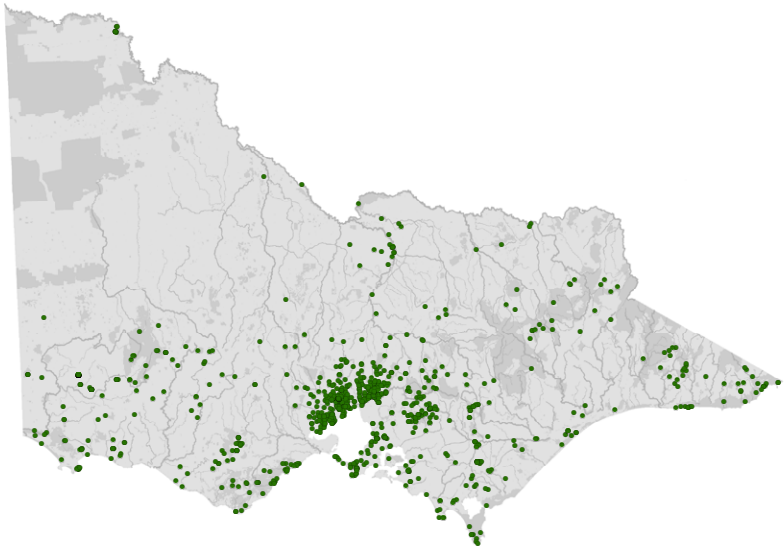
Distribution map




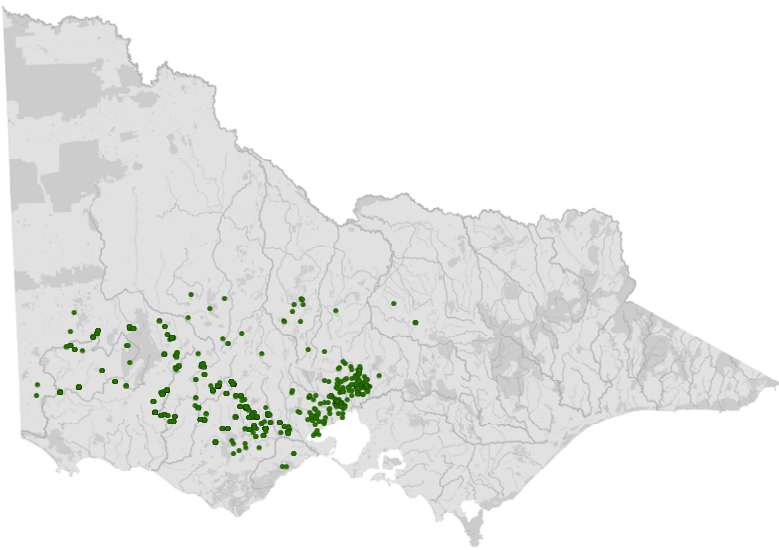
Data source: Victorian Biodiversity Atlas Jan 2023
www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

General appearance	Black with crimson belly
Snout vent length	150–250 cm
Venomous	Yes, fatal
Conservation status*	Common
Habitat	Stream, swamp, lagoon
Home range	0.02–40 ha
Foraging style	Search
Diet	Wide variety
Roost or hide	Rocks, logs, burrows
Peak activity	Diurnal



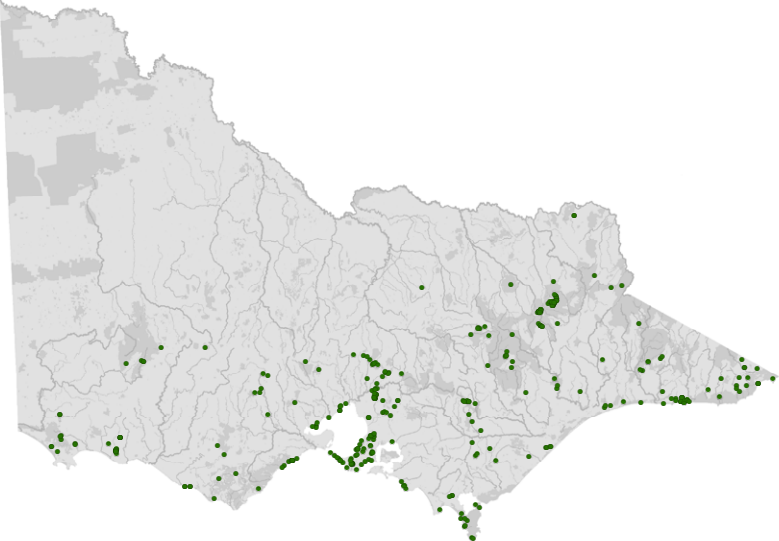
Species	Red-bellied black snake (<i>Pseudechis porphyriacus</i>)
Territorial	Yes
Sexual maturity	2–3 years
Give birth/lay eggs	February–April
Incubation	Live bearer
Litters per year	5–18

Species	Tiger snake (<i>Notechis scutatus</i>)
 <p>Photo credit: David Paul, Museums Victoria</p>  <p>Photo credit: Nick Clemann</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	May or may not have bands on body. Note the colour variations in this species
Snout vent length	SVL 75–85 cm
Venomous	Yes, fatal
Conservation status*	Common
Habitat	Woodland to river floodplain
Home range	3–7 ha
Foraging style	Search


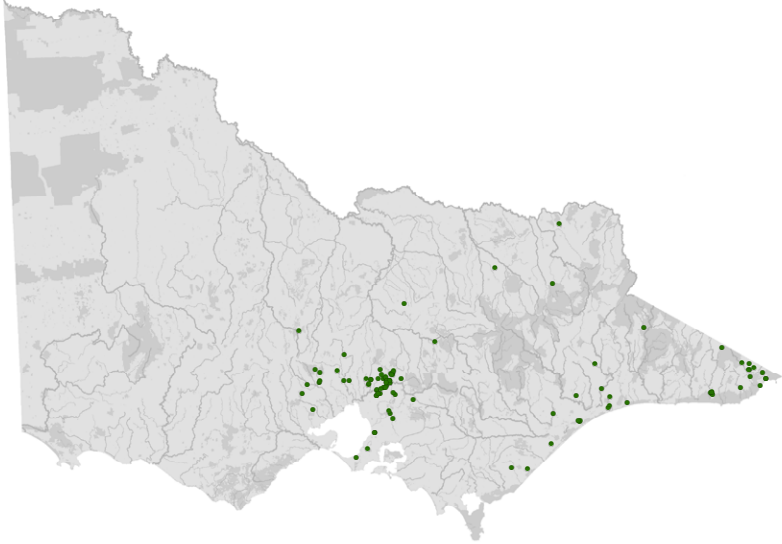
Species	Tiger snake (<i>Notechis scutatus</i>)
Diet	Wide variety
Roost or hide	Fallen timber, disused burrows
Peak activity	Diurnal but nocturnal in warm weather
Territorial	Yes
Sexual maturity	SVL 75–85 cm
Give birth/lay eggs	Late summer–mid autumn
Incubation	Live bearer
Litters per year	10–64

Species	Little whip snake (<i>Parasuta flagellum</i>)
 <p>Photo credit: Ian R McCann, Museums Victoria</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Brown with black on top of head. Little whip snake showing the dark head and brown body
Snout vent length	30–40 cm
Venomous	Yes, not fatal
Conservation status*	Common

Species	Little whip snake (<i>Parasuta flagellum</i>)
Habitat	Woodland, rocky outcrops
Home range	1–3 ha
Foraging style	Search and ambush
Diet	Lizards
Roost or hide	Rock crevices
Peak activity	Nocturnal
Territorial	Yes
Sexual maturity	Unknown
Give birth/lay eggs	September–February
Incubation	Live bearer
Litters per year	2–7

Species	White-lipped snake (<i>Drysdalia coronoides</i>)
 <p>Photo credit: David Paul, Museums Victoria</p>  <p>Photo credit: Nick Clemann</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	White-lipped snake showing the white scales on the top lip
Snout vent length	35–50 cm
Venomous	Yes, not fatal

Species	White-lipped snake (<i>Drysdalia coronoides</i>)
Conservation status*	Common
Habitat	Near water, grasses
Home range	1–3 ha
Foraging style	Search
Diet	Mostly skinks
Roost or hide	Rocks, logs, litter
Peak activity	Mainly diurnal
Territorial	Yes
Sexual maturity	3 years
Give birth/lay eggs	March–April
Incubation	Live bearer
Litters per year	2–10



Species	Eastern small-eyed snake (<i>Cryptophis nigrescens</i>)
 <p>Photo credit: Nick Clemann</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Black with cream to pale pink belly

Species	Eastern small-eyed snake (<i>Cryptophis nigrescens</i>)
Snout vent length	Males SVL 26.3 cm Females SVL 28.5 cm
Venomous	Yes, fatal (one human fatality)
Conservation status*	Common
Habitat	Rainforest, wet sclerophyll forest, woodlands, heaths, rocky outcrops
Home range	Unknown
Foraging style	Search and ambush
Diet	Mostly skinks
Roost or hide	Rocks, bark, fallen timber
Peak activity	Mainly nocturnal
Territorial	Yes
Sexual maturity	Males SVL 26.3 cm Females SVL 28.5 cm
Give birth/lay eggs	October–April
Incubation	Live bearer
Litters per year	4–8

*From the *Flora and Fauna Guarantee Act 1988* Threatened List June 2023. This list is updated regularly throughout the year. For the most current list, please visit <https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list>

Table 2.2 Non-endemic native and exotic snake species that are kept under permit

Species	Introduced or non-endemic	Declared pest animals/ kept in Victoria	Description
Children's python <i>(Antaresia childreni)</i>  <p>Photo credit: Shutterstock</p>	Non-endemic	Not declared, can be kept but not released	75–100 cm, spotted, northern Australian, non-venomous snake
Spotted python <i>(Antaresia maculosa)</i>  <p>Photo credit: Shutterstock</p>	Non-endemic	Not declared, can be kept but not released	100–140 cm, blotched, northern Australian, non-venomous snake
Corn snake (<i>Pantherophis guttatus</i>)  <p>Photo credit: AgVic</p>	Introduced	Declared pest animal, must not keep in Victoria	61–182 cm, brightly marked, North American, non-venomous snake
Reticulated python <i>(Malayopython reticulatus)</i>  <p>Photo credit: AgVic</p>	Introduced	Declared pest animal, must not keep in Victoria	1.5–6.5 m, reticulated patterned, South and Southeast Asian, non-venomous snake

Species	Introduced or non-endemic	Declared pest animals/ kept in Victoria	Description
Boa constrictor (<i>Boa constrictor</i>)  <p>Photo credit: AgVic</p>	Introduced	Declared pest animal. Can only be kept under restricted permit	3–5 m, varied colouring/markings, South American, non-venomous snake
Burmese python (<i>Python bivittatus</i>)  <p>Photo credit: AgVic</p>	Introduced	Declared pest animal, must not keep in Victoria	3–5 m, brown blotched, Southeast Asian, non-venomous snake

The introduced species listed in **Table 2.2** are not native to Australia and if given the opportunity could populate a wide range of landscapes within Victoria, impacting native wildlife through predation and the introduction of new animal diseases.

These introduced snakes are classified as a controlled pest animal under the Victorian *Catchment and Land Protection Act 1994*. The importation, keeping, breeding and trading of this species, without appropriate permits, is illegal and penalties apply.

These introduced snakes have been found in all states in Australia, including Victoria and are typically escapees or deliberately released animals from the illegal pet trade.

Exotic and native species non-endemic to Victoria **must not** be released into the wild. In cases where the animal is suspected to be an escaped pet, take the animal to a veterinarian to be scanned for a microchip. If an owner can be identified, the animal should be returned

as soon as possible. Occasionally exotic snake species come into care. It is illegal for wildlife rehabilitators to be in possession of such species. These animals must be euthanised as they are considered potential pests and pose a threat to native species. Notify DEECA or Agriculture Victoria of all exotic snakes in the wild or any that come into care on 136 186 or email **highrisk.invasiveanimals@agriculture.vic.gov.au** or **<https://agriculture.vic.gov.au/biosecurity/pestanimals/report-an-exotic-pest-animal-sighting>**.

A few examples of non-endemic and exotic species are listed in **Table 2.2**. The list is not intended to be exhaustive or representative.

2.3 Animal and human safety considerations



In general, animals in the wild have limited contact with people, pets, and the hustle and bustle of our daily lives. When sick, injured or orphaned wild animals come into care this unnaturally close contact can carry risks to the health and safety of both people and animals. For general information on biosecurity and approaches to minimise these risks see Part A of these guidelines. Specific information on enclosure hygiene and biosecurity for snakes is in **Section 2.6.2**.

The following information relates to the human and animal health and safety considerations specifically related to the rehabilitation of snakes.

2.3.1. Human safety considerations

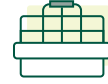
- Wash hands with soap and water after handling frogs to minimise the risk of infection with zoonotic disease agents such as *Salmonella*.
- **Wildlife rehabilitators should not attempt to handle or capture snakes unless they have had suitable training and experience due to the potential risk of harm to the snake, or to the rehabilitator.** A first aid (HLTAID003) course with proficiency in bandaging for snake bite is also recommended.

- Almost all of the snakes found in Victoria are venomous. If there is any possibility that the snake is a venomous species, a licenced/ trained venomous snake handler should be sought. A bite from these snakes may produce envenomation which can be fatal to humans due to paralysis of the respiratory muscles. **If bitten by a snake, dial 000 immediately.**
- Juvenile snakes are just as venomous as adults.
- Non-venomous snakes can still deliver a painful bite that can become infected.

2.3.2. Animal safety considerations

- When used correctly by a licensed venomous snake handler, tongs and jigger sticks are legitimate tools for capturing and handling venomous snakes. However, inappropriate force from these instruments can injure the snake.

2.4 Capture, restraint, and transport



Refer to Part A of these guidelines for general advice on wildlife welfare, biosecurity and hygiene, and record requirements. The following information relates to the capture, restraint, and transport of sick, injured and orphaned snakes.

2.4.1 Visual observations

Visual observations of wildlife should be conducted prior to any attempts to capture the animal. This is just as important prior to the first capture from the wild as it is before any capture conducted while an animal is in captive care. Observations should be conducted quietly, by

one person, and from a distance which provides a clear view of the animal with as little disturbance as possible. Visual observation should focus on the animal's demeanour, behaviour, movement and posture. Check for evidence of injury/ severe disease or deterioration and assess their breathing as demonstrated in the following table.

Table 2.3 Visual health observations in snakes

Observation	What to look for
Demeanour	<ul style="list-style-type: none"> • Appears alert • Tongue flicks out of the mouth at regular intervals
Behaviour	<ul style="list-style-type: none"> • Should attempt to move away, hide or strike if approached
Movement and posture	<ul style="list-style-type: none"> • Moves freely on its belly • Entire body moves
Breathing	<ul style="list-style-type: none"> • Nostrils are clear and open • Breathing is regular • No open mouth breathing

2.4.2. Equipment

- **Personal protective equipment** including long sleeves and trousers with covered shoes are to be worn during capture and handling.
- **First aid kit, including a snake bite bandage** should be on-hand at all times during snake capture and handling.
- **A pinning or hook stick can be used with a hoop net.** A pinning stick has a long handle with a T-shaped end covered with rubber. Prior training in the use of a pinning stick is required to prevent damage to the snake from its use.
- **Tongs and jigger sticks** may be used.
- **Snake bag:** This is a cloth bag with a rigid rim on a short pole. See **Figure 2.1**. The corners of the bag are sewn to create a curved edge. The pole should be detachable from the rim so that the snake does not need to be transferred to a calico bag for transport.
- Alternatively, the snake is transported inside a **pillow case or calico bag inside a container.** The bag is secured with a cable tie, rope or pipe cleaner. Pillow cases and calico bags should be inspected prior to use to ensure no loose threads on the inside where snakes can become entangled during transport.
- **Solid-walled enclosure with sufficient ventilation:** Examples include rubbish bins with clipped lids, ClickClack containers (for small snakes), eskies or plastic tubs all with holes cut for ventilation.
- Enclosures for transportation of snakes should be labelled: 'CAUTION: LIVE VENOMOUS (or NON-VENOMOUS) SNAKE' with a contact number, in the event of an accident.

Figure 2.1 Snake bag



Photo credit: Zoos Victoria

2.4.3. Technique

It is beyond the scope of these guidelines to outline techniques for every situation that may be encountered. Examples of techniques for some specific situations are outlined in the following section.

In addition to this information, for further advice please also refer to the recommended reading list, zoological institutions, veterinarians and/or wildlife experts. Inexperienced rescuers should request assistance where possible.

- Venomous snakes should not be handled unless the person has had training and demonstrated competency in handling these species.
- Whenever possible, avoid picking up the snake. Use the jigger or hook stick to move the snake into a darkened bag.
- The preferred method of snake restraint involves the use of clear plastic tubes, with lids that can be secured, slightly larger than the width of the snake (see **Figure 2.5**).

- A snake hook is used to reach the snake's tail that is then held by hand. The snake is positioned on the floor against a wall. As the snake moves along the wall the tube is positioned in front of it so that the snake crawls into it. This process can also be completed with the snake in a garbage bin. Gloves should be worn as snakes will often attempt to bite the inside of the tube releasing venom. This venom can be absorbed through any wounds on the hands and via mucous membranes. Snake handling and holding equipment should always be rinsed well after use.
- The snake could also be restrained using a pinning stick to immobilise the head so that it can then be restrained by hand. This should only be done by an experienced handler. The body is supported by the other hand.

Figure 2.2 a. Restraint of a snake using the thumb and index finger to immobilise the head. b. A hook and pinning stick are shown.

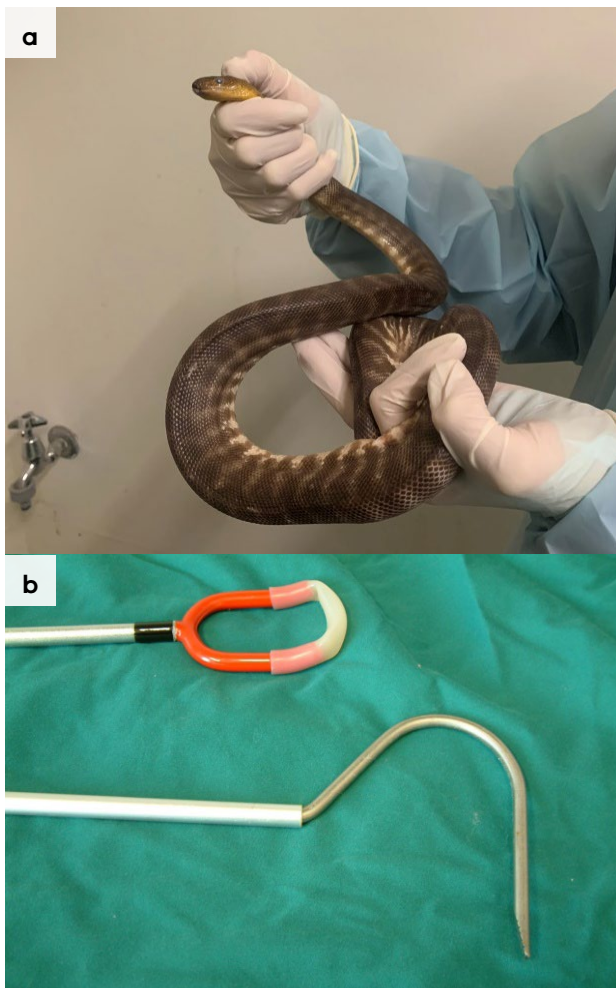


Photo credit: Zoos Victoria

15.4.2.1. Entanglement

Snakes can become entangled in netting and wire, or stuck inside cans. Rather than attempting to free the snake at the site, cut the netting/wire and take the snake with the netting/wire to a veterinarian. The netting/wire may then be cut away or the snake extracted from the can while the snake is anaesthetised.

Figure 2.3 A tiger snake's head is trapped inside a can. (Extreme care must be taken. Snake was anaesthetised to remove the can).



Photo credit: Zoos Victoria

15.4.2.2 Predation

Trained and accredited snake handlers should ensure pets are restrained and removed from the scene prior to the capture process to prevent them being bitten, and to prevent further injury to the snake (for example dog bites). The pet owner should also be advised to take their pet to a veterinarian if there is a chance that the animal has been bitten. If the snake is injured, there may be a high likelihood the pet has been bitten.

15.4.2.3. Side of the road

Snakes that have been victims of vehicle trauma may be severely injured but may still be able to move quickly and unexpectedly. Performing any animal capture work near a road also poses an inherent danger to the responder, due to the presence of oncoming traffic. Use high caution and assess for potential hazards when capturing animals next to roads and when handling the snake itself. Ideally, a trained and accredited snake handler should be called to perform the rescue.

15.4.4 Transport

- Snakes should be transported in a solid sided container such as a bin, ClickClack or esky with air holes.
- All containers holding snakes should have lids that can be secured.
- Ideally, snake holding/transport containers should be clearly labelled with 'Contains venomous snake'.
- The vehicle should be air conditioned but should not go below 20°C.
- Food and water do not need to be provided.

Figure 2.4 Example of label for transport container holding venomous snake.



Photo credit: Zoos Victoria

2.5 Monitoring animal health and welfare



The goal of wildlife rehabilitation is to address health and welfare concerns quickly and effectively so wildlife can be released back to the wild as soon as possible. Decision-making from the time of capture through to release should be guided by an accurate understanding of the animal's true state of health and welfare. Careful monitoring throughout the rehabilitation period ensures that significant issues, or deterioration in health condition, are identified immediately and rapidly addressed.

It is preferred that all sick, injured or orphaned wildlife be assessed by a veterinarian to ensure that non-obvious signs of trauma or disease can be assessed and treated as soon as practicable. No medication should be provided prior to this assessment, as this can mask clinical signs and make an accurate health assessment by the veterinarian very difficult.

Templates for record-keeping visual and physical observations and daily care can be found in Part A of these guidelines.

This section provides guidance on health assessments on arrival and on effective monitoring of the health and welfare of individuals in care through minimising human-animal interactions and stress to the animal to maximise successful release back to the wild.

2.5.1 Physical examination

If not a trained snake handler, one should be engaged to assist when performing any examination or intervention with a venomous snake. Once visual observations are complete, and the animal is stable enough to withstand capture and handling, a basic physical examination should be conducted. This can be repeated when required any time the carer has the animal in the hand, such as for an enclosure change. However, if a full physical exam is not conducted, body condition and weight should be assessed every time the animal is in the hand for other reasons. Carers should make sure weighing scales are available and ready to use before capturing the animal. Physical examinations are also required if the carer notices any changes suggestive of deteriorating health or injury.

Always record the physical examination findings, so that you can compare findings as the

animal's rehabilitation progresses. This ensures any health concerns are identified as soon as possible, and the carer can plan release as soon as appropriate. **A template for recording physical examination findings can be found in the appendices to Part A of these guidelines.**

Examinations should be conducted in a quiet location, away from domestic animals. **Only a trained venomous snake handler should handle a venomous animal, while a second person takes notes. Experienced python handlers should handle those species.** All other people should move away, and noise kept to a minimum. Handling should also be kept to a minimum, with careful monitoring for any signs of distress (such as sudden deterioration in demeanour or a limp posture). If these are seen, the examination should be stopped immediately and the animal returned to its catch bag, transport box or enclosure and allowed to recover.

Species specific considerations:

- Examination of venomous snakes is best performed under general anaesthesia. Clear plastic tubing can be used to examine and anaesthetise venomous snakes. Restraint in this type of manner should be performed by a trained snake handler.
- Manual restraint can be used to examine pythons. However, care should be taken not to cause injury to the animal. Only those experienced in handling pythons should undertake manual restraint. It is important to restrain the head to avoid being bitten.
- Physical examinations should be performed when the snake's body temperature is within its preferred body temperature zone (**PBTZ**) to permit the normal display of behaviour. **Table 2.4** summarises normal presentations to assist with identifying illnesses and injuries.

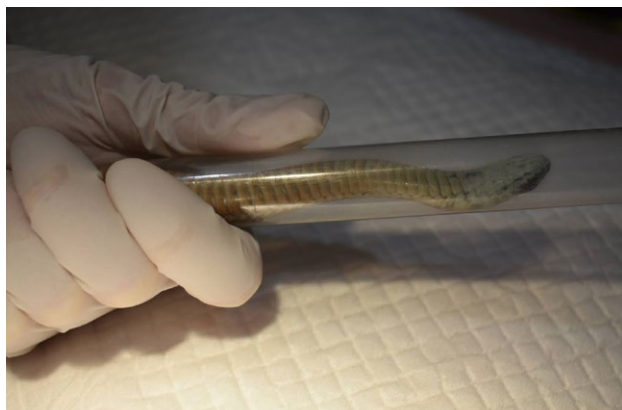
Figure 2.5 Snake restrained inside a plastic tube.

Photo credit: Shane Simpson

Figure 2.6 Snake physical examination

Photo credit: Zoos Victoria

Table 2.4 Physical examination of snakes

What to look for	
Body weight	<ul style="list-style-type: none"> Record body weight on arrival and at least weekly while in care. A greater than 10% change in body weight is cause for concern, and the carer should seek veterinary advice.
Body condition	<p>Body condition is scored by palpation of the muscles either side of the spine:</p> <ul style="list-style-type: none"> Under condition: Spine is pronounced. Adjacent muscles are concave. Ideal condition: Spine is easily palpated. Muscle profile is triangular. Over condition: Spine cannot be felt. Muscles protrude above the spine.
Hydration status	<ul style="list-style-type: none"> Skin should glide over muscles and should not tent. Skin should be taut and not wrinkled.
Eyes	<ul style="list-style-type: none"> Clear unless the snake is sloughing when they will appear blue or cloudy.
Mouth	<ul style="list-style-type: none"> Will be difficult to see unless anaesthetised. Should be pale pink unless pigmented. No swelling or cheesy material, which may indicate a mouth infection.
Cloaca	<ul style="list-style-type: none"> Pink with no accumulation of faeces or urates.
Skin condition	<ul style="list-style-type: none"> Scales should be smooth and shiny (unless sloughing when they become dull) with no wrinkles.
Tail	<ul style="list-style-type: none"> Should end in a distinct point.
Sex determination	<ul style="list-style-type: none"> Not usually relevant to its rehabilitation. Determined by inserting a probe into the hemipenal pocket. If not done properly it can be dangerous for the snake and the handler. It should only be performed by a veterinarian or trained snake handler.

2.6 Ongoing monitoring of health and welfare



The aim of wildlife rehabilitation is to ensure animals recover and can be released back to the wild as quickly as possible. Careful, daily monitoring is required to ensure that animals are responding as expected to the treatment being provided and so that any deterioration or welfare concerns can be identified and addressed as soon as possible. Rehabilitators should ensure that record-keeping is a priority to maximise positive welfare outcomes. Templates to assist wildlife rehabilitators to record and monitor wildlife health and welfare can be found in the appendices to Part A of these guidelines. These records will be valuable tools to share with veterinarians to support decision-making.

The following is recorded daily:

- demeanour
- food consumption
- faecal/urine output
- behaviour observed
- medical treatment provided
- evidence of overnight activity.

The following is recorded weekly:

- weight
- body condition.

Over time, regular monitoring will also help to develop carer skills and knowledge, as regular observations and recording will result in a deep understanding of the expected behaviour and response to treatment for the species in care.

Species specific considerations:

- The snake should be observed at least daily.
- Note the snake's demeanour and behaviour every time food is introduced or taken away, the animal is medicated or the enclosure is cleaned. Pay particular attention to any changes that have occurred since the previous day.
- Note faecal consistency. The snake should pass solid brown faeces, pasty white urates and liquid urine, which may not be detectable if it has soaked into the substrate. If diarrhoea is noticed, a faecal sample should be collected and submitted to the veterinarian for assessment as soon as possible. Do not

treat on suspicion of a bacterial or parasitic infection, as this can make definitive diagnosis very difficult and potentially prolong the course of the disease.

- Venomous snakes should only be handled by trained/experienced personnel.

2.6.1. Common presenting injuries and clinical signs of emerging health conditions

Clear guidance on conditions that may require euthanasia can be found in Part A of these guidelines.

Table 2.4 lists common clinical signs and possible causes of injury/disease. Carers should be aware that these are not exhaustive. Aside from first aid, carers should avoid administering medications prior to the provision of veterinary advice.

Unusual clinical signs or mass mortality events – a number of animals dying or found dead at the same time, with similar signs – may indicate an emergency animal disease, an emerging/new infectious disease or an environmental/human related toxicity which needs further investigation. Report these immediately to the Emergency Animal Disease Watch Hotline on 1800 675 888 (24 hours).

Table 2.5 Common injuries and clinical signs of emerging health conditions seen on presentation or during care

Injury or clinical signs	Possible causes	Carer observations and response
<p>Note: Do not provide pain relief or other medication, including antibiotics, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. Use of antibiotics when not indicated can contribute to antimicrobial resistance and reduced drug efficacy.</p>		
Grazes Scratches Bites Unable to move properly	Trauma from vehicles Predators People	<ul style="list-style-type: none"> • Seek veterinary attention. • Medication should be given as directed by the veterinarian. • All snakes should be held in their preferred body temperature zone (PBTZ) and provided with heat and UV light. See Table 2.6.
Entanglement	Rubbish Netting Yabby traps etc.	<ul style="list-style-type: none"> • Seek veterinary attention to extricate safely and for damage to scales to be assessed.
Open mouth breathing Bubbles from the nostrils Increased mucous in the mouth	Respiratory tract infection due to poor husbandry Disease	<ul style="list-style-type: none"> • Seek veterinary attention. • Medication should be given as directed by the veterinarian. • All snakes should be held in their PBTZ and provided with heat and UV light. See Table 2.6.
Bleeding gums Swollen mouth Cheesy material visible in the mouth	Stomatitis due to poor husbandry Disease Trauma	<ul style="list-style-type: none"> • Seek veterinary attention. • Medication should be given as directed by the veterinarian. • All snakes should be held in their PBTZ and provided with heat and UV light. See Table 2.6.
Lumps under skin	Sparganosis Abscess Herniation	<ul style="list-style-type: none"> • Seek veterinary attention to differentiate.

Injury or clinical signs	Possible causes	Carer observations and response
Burns	<p>Poor husbandry</p> <p>Hot environmental surfaces</p> <p>Bushfire</p>	<ul style="list-style-type: none"> • Seek urgent veterinary attention. • Burn injuries are very painful, to ensure good welfare, animals must be assessed by a veterinarian as soon as possible. • Treatment may require multiple visits to a veterinarian for bandage changes under anaesthesia, and to ensure adequate pain management. • Burn injuries may result in scars that may impact future skin shedding. • Determine the cause of the burn and modify the enclosure to prevent it happening again. • Newspaper is a suitable substrate in the snake enclosure as it will prevent contamination of the wound during the healing process.

Injury or clinical signs	Possible causes	Carer observations and response
<p>Restlessness</p> <p>Spending time soaking in the water bowl</p> <p>Small moving specks seen on the skin, particularly around the eyes, labial pits and cloaca</p>	<p>Mites secondary to contact with other reptiles</p> <p>Poor husbandry</p> <p>Disease process or injury compromising animal</p>	<ul style="list-style-type: none"> • Seek veterinary advice. • Animals with heavy burdens of parasites should be presented for veterinary examination to ensure the parasite infestation is not secondary to another disease or injury. • Do not house wild snakes in the same room as other/pet reptiles. • The enclosure may be treated with pyrethrin sprays e.g. Callington Reptile Enclosure Insecticide (formerly Top of Descent). Use as directed on the label. Rinse the enclosure thoroughly before returning animals. • Remove water bowls for up to 24 hours when treating enclosures to ensure no incidental ingestion of mite treatment by snakes. • In severe cases snakes can be directly treated with Frontline flea spray (active ingredient fipronil). Be careful of eyes and eye area. A cotton tip is useful for applying the Frontline solution to these areas (spray a cotton tip and wipe around the eye area). • After spraying, animals should be held in a clean tub or bin for 15 minutes. Following this they should be gently rinsed and returned to the treated enclosure. • During treatment the enclosure can be placed in a water bath, or Vaseline lotion used around the edges to prevent mites spreading to other enclosures. • Disinfect or discard any cage furniture between snakes. • Snake should be visibly free of mites prior to release into the wild.
<p>Retained pieces of skin or scales over the eyes/foggy/clouded appearing eyes</p>	<p>Abnormal pattern of shedding of the dead out skin</p> <p>Dysecdysis</p>	<ul style="list-style-type: none"> • Seek veterinary attention as required. • Identify housing issues that may contribute to dysecdysis such as low temperature and humidity. • Place coarse rocks in the enclosure to provide surfaces for the animal to rub against while shedding. • Individuals can be soaked for 10–30 minutes in a shallow bowl of luke-warm water. Ensure access to a trained handler. • Assist shedding after the soaking period.

Figure 2.7 A wild diamond python with predation injuries to its back. The bites have extended through the skin and exposed the muscles below.



Photo credit: Anne Fowler

Figure 2.8 An eastern brown snake entangled in fruit tree netting.



Photo credit: Zoos Victoria

Figure 2.9 Facial burns on a python.

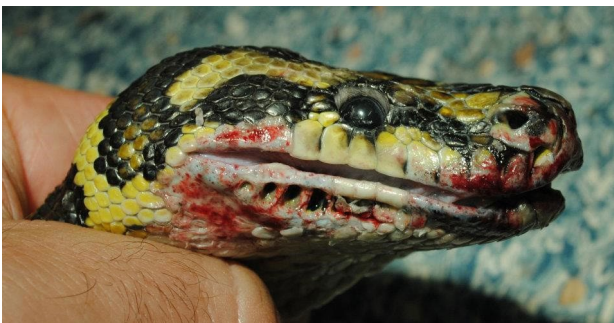


Photo credit: Shane Simpson

Figure 2.10 A carpet python with severe stomatitis. Note the red and swollen gums.



Photo credit: Zoos Victoria

Figure 2.11 A tiger snake having a larval *Spirometra erinacei* (sparganosis) removed from under the skin by a veterinarian



Photo credit: Zoos Victoria

2.6.2. Administering treatment

- Oral medications are usually placed in a food item such as a rat or mouse.
- Any treatment requiring the handling of a venomous snake should only be done by someone that has had suitable training and experience under the direction of a veterinarian.
- Non-venomous snakes should be treated as directed by a veterinarian.

2.7 Housing

Below are several key considerations when housing snakes in care.

2.7.1. General housing information for snakes

All snakes should be housed within their preferred body temperature zone and preferred humidity level during their time in care. See **Table 2.6**.

Intensive care, intermediate and pre-release housing are identical. Snakes are generally housed individually. **Wild snakes should not be housed in the same room as other reptiles.** Enclosures used for captive snakes should never be used for wild snakes.

Table 2.6 Snake enclosure temperatures

Species	Basking temp (°C)	Temperature gradient (°C)		Humidity (%)	PBTZ (°C)	Other enclosure set up specifications
		Summer	Winter			
Diamond python/ Carpet Python	32–35	25–35	20–25	40–80	28–30	Heat pad under enclosure floor, including nest box and a third of the enclosure. No heat lamps overnight. UV 1–4 hours/day.
Eastern brown snake	32–35	25–35	25–30	40–80	35	Heat pad under enclosure floor, including nest box and a third of the enclosure. No heat lamps overnight. UV 1–4 hours/day.
Copperhead	30	25–30	25–30	40–80	28–30	Heat pad under enclosure floor, including nest box and a third of the enclosure. No heat lamps overnight. UV 1–4 hours/day.

Species	Basking temp (°C)	Temperature gradient (°C)		Humidity (%)	PBTZ (°C)	Other enclosure set up specifications
		Summer	Winter			
Little whip snake	30	25–30	25–30	40–80	30	Heat pad under enclosure floor, including nest box and a third of the enclosure. No heat lamps overnight. UV 1–4 hours/day.
Red-bellied black snake	30–33	25–30	25–30	40–80	31	Heat pad under enclosure floor, including nest box and a third of the enclosure. No heat lamps overnight. UV 1–4 hours/day.
Tiger snake	30–33	25–30	25–30	40–80	28–30	Heat pad under enclosure floor, including nest box and a third of the enclosure. No heat lamps overnight. UV 1–4 hours/day.
White-lipped snake	30–33	25–30	25–30	40–80	31	Heat pad under enclosure floor, including nest box and a third of the enclosure. No heat lamps overnight. UV 1–4 hours/day.
Eastern small-eyed snake	28	25–30	25–30	40–80	18–23	Heat pad under enclosure floor, including nest box and a third of the enclosure. No heat lamps overnight. UV 1–4 hours/day.

2.7.2. Enclosure hygiene and biosecurity

General information about hygiene and biosecurity can be found in Part A of these guidelines. It is important to maintain the highest levels of hygiene and biosecurity to avoid inadvertently transferring diseases between animals and from humans, and to protect the wild population where the animal will eventually return to.

Species specific considerations:

- Wash hands with soap and water after handling snakes, their substrate or furniture to minimise the risk of infection with zoonotic disease agents such as *Salmonella*.
- Ideally examination gloves should be worn and changed between each animal.
- Left-over food and faecal matter should be spot cleaned daily from enclosures to ensure good levels of hygiene are maintained.

- Enclosures used to house sick/injured snakes should be cleaned and disinfected between inhabitants. Substrate should be completely replaced and furniture, such as branches or boxes made of unsealed wood, should be discarded as they cannot be effectively disinfected.
- Enclosures should be cleaned with hot soapy water and then disinfected with products such as F10 SC or bleach, used at appropriate concentrations and contact times. If using bleach, it must be thoroughly rinsed before.

2.7.3. Housing types

Intensive care, intermediate and pre-release housing are identical and depend on the length of the snake. The enclosure should be large enough to allow the snake to stretch out to its longest length.

Table 2.7 Rehabilitation housing for adult snakes

Example	Snake length	Dimensions L x W x H	Housing type
Little whip snake	<0.6 m	0.60 m x 0.30 m (0.18 m ²) x 0.30 m	Glass fish tank, but wooden enclosures retain heat better. Tanks can be further insulated by sheets of polystyrene foam. House in a quiet room as snakes are sensitive to vibrations.
Tiger snake, copperhead	0.6–1.2 m	1.0 m x 0.4 m (0.4 m ²) x 0.5 m	
Eastern brown snake	1.2–2.5 m	1.5 m x 1.0 m (1.5 m ²) x 1.2 m	
Diamond python	>2.5 m	2.0 m x 1.0 m (2.0 m ²) x 1.5 m	

Table 2.8 Key aspects of housing for snakes during rehabilitation

Term	Parameter
UV light	A natural light cycle of 12 hours light and 12 hours dark is required. A UV light on a timer should be used to provide some of this light cycle.
Temperature	Provide heat using ceramic heat lamps, or incandescent globes. These should never be used inside the enclosure to minimise the risk of thermal burns and should not be in direct contact with wood or plastic to reduce the risk of the enclosure catching fire. Heat pads and heat rocks may pose a risk of burning the snake but could be used with a thermostat. A heat gradient should be provided across the enclosure with a cooler area being available.
Furniture	A rough surface, such as a natural rock, may be included to provide a surface for the snake to rub against when it starts shedding. All snakes need access to a hide. This may be as simple as a cardboard box. A disposable hide is preferred to reduce the risk of disease transmission between snakes. The snake should be able to fit its entire body into the hide. Diamond pythons are arboreal and require sturdy branches for climbing and basking.
Water	A wide, shallow water bowl, large enough to contain the entire snake, is required for drinking and bathing.

Figure 2.12 An example of a snake enclosure. Note the light above the cage and the wooden box used as a hide. Newspaper is used as a substrate.



Photo credit: Zoos Victoria

2.8 Feeding and nutrition

Keeping daily records of food offered (item and volume fed) and food consumed is good practice and will allow the rehabilitator to observe appetite, and whether the animal is consuming a balanced diet, or is preferentially consuming only certain food items offered.

Please note: Food suppliers and specific products mentioned in these guidelines are intended as examples only. Other suitable products may also be available.

This section refers to feeding and nutrition of snakes in rehabilitation.



STOP – Please refer to your authorisation for mandatory conditions regarding live feeding.

- Due to welfare concerns for both the snake and its prey, it is ethically inappropriate to offer live prey to snakes.
- As natural prey such as lizards or frogs are also protected species in Victoria, it is an offence to collect them from the wild and offer them as food.
- It is also illegal to keep exotic species of frogs and reptiles as food items for snakes.
- White-lipped, little whip and small-eyed snakes will likely require assist feeding of artificial diets if being held for a prolonged period (>1 month).

Table 2.9 Feeding and diet guide for adult snakes during rehabilitation

Species	Captive diet	Feeding frequency
Red-bellied black snake	Whole dead mice or rats that have been defrosted overnight in a refrigerator and warmed to room temperature. Do not microwave.	Adult snakes in care for less than two weeks do not require feeding. Snakes in care for longer than two weeks are offered a prey item that is 10–15% of their bodyweight fortnightly. Juvenile snakes are fed 10–15% of their bodyweight once a week.
Tiger snake		
Eastern brown snake		
Copperheads		
White-lipped snake		
Little whip snake		
Diamond python/carpet python		
Eastern small-eyed snake		

Figure 2.13 Suitable feed for snakes.

Photo credit: Zoos Victoria



2.9 Release protocol

Ideally, wild animals will be rehabilitated and released in a short timeframe. If this is not possible and the animal is in care for significant extended periods, ensure that the animal is regularly assessed against the five welfare domains to support decision-making. Animals in care for extended periods may have a reduced ability to survive in the wild. Talk to your veterinarian and consider whether euthanasia will provide the best welfare outcome for such individuals.

2.9.1. Pre-release assessment

Pre-release assessment of animals in care is essential to support improved outcomes once back in the wild. Animals should be assessed based on body condition, fitness and the ability to engage in natural species-specific behaviours prior to release.

The following check list should be used to guide decision-making regarding release suitability for snakes:

- ☑ The snake should be examined to ensure snake mites are not present prior to release. Sutures should have been removed. If the snake had skin sutures or an injury to its skin, it should have shed its skin at least once without assistance, provided the husbandry is ideal.
- ☑ A snake should demonstrate that it can move freely in the enclosure. It should be able to coil tightly. Arboreal species should demonstrate that they can climb up branches.
- ☑ The snake should move into a shelter when disturbed.

2.9.2. At the release site

Post release survival will be maximised by ensuring that both the release site and the way in which the animal is released are carefully considered.

Snakes require the following:

- Adequate shelter at the release site.
- Snakes should only be released in warm ambient temperatures (>20°C) so they can seek shelter while mobile.

For more information on the ecological characteristics and requirements of snakes that may help with their release, please refer to **Table 2.1**

2.9.3. Release checklist

Check all of the requirements of your authorisation are being met, and consider the following:

Release location

- ☑ The best time to release a snake will depend on the time of day when the species is most active, as shown in **Table 2.1**.
- ☑ Release should be timed to occur during normal peak activity.
- ☑ For diurnal species release may be timed for the middle of the day when it is warmer.
- ☑ Nocturnal species are released on dusk when it is still warm from the day.
- ☑ Snakes should not be released in the cooler months. They should be released from September to March.
- ☑ It is preferable to release snakes when the weather is forecast to be over 20°C for three consecutive days.

Release Procedure

- ☑ Care needs to be taken when releasing snakes to avoid being bitten.
- ☑ Snakes are transported to the release site inside a calico bag sitting inside a solid transport container that should be labelled: "CAUTION: LIVE VENOMOUS (or NON-VENOMOUS) SNAKE".
- ☑ Place the calico bag on the ground with the opening facing away from the handler and close to suitable cover.
- ☑ Partly open the calico bag and permit the snake to move out of the bag in its own time, while slowly moving back.

2.10 Key references and additional reading

Cogger, H.G. 2018. Reptiles and amphibians of Australia, 7th Edition. Reed New Holland.

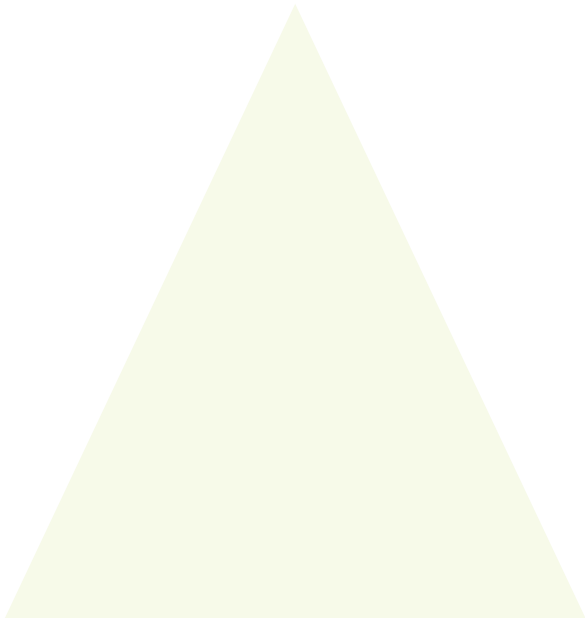
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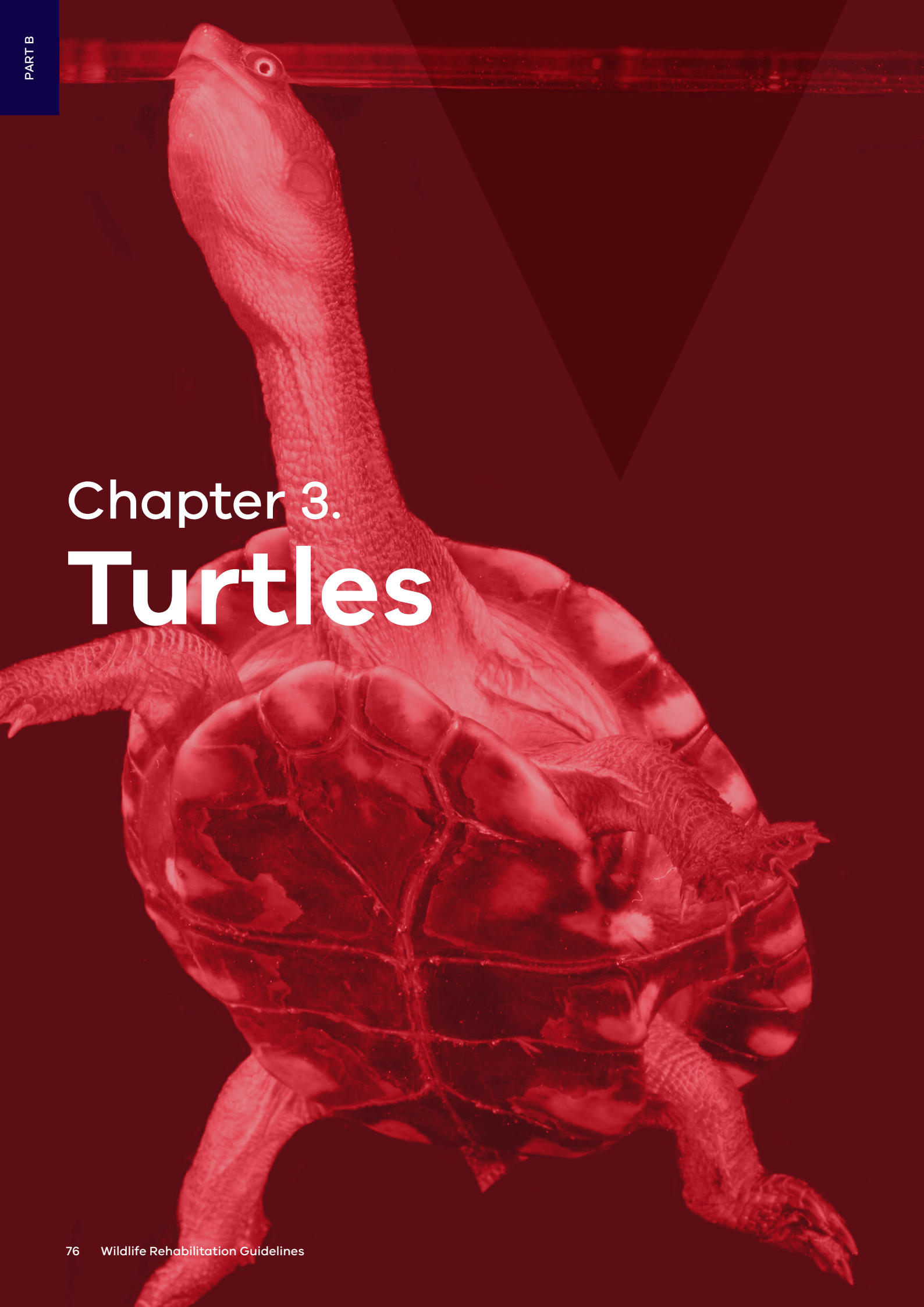
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Chapter 3. Turtles



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In Victoria, sick, injured or orphaned wildlife can only be rehabilitated by a wildlife shelter operator or foster carer who is authorised under section 28A of the Victorian *Wildlife Act 1975* (Wildlife Act). Wildlife rehabilitators are subject to strict conditions. The mandatory requirements that they must meet are set out in the Wildlife Shelter and Foster Carer Authorisation issued under the Wildlife Act. These conditions enforce the minimum standards required for the humane treatment and successful rehabilitation of wildlife in care. The Wildlife Rehabilitator Authorisation Guide: Things You Need To Know explains how wildlife rehabilitators can meet these mandatory requirements and can be found here: <https://www.vic.gov.au/wildlife-rehabilitation-shelters-and-foster-carers>.

The Victorian Wildlife Rehabilitation Guidelines have been developed to incorporate evidenced-based best practice in wildlife care and rehabilitation to equip rehabilitators to deliver positive welfare outcomes for individual animals in their care from first aid to post-release into the wild.

You must comply with the conditions of your authorisation. These guidelines must be read in conjunction with the conditions of your authorisation.

This chapter also lists an introduced species, the red-eared slider (*Trachemys scripta elegans*). This species poses a threat to native species through predation and the introduction of new animal diseases and should be reported.

Notify DEECA or Agriculture Victoria of any exotic turtles in the wild or any that come into care on 136 186 or email highrisk.invasiveanimals@agriculture.vic.gov.au.

3.1 Introduction

There are three turtle species that commonly come into care in Victoria. This chapter addresses their husbandry, care and welfare. It does not cover marine turtles.

The Macquarie River turtle is listed as threatened in Victoria.



STOP – If any turtle species listed as threatened, or a marine turtle comes into care, please STOP and refer to your authorisation for mandatory conditions including notification and release requirements.


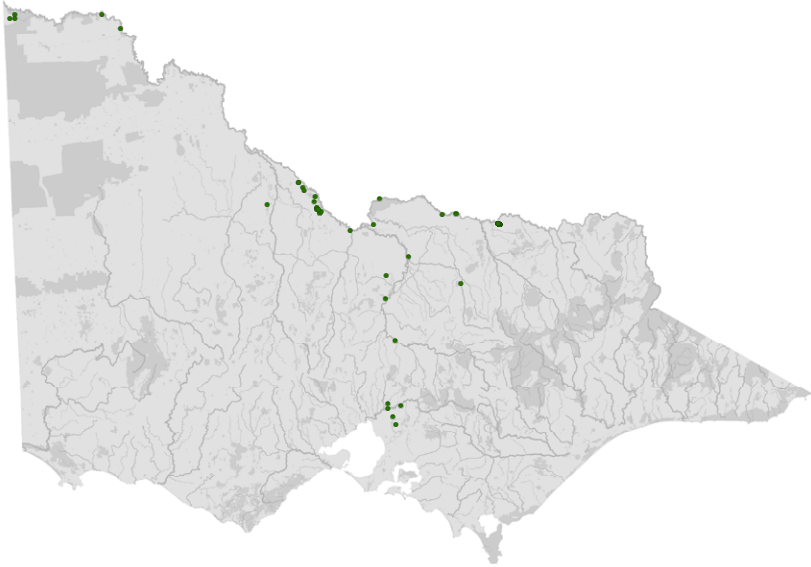
When turtles come into care it is the responsibility of the wildlife rehabilitator to ensure that the five domains of animal welfare are satisfied. These include providing optimal nutrition and an environment appropriate to the stage of rehabilitation. The focus should be on the turtle's return to health and release, which is facilitated through regular collaboration with a veterinarian. It is also important to consider the turtle's mental state and ability to exhibit normal behaviours without detrimentally affecting its recovery. Welfare may be temporarily compromised by the necessity of a gradual return to normal activity, depending on its stage of rehabilitation. Further information about the five domains of animal welfare can be found in Part A of these guidelines.

3.2 Species information



Profiles for the most common turtle species found in Victoria are detailed in the following tables. It does not describe all of the turtle species found in Victoria. For assistance in identification of turtle species, refer to the recommended reading and reference material at the end of this chapter.

Table 3.1 Species profiles

Species	Broad-shelled turtle (<i>Chelodina expansa</i>)
 <p data-bbox="129 1003 400 1025">Photo credit: Shutterstock</p>	<p data-bbox="560 775 772 801">Distribution map</p>  <p data-bbox="560 1406 1286 1456">Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
<p data-bbox="129 1491 384 1518">General appearance</p>	<p data-bbox="560 1491 847 1518">Long neck, broad head</p>
<p data-bbox="129 1563 392 1590">Conservation status*</p>	<p data-bbox="560 1563 715 1590">Endangered</p>
<p data-bbox="129 1635 368 1662">Sexual dimorphism</p>	<p data-bbox="560 1635 1382 1738">Males are smaller and mature earlier than females. They are distinguished by a long tail that extends beyond the margin of the carapace (the top shell) when mature</p>
<p data-bbox="129 1774 392 1800">Adult morphometrics</p>	<p data-bbox="560 1774 1158 1800">Body weight: Male: Up to 4 kg. Female: Up to 6 kg</p> <p data-bbox="560 1823 791 1850">Length: 40–50 cm:</p>
<p data-bbox="129 1895 225 1921">Habitat</p>	<p data-bbox="560 1895 999 1921">In reeds and under submerged logs</p>
<p data-bbox="129 1966 280 1993">Home range</p>	<p data-bbox="560 1966 807 1993">Male = 11.18 ± 4.10 km</p> <p data-bbox="560 2016 839 2042">Female = 1.43 ± 1.73 km</p>

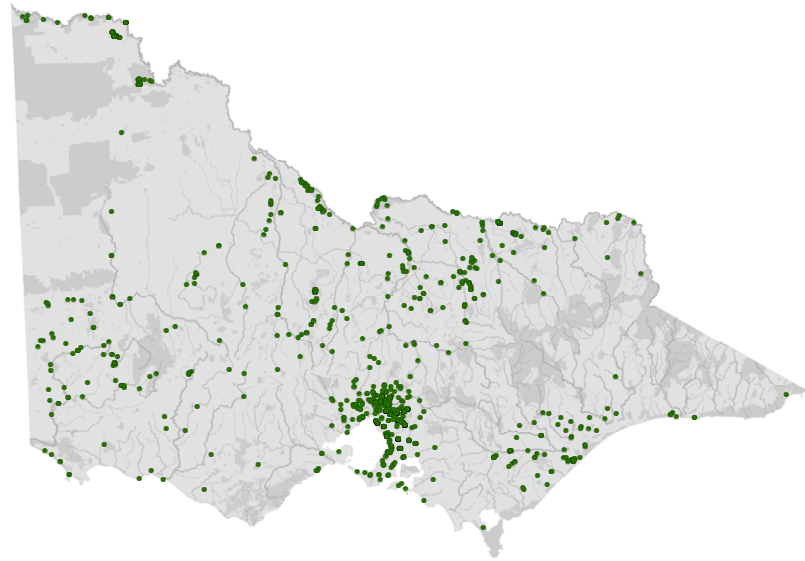
Species	Broad-shelled turtle (<i>Chelodina expansa</i>)
Foraging style	Ambush hunter
Type of waterway	Permanent
Depth (m)	>2
Water quality	Turbid
Water temperature at which turtles are active	Usually above 18°C, but has occasionally been observed to be active in water above 16°C
Natural activity peak	Late afternoon
Movement	No
Hibernation – duration and timing	No
Nesting time	March–May
Nest location from water (m) and nest substrate	30–55
Number of eggs laid	5–30
Incubation (days)	200–650
Age at sexual maturity (years)	Male = 9–11 Female = >14
Diet	Frogs, crustaceans, aquatic insects, fish

Species

Common long-necked turtle (*Chelodina longicollis*)

Photo credit: David Paul,
Museums Victoria


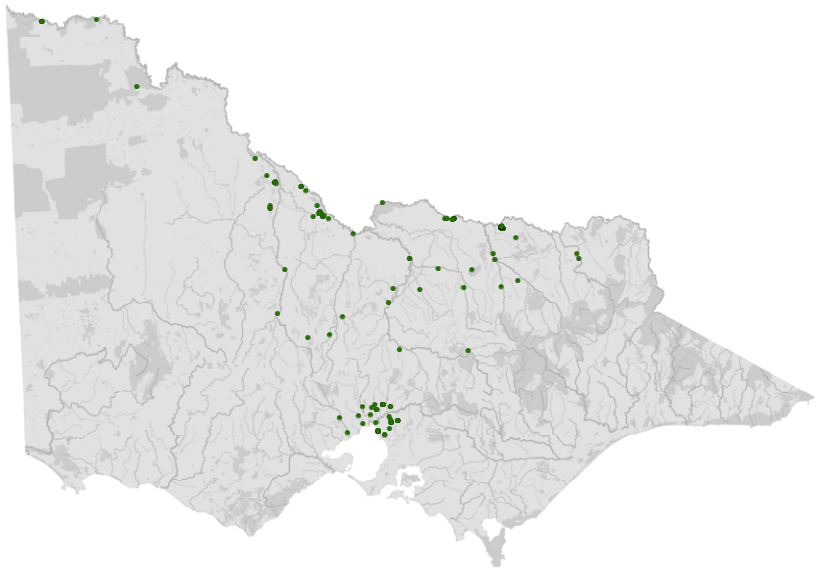
Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023
www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

General appearance	Long neck, plastron scutes have black edges
Conservation status*	Common
Sexual dimorphism	Dimorphism is present but can be subtle. Males tend to be smaller, with longer tails, a concave plastron (the bottom shell) and V shaped anal scutes. Females tend to be larger, with shorter tails, a convex plastron and U shaped anal scutes
Adult morphometrics	Body weight: 0.5–2.0 kg Length: 20–25 cm
Habitat	Oxbow lakes, ponds, swamp
Home range (ha)	10–16
Foraging style	Snatch, grab and chase
Type of waterway	Not permanent
Depth (m)	<2
Water quality	Partly turbid
Water temperature at which turtles are active	Above 12°C

Species	Common long-necked turtle (<i>Chelodina longicollis</i>)
Natural activity peak	Dawn and dusk
Movement	Between watercourses
Hibernation – duration and timing	Yes – on land
Nesting time	September–November
Nest location from water (m) and nest substrate	<200
Number of eggs laid	4–20. In favorable conditions can produce more than one clutch per year
Incubation (days)	120–180
Age at sexual maturity (years)	Male = 7–8 Female = 10–12
Diet	Frogs, tadpoles, crustaceans, aquatic insects, fish

Species	Macquarie River turtle (<i>Emydura macquarii</i>)
 <p>Photo credit: Zoos Victoria</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Short neck, light coloured shell, cream band from mouth to neck
Conservation status*	Critically endangered
Sexual dimorphism	Males are smaller with longer tails

Species	Macquarie River turtle (<i>Emydura macquarii</i>)
Adult morphometrics	Body weight: 1.2–1.8 kg Length: 20–30 cm
Habitat	Still, deep water body
Home range (ha)	0.01–24
Foraging style	Forage and graze
Type of waterway	Permanent
Depth (m)	>3
Water quality	Clear to turbid
Water temperature at which turtles are active	Above 16°C
Natural activity peak	Afternoon to early evening
Movement	No
Hibernation – duration and timing	Yes – in water
Nesting time	November–January
Nest location from water (m) and nest substrate	2–40
Number of eggs laid	10–15
Incubation (days)	48–85
Age at sexual maturity (years)	Male = 5–6 Female = 10–12
Diet	Molluscs, crustaceans, fish, carrion, aquatic plants

*From the *Flora and Fauna Guarantee Act 1988* Threatened List June 2023. This list is updated regularly throughout the year. For the most current list, please visit <https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list>.

Figure 3.1 A photo showing a Macquarie river turtle on the left and a common long-necked turtle on the right. Note the pale stripe running along the side of the head of the Macquarie river turtle.




Photo credit: Shane Simpson


Figure 3.2 Note the proportionally smaller plastron of the Macquarie River turtle on the left compared with the larger plastron of the common long-necked turtle on the right.



Photo credit: Shane Simpson

Table 3.2 Non-endemic and exotic species that may come into care

Introduced species	Krefft's turtle (<i>Emydura krefftii</i>)
General appearance 	Short neck, pale facial stripe
Sexual dimorphism	Males are smaller and have longer tails than females
Adult morphometrics	Body weight: Male: 650 +/- 37.8 g. Female: 1010 +/- 61.7 g Average Length: 25–29 cm

Introduced species	Red-eared slider (<i>Trachemys scripta elegans</i>)
<p>General appearance</p>  <p>Photo credit: Agriculture Victoria</p>	<p>General appearance</p> <p>Red facial stripe, retracts head by pulling it straight back into the shell</p>
<p>Sexual dimorphism</p>	<p>Males are smaller and have longer tails than females</p>
<p>Adult morphometrics</p>	<p>Body weight: Up to 3 kg</p> <p>Length: 12–28 cm</p>

Exotic and native species non-endemic to Victoria must not be released into the wild. Non-endemic turtle species, such as Krefft's turtles (*Emydura krefftii*), may escape their enclosures or find their way into Victoria in containers. In cases where the animal is suspected to be an escaped pet, take the animal to a veterinarian to be scanned for a microchip. If an owner can be identified, the animal should be returned as soon as possible.

Occasionally exotic turtle species come into care, for example red-eared slider (*Trachemys scripta elegans*). Red-eared sliders are classified as a controlled pest animal under the Victorian *Catchment and Land Protection Act 1994*. The importation, keeping, breeding and trading of this species, without appropriate permits, is illegal. These animals must be euthanised as they are a pest and pose a threat to our native species. Notify DEECA or Agriculture Victoria of all exotic turtles in the wild on 136 186 or email **highrisk.invasiveanimals@agriculture.vic.gov.au**.

The introduced specie listed, the red-eared slider (*Trachemys scripta elegans*), in **Table 3.2** is not native to Australia and if given the opportunity could populate a wide range of landscapes within Victoria, impacting native wildlife through predation and the introduction of new animal

diseases. Red-eared sliders have been found in all states in Australia, including Victoria, and are typically escapees or deliberately released animals from the illegal pet trade. Since 2000 more than 70 red-eared sliders have been detected across Greater Melbourne and Geelong. Twenty of these have been in, or adjacent to, Victorian rivers and lakes, including at Caroline Springs, Elwood Canal, Elsternwick Park Lake, Yarra River and in urban streets of Lara, Frankston, Aberfeldie, Kensington and Taylors Lakes. The illegal keeping and trading of introduced species is one of the greatest risks of the species establishing in Victoria and poses a direct threat to our native wildlife. All introduced turtle species identified should be reported via email to **highrisk.invasiveanimals@agriculture.vic.gov.au**.

Further information is available at:
<https://agriculture.vic.gov.au/biosecurity/pestanimals/report-an-exotic-pest-animal-sighting>

<https://agriculture.vic.gov.au/biosecurity/pestanimals/priority-pest-animals/redeared-sliderturtle>

3.3 Animal and human safety considerations



In general, animals in the wild have limited contact with people, pets, and the hustle and bustle of our daily lives. When sick, injured or orphaned wild animals come into care this unnaturally close contact can carry risks to the health and safety of both people and animals. For general information on biosecurity and approaches to minimise these risks see Part A of these guidelines. Specific information on enclosure hygiene and biosecurity for turtles is in **Section 3.6.2**.

The following information relates to human and animal health and safety considerations specifically related to the rehabilitation of turtles.

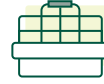
3.3.1 Human safety considerations

- Wash hands with soap and water after handling turtles to minimise the risk of infection with zoonotic disease agents such as *Salmonella*.
- Turtles can inflict a painful bite but rarely break the skin.
- Their claws are sharp and may scratch. Hind legs are also quite powerful. Handlers should be wary of claws and ensure they have a tight grip on the carapace to reduce the risk of dropping and injury to the handler or turtle.
- As a deterrent, common long-necked turtles can produce a strong, foul-smelling, liquid from musk glands when disturbed or handled. Musk glands can be found at the corners of the bony bridge between the plastron (the bottom shell) and the carapace (the top shell). This liquid may be confused with blood as it is often orange-red in colour. Wash hands after handling to avoid wiping the liquid into the eyes or mouth.

3.3.2 Animal safety considerations

- Injuries including broken limbs and shell fractures can occur if turtles are dropped. Turtles should be firmly restrained and held over raised surfaces (table or bench) to reduce height and risk of injury.

3.4 Capture, restraint, and transport



***STOP** – A visual examination must be done BEFORE the animal is captured. This applies to the initial capture from the wild as well as prior to captures which occur during time in captive care. See Section 3.4.1 for information on what to look for when conducting a visual health assessment.*

Refer to Part A of these guidelines for general advice on wildlife welfare, biosecurity and hygiene, and record requirements. The following information relates to the capture, restraint, and transport of sick, injured and orphaned turtle species.

3.4.1. Visual observations

Visual observations of wildlife should be conducted prior to any attempts to capture the animal. This is just as important prior to the first capture from the wild as it is before any capture conducted while an animal is in captive care. Observations should be conducted quietly, by one person, and from a distance which provides a clear view of the animal with as little disturbance as possible. Visual observation should focus on the animal's demeanour, behaviour, movement and posture. Check for evidence of injury/severe disease or deterioration and assess their breathing as demonstrated in the following table.

Visual examination of turtles can be challenging as they tend to remain motionless with limbs and head tucked into their shell if they feel threatened. However, it should still be possible to assess the state of the turtle's shell.

Table 3.3 Visual health observations in turtles

What to look for	
Demeanour	<ul style="list-style-type: none"> • Reactive to being approached • All limbs and head are pulled tightly into the shell and are not protruding • Broadshell and Macquarie River turtles are more likely to have head and limbs protruding from their shell than common long-neck turtles
Shell	<ul style="list-style-type: none"> • Intact • No obvious fractures, missing pieces or bleeding • Ensure you check the top of the shell (carapace), bottom of the shell (plastron) and each side (bridge) as well as the edges of the shell • May be covered in algae
Movement	<ul style="list-style-type: none"> • When left alone and observed from a distance turtles will often start walking, allowing movement to be assessed • Able to use all four legs, none dragging abnormally
Skin	<ul style="list-style-type: none"> • Intact • No obvious cuts or bleeding
Eyes	<ul style="list-style-type: none"> • Open, bright, not sunken

3.4.2. Equipment

No particular equipment is required to pick up a turtle that is found on the ground. A turtle in water can be caught with a fishing net.

Turtles should be transported in a solid container, such as a plastic tub with a lid to prevent escape. Tubs should also have some level of ventilation. Container size will vary with the individual but as a guide it should be twice the body length of the turtle. Most individuals should fit within a transport container 40 cm x 30 cm x 20 cm (H). A larger size will likely be required for broad-shelled turtles.

Figure 3.3 A Rio basket lined with a damp towel used to transport a turtle.

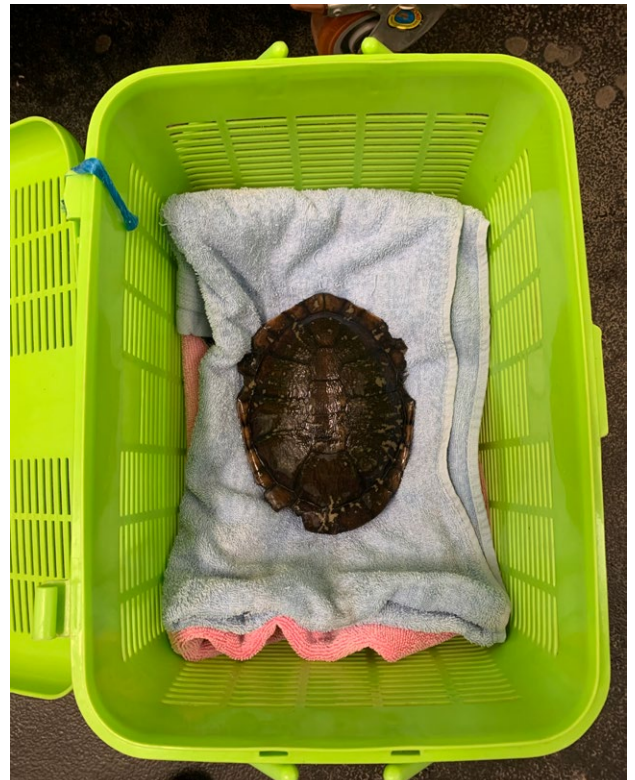


Photo credit: Zoos Victoria

3.4.3. Technique

It is beyond the scope of these guidelines to outline techniques for every situation that may be encountered. Examples of techniques for some specific situations are outlined in the following section.

In addition to this information, for further advice please also refer to the recommended reading list, zoological institutions, veterinarians and/or wildlife experts. Inexperienced rescuers should request assistance where possible.

- A turtle should be held with two hands on either side of the carapace and plastron as shown in **Figure 3.4**. Raise the animal higher and tilt it to examine the underside.

Figure 3.4 Restraint of a turtle for examination using both hands.



Photo credit: Zoos Victoria

Turtles may be hit by vehicles when they cross roads to travel to and from water bodies, particularly during nesting time or after rain. After the turtle is picked up, examine it for injuries. If no injuries are present, place it on the side of the road that it was heading toward. Common long-necked and broad-shelled turtles are more likely to cross roads during the day while the weather is sunny.

3.4.4. Transport

- Transport turtles in a well-ventilated container.
- Secure the container in the vehicle so that it cannot slide or roll over.
- Turtles should not be transported in water.
- A damp towel can be placed on the floor of the enclosure to provide humidity.
- Turtles do not require food or water during transit.
- In hot weather, transport the turtle in an air-conditioned vehicle.

3.5 Monitoring animal health and welfare



The goal of wildlife rehabilitation is to address health and welfare concerns quickly and effectively so wildlife can be released back to the wild as soon as possible. Decision-making from the time of capture through to release should be guided by an accurate understanding of the animal's true state of health and welfare. Careful monitoring throughout the rehabilitation period ensures that significant issues, or deterioration in health condition, are identified immediately and rapidly addressed.

It is preferred that all sick, injured or orphaned wildlife be assessed by a veterinarian to ensure that non-obvious signs of trauma or disease can be assessed and treated as soon as practicable. No medication should be provided prior to this assessment, as this can mask clinical signs and make an accurate health assessment by the veterinarian very difficult.

Templates for record-keeping visual and physical observations and daily care can be found in Part A of these guidelines.

This section provides guidance on health assessments on arrival and on effective monitoring of the health and welfare of individuals in care through minimising human-animal interactions and stress to the animal to maximise successful release back to the wild.

3.5.1 Physical examination

Once visual observations are complete, and the animal is stable enough to withstand capture and handling, a basic physical examination should be conducted. This can be repeated when required any time the carer has the animal in the hand, such as for an enclosure change. However, if a full physical exam is not conducted, body condition and weight should be assessed every time the animal is in the hand for other reasons. Carers should make sure scales are available and ready to use before capturing the animal. Physical examinations are also required if the carer notices any changes suggestive of deteriorating health or an injury.

Always record the physical examination findings so that you can compare findings as the animal's rehabilitation progresses. This ensures any health concerns are identified as soon as possible, and the carer can plan release as soon as this is appropriate. **A template for recording physical examination findings can be found in the appendices to Part A of these guidelines.**

Examinations should be conducted in a quiet location, away from any domestic animals. Only one person should handle the animal, while a second person takes notes. All other people should move away, and noise kept to a minimum. Handling should also be kept to a minimum.

Species specific considerations:

- Turtles can be examined while conscious. However, healthy turtles (especially common long-neck turtles) will tuck all four limbs and head into their shell. These can be difficult to extract and examine. Excessive force should not be used as this may further injure the limbs or head.
- Anaesthesia may be required to examine the head and legs and to take x-rays. The normal radiographic (process of taking x-rays) examination of a turtle involves taking three separate views. If your veterinarian is not aware of these, they should contact Zoos Victoria for advice on how to obtain these views.

Table 3.4 Physical examination

What to look for	
Body weight	<ul style="list-style-type: none"> Record body weight on arrival and at least weekly while in care. As a rough guide, a greater than 10% change in body weight is cause for concern, and the carer should seek veterinary advice.
Body condition	<ul style="list-style-type: none"> The amount of musculature on the head, neck and limbs will provide an indication of the turtle's body condition. A turtle whose neck vertebrae are prominent is in poor condition whereas a turtle whose neck vertebrae can just be felt is in good condition.
Hydration status	<ul style="list-style-type: none"> Eyes should be bright, sunken eyes can indicate dehydration. Check skin tenting along the side of the neck. It should fall down within one second. Wrinkled skin may indicate dehydration.
Eyes	<ul style="list-style-type: none"> Open, bright, no excessive mucous or other discharge. Basic internal structures of eyes (e.g. pupil, iris) appear symmetrical. No swelling.
Nostrils	<ul style="list-style-type: none"> Open, clear, no excessive mucous or other discharge.
Mouth	<ul style="list-style-type: none"> Yellow or cream lining. Jawline is stable and symmetrical, no evidence of fracture. No evidence of fishing line.
Limbs, feet and tail	<ul style="list-style-type: none"> Uses all four legs when it walks or swims. Tail is functioning normally. No missing toes or nails. Feet are free from abrasions or injuries.
Sex determination	<ul style="list-style-type: none"> Turtles can be sexed by looking at the shape of the plastron near the tail. Male turtles have a V-shaped rear end to the plastron, which may also be slightly concave. The tail may appear longer to accommodate the male reproductive organ. Females have a broader U-shaped end to the plastron. The tail may be shorter in length compared to males. See Figure 3.5. Awareness of seasons and of female turtles entering care that may be gravid (carrying eggs).

Figure 3.5 On the left, a male common long-necked turtle and on the right, a female turtle. The male has a V-shaped appearance to the rear end of the plastron. The appearance of the female is broader and more u-shaped.



Photo credit: Zoos Victoria

3.5.2. Ongoing monitoring of health and welfare

The aim of wildlife rehabilitation is to ensure animals recover and can be released back to the wild as quickly as possible. Careful, daily monitoring is required to ensure that animals are responding as expected to the treatment being provided and so that any deterioration or welfare concerns can be identified and addressed as soon as possible. Rehabilitators should ensure that record-keeping is a priority to maximise positive welfare outcomes. Templates to assist wildlife rehabilitators to record and monitor wildlife health and welfare can be found in the appendices to Part A of these guidelines. These records will be valuable tools to share with veterinarians to support decision-making.

The following is recorded daily:

- demeanour
- food consumption
- faecal/urine output
- behaviour observed
- medical treatment provided
- evidence of overnight activity.

The following is recorded weekly:

- weight
- body condition.

Over time, regular monitoring will also help to develop carer skills and knowledge, as regular observations and recording will result in a deep understanding of the expected behaviour and response to treatment for the species in care.

Species specific considerations:

- The turtle should be observed at least daily.
- Note the turtle's demeanour and behaviour every time food is introduced or taken away, the animal is medicated or the enclosure is cleaned. Pay particular attention to any changes that have occurred since the previous day.
- Awareness of seasonal behaviours, such as gravid females, or brumation. Factors that need to be considered when planning care, rehabilitation and release.
- Note the turtle's buoyancy and ability to swim. It should be able to swim to the bottom of the tank and back up to the surface. The turtle should sit level in the water and should not list to either side or float with its tail higher than its head. If the turtle does not sit level, this may indicate a build-up of air within one of its organs and the turtle should be assessed by a veterinarian as soon as possible.

3.5.3. Common presenting injuries and clinical signs of emerging health conditions

Clear guidance on conditions that may require euthanasia can be found in Part A of these guidelines.

Table 3.5 lists common clinical signs and possible causes of injury/disease. Carers should be aware that these are not exhaustive. Aside from first aid, carers should avoid administering medications prior to the provision of veterinary advice.

Unusual clinical signs or mass mortality events – a number of animals dying or found dead at the same time, with similar signs – may indicate an emergency animal disease, an emerging/new infectious disease or an environmental/human related toxicity which needs further investigation. Report these immediately to the Emergency Animal Disease Watch Hotline on 1800 675 888 (24 hours).

Table 3.5 Common injuries and clinical signs of emerging health conditions seen on presentation or during care

Injury or clinical signs	Possible causes	Carer observations and response
<p>Note: Do not provide pain relief or other medication, including antibiotics, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. Use of antibiotics when not indicated can contribute to antimicrobial resistance and reduce drug efficacy.</p>		
<p>Leg or jaw or shell fracture</p>	<p>Motor vehicle Lawn mower Whipper snipper Predator attack</p>	<ul style="list-style-type: none"> • Seek urgent veterinary attention. Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Do not attempt to stabilise fractures as this is very painful and risks making the injury worse. Fracture stabilisation, including shell fractures, should only be attempted by a veterinarian following physical examination, x-rays and under general anaesthesia, with adequate pain relief medication. • Do not provide pain relief or other medication unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. • Move animal to a small transport box to restrict movement. Ensure temperature is appropriate for the species and minimise stress. • Monitor wounds. If the wounds are open then the turtle must not be housed in water until the wounds have healed or water access is approved by a veterinarian. • Turtles should not be dry docked for extended periods of time as they only eat in the water. If the turtle is deemed to need extended periods of dry docking it should be transferred to a wildlife hospital to provide ongoing nutritional, fluid and medical support e.g. Zoos Victoria. • Animals with jaw fractures may require assist feeding and should be transferred to a wildlife hospital. • The season of presentation and term in care should be noted, as animals should not be released in the cold weather months.

Injury or clinical signs	Possible causes	Carer observations and response
Head or eye trauma	Motor vehicle Lawn mower Whipper snipper Predator attack	<ul style="list-style-type: none"> • Seek urgent veterinary attention. Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Do not provide pain relief or other medication unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. • Move animal to a small transport box to restrict movement. Ensure temperature is appropriate for the species and minimise stress. • Turtles should not be dry docked for extended periods of time as they only eat in the water. If the turtle is deemed to need extended periods of dry docking it should be transferred to a wildlife hospital for ongoing treatment and care.
Bleeding		<ul style="list-style-type: none"> • Seek urgent veterinary attention. Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Do not provide pain relief or other medication unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. • Move animal to a small transport box to restrict movement. Ensure temperature is appropriate for the species and minimise stress. • Monitor wounds. If the wounds are open then the turtle must not be housed in water until the wounds have healed or water access is approved by a veterinarian. • Turtles should not be dry docked for extended periods of time as they only eat in the water. If the turtle is deemed to need extended periods of dry docking it should be transferred to a wildlife hospital for ongoing treatment and care.

Injury or clinical signs	Possible causes	Carer observations and response
<p>Flaking skin</p> <p>Skin ulcers</p> <p>Shell that is soft, pitted, eroded, discoloured or slimy</p>	<p>Shell and skin infections</p> <p>Bacterial or fungal infection</p> <p>Poor husbandry</p>	<ul style="list-style-type: none"> • Seek veterinary attention. • Do not provide pain relief or other medication unless under veterinary guidance and supervision. • If prescribed a topical agent by a veterinarian do not return the turtle to the water for one hour to permit the treatment time to work before being washed off. • Fungal or bacterial skin infections can take a long time to heal, requiring treatment for at least three weeks and possibly longer. Consideration of housing requirements and season of presentation should be considered. • While under treatment, change water as frequently as possible, preferably complete daily water changes to ensure clean water and reduce the risk of further infection. Ensure the new water temperature is within 2-3°C of the tank water or temperature shock may result – particularly in smaller/younger individuals. • Clean the tank filter monthly by rinsing it in tank water. A larger filter unit may be required. • Remove abrasive furniture from the enclosure as this may be causing lesions. • Ensure husbandry and feeding practices are correct for the species, including preferred optimal temperature zone (POTZ), seek advice from wildlife experts.

Injury or clinical signs	Possible causes	Carer observations and response
<p>Fishing line wrapped around the turtle's legs or protruding from its mouth</p>	<p>Fishing line entanglement and ingestion, including ingestion of hooks and lures</p>	<ul style="list-style-type: none"> • Seek veterinary attention. • All animals impacted by fishing line should be taken to a veterinarian for X-ray to ensure no hooks have been ingested. • If fishing line is coming from the turtle's mouth, seek urgent veterinary attention. The animal will require X-rays to locate the hook, and possible surgical removal of the hook. • Do not cut the fishing line if it is coming out of the turtle's mouth as it facilitates handling of the hook to locate and remove it. A piece of tape can be added to the line and stuck to the shell, to ensure it doesn't move during transport. • Simple entanglements involving limbs can be removed by cutting the line. Ensure this line is not connecting with a line that has been ingested, as this line may be connected to a hook that has been swallowed. • If the limb is severely swollen, has cutting injuries or limb function is abnormal, the turtle should receive a veterinary examination, despite the entanglement being removed. • Monitor the turtle's faeces for the presence of hooks and/or fishing line. • If during recovery, the turtle is deemed to need extended periods of dry docking it should be transferred to a wildlife hospital for ongoing treatment and care.
<p>Inappetence anorexia</p>	<p>Not feeding because food is not offered in the water</p> <p>The water/air temperature is too low</p> <p>Poor husbandry</p> <p>Turtle is sick and/or debilitated</p>	<ul style="list-style-type: none"> • Seek veterinary assessment to ensure the animal is not sick or injured. • Seek husbandry advice from a reptile or turtle expert. • Ensure husbandry and feeding practices are correct for the species, including POTZ. • Check the water temperature daily with a thermometer. • Turtles usually only feed in water. However, if the turtle is reluctant to eat, try feeding it on land. • Offer a variety of foods: Ox heart, turkey mince, insects (crickets/cockroaches), or feeder fish (frozen or fresh – no saltwater species). Thaw fish in the fridge and not in running water to minimise nutrient loss. It is illegal to feed live fish. • Remove uneaten food after 8-12 hours to prevent contamination and fouling of the water. • If the turtle continues to refuse food seek further veterinary attention.

Injury or clinical signs	Possible causes	Carer observations and response
Reduced activity Inappetence	Sick or injured Brumation (normally occurs over the cooler winter months)	<ul style="list-style-type: none"> • Seek veterinary assessment to ensure the animal is not sick or injured. • Turtles in care should not be released during the cooler months of the year because they will be in a state of dormancy in the wild (brumation). • The turtle can be maintained in its tank over the winter months and released once the outside temperature reaches 20°C on a consistent basis. • If housing for extended periods, ensure husbandry practices are correct for the species. Poor husbandry can have detrimental effects to the animal.
Soft shell	Sick or injured Bacterial or fungal infection Poor husbandry Poor nutrition Metabolic bone disease	<ul style="list-style-type: none"> • Seek veterinary attention. • Ensure husbandry practices are correct for the species. Turtles must be provided with the correct UV light. Seek advice from reptile or turtle experts. • Ensure good nutrition. Provide a diet that contains natural foods, such as whole fish. Any insects that are offered should be gut loaded with quality foods, such as Vetafarm Herpagrub or Wombaroo Insect Booster. Oral calcium (Calcium Sandoz or Vetafarm Calcivet) may also be given under the guidance of a veterinarian.

Figure 3.6 a. A turtle with a piece of shell missing from the edge of the carapace. This is an old injury which does not penetrate the body cavity and needs no treatment. **b.** a turtle with fresh abrasions and a fracture through the plastron, which may or may not require repair, depending on its degree of stability.

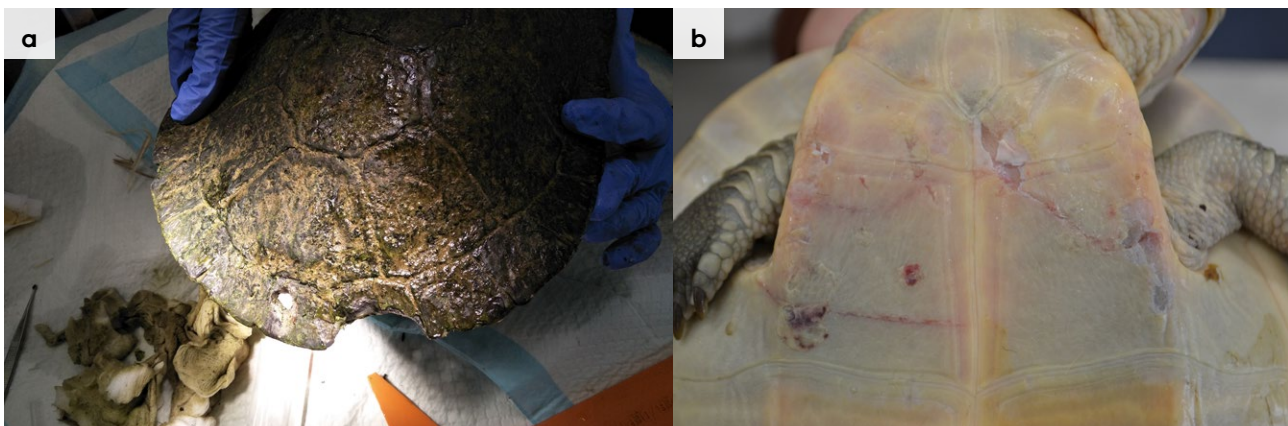


Photo credit: Zoos Victoria

Figure 3.7 A turtle with shallow shell erosions and missing pieces of shell, possibly inflicted by a dog. The injuries are old and do not require treatment.



Photo credit: Zoos Victoria

Figure 3.8 A Macquarie River turtle with a severely infected shell. Note the brown slimy area on the plastron on the turtle on the left and the red ulcerated area on the plastron on the turtle on the right.



Photo credit: Zoos Victoria

3.5.4. Administering treatment

- Due to the turtle's ability to retract its head and hold its mouth tightly shut, it is usually not possible to administer oral medication without risking causing damage to the turtle's mouth.
- To combat fungal and/or bacterial infections, the veterinarian may recommend an iodine soak. Iodine is diluted in water to produce a solution; the veterinarian will provide guidance on the correct concentration to use. The turtle is not submerged in this solution but placed in a shallow bath that covers the plastron and legs, but keeps the head exposed.
- For carapace lesions the veterinarian may recommend application of an iodine ointment. The turtle is dry docked for up to an hour and the ointment applied to the affected area. The turtle is then returned to its tank.
- If the veterinarian prescribes a course of injections, the injection site should be recorded and rotated at each treatment, so as not to repeatedly inject in the same limb each time.

3.6 Housing

Below are several key considerations when housing turtles in care.

3.6.1. General housing information for turtles

There are no national standards regarding enclosure size for turtles during rehabilitation. Each state has a different set of guidelines which contain a variety of recommended enclosure

sizes. The dimensions recommended in this chapter are suggestions based on Zoos Victoria enclosure sizes. There is no 'one size fits all' and it is important to continually assess the welfare of the turtle and tailor enclosures and enclosure size to suit the requirements of the turtle.

Table 3.6 Key aspects of housing for turtles during rehabilitation

Term	Parameter
UV light	<ul style="list-style-type: none"> • UV lights, placed approximately 30 cm above the turtle, can be used on a 12-hour light/dark cycle. • If possible, provide access to natural dappled sunlight for 5–10 hours each week. • Do not leave the turtle unattended in full sunshine.
Preferred optimal temperature zone (POTZ)	<ul style="list-style-type: none"> • 20–26°C.
Water temperature	<ul style="list-style-type: none"> • The water in the tank does not require any additional heating if an appropriate basking lamp and site are provided.
Water quality	<ul style="list-style-type: none"> • Water parameters should be measured weekly. • pH should be 7. • Ammonia, nitrite and nitrate levels should be within the ranges that support fish, i.e. ammonia less than 0.02 ppm, nitrite less than 0.1 ppm and nitrate less than 50 ppm. • A water hardness of 180–200 ppm is preferred by turtles. • Approximately 25% of the water should be changed weekly. • Uneaten food and faeces should be removed daily.
Dry dock area	<ul style="list-style-type: none"> • The turtle requires access to a dry area, which consists of a ramp leading up to a platform above the water's surface. • Turtle ramps can be purchased from pet shops or homemade using a sheet of plastic covered by Astroturf or other non-abrasive material. • Basking spot and UV lamps are best situated over the dry dock area.
Basking lights and 'hot spot'	<ul style="list-style-type: none"> • Access to radiant heat is required. • The turtle should have a basking spot set at 26–30°C. • The turtle must be able to move away from the heat source.

3.6.2. Enclosure hygiene and biosecurity

General information about hygiene and biosecurity can be found in Part A of these guidelines. New diseases emerge frequently and sick and injured animals in care are often more susceptible to picking up pathogens from the environment. It is important to maintain the highest levels of hygiene and biosecurity to avoid inadvertently transferring diseases between animals and from humans, and to protect the wild population where the animal will eventually return to.

Species specific considerations:

- Wash hands with soap and water after handling turtles to minimise the risk of infection with zoonotic disease agents such as *Salmonella*.
- Ideally examination gloves should be worn and changed between handling each animal.
- Left-over food and faecal matter should be removed daily to keep the water clean and prevent a build-up of ammonia.

- Enclosures used to house sick/injured turtles, must be cleaned **and disinfected between inhabitants**. Tanks should be completely drained and any furniture made of unsealed wood should be discarded as it **cannot be effectively disinfected**.
- Tanks and plastic furniture should be cleaned with hot soapy water and then disinfected with products such as F10 SC or bleach used at appropriate concentrations and contact times. If using bleach, it must be thoroughly rinsed before returning the turtle to the enclosure.

3.6.3. Housing types

Different set ups are required for animals at different stages of treatment and care. **Table 3.7** describes the housing type, suggested dimensions and requirements at each stage of care.

Table 3.7 Rehabilitation housing for adult turtles.

Intensive care housing		
Indications for use	Suggested min. dimensions	Suggested requirements
<p>These turtles may need restricted access to water. Fluids may need to be given by a veterinarian to prevent dehydration. This stage is suitable for a maximum of one week. Turtles should only be housed in this way by rehabilitators with extensive turtle care and husbandry experience.</p>	<p>Large enough to turn around</p> <p>Carapace length <10 cm: 0.4 x 0.3 m (0.12 m²) Carapace length >10 cm: 1.0 x 0.6 m (0.6 m²)</p>	<p>ENCLOSURE CONSTRUCTION</p> <ul style="list-style-type: none"> A Kimani incubator or other type of intensive care unit or, alternatively, a plastic tub with damp towels on the floor can be used for short-term housing for less than one week. <p>ENCLOSURE FURNISHING</p> <ul style="list-style-type: none"> The wet towels are replaced daily to prevent them from becoming mouldy. <p>ENVIRONMENTAL VARIABLES</p> <ul style="list-style-type: none"> Temperature should be between 20–26°C <p>PROVISION OF FOOD/WATER</p> <ul style="list-style-type: none"> The turtle is not fed in the intensive care unit. If feeding is required the turtle is placed in a shallow tub of water. This method can be utilised if the carapace is damaged as it will remain out of the water.
Intermediate housing (treatment/cage rest)		
Indications for use	Suggested min. dimensions	Suggested requirements
<p>Provision of daily medication, close monitoring once animal is stabilised and no longer requires intensive care.</p> <p>The intermediate housing is the enclosure that a turtle spends the majority of its time in while in care. It can also function as the pre-release enclosure. See Figure 3.9.</p>	<p>Tank dimensions:</p> <p>Carapace length <10 cm: 1.0 x 0.6 m (0.6 m²)</p> <p>Carapace length >10 cm: 2.0 x 1.0 m (2.0 m²)</p> <p>Land area = 3 x carapace length²</p> <p>Add 50% for each additional turtle</p> <p>Minimum depth (deep enough for the turtle to swim freely):</p> <p>Carapace length <10 cm: 0.3 m Carapace length >10 cm: 0.5 m</p>	<p>ENCLOSURE CONSTRUCTION</p> <ul style="list-style-type: none"> Glass fish tank. <p>ENCLOSURE FURNISHING</p> <ul style="list-style-type: none"> Basking platform with ramp. UV light. Basking/heat lamp. A hide on the bottom of the tank made of PVC pipe or similar. <p>ENVIRONMENTAL VARIABLES</p> <ul style="list-style-type: none"> Basking spot 26–30°C. Water temperature 20–26°C. <p>PROVISION OF FOOD/WATER</p> <ul style="list-style-type: none"> The turtle can be placed in a smaller tank/tub containing water and food to avoid fouling the main tank. This tub is emptied and cleaned after the turtle is returned to the main tank.

Pre-release		
Indications for use	Suggested min. dimensions	Suggested requirements
<p>No longer require regular handling/medication.</p> <p>Development of fitness/strength prior to release.</p> <p>Instead of a fish tank, turtles may be housed in an outside pond for acclimatisation prior to release.</p>	<p>Turtle size: <10 cm</p> <p>Minimum floor area: 1.0 x 0.6 m (0.6 m²)</p> <p>Minimum pond depth: 0.3 m</p> <p>Increased floor area for each additional turtle: 0.3 m²</p>	<p>ENCLOSURE CONSTRUCTION</p> <ul style="list-style-type: none"> • Pre-fabricated pond. Children's wading pool. • Solid walls (corrugated tin or wood) sunk into the ground to 50 cm to prevent predators gaining access or turtles digging out. <p>ENCLOSURE FURNISHING</p> <ul style="list-style-type: none"> • Plants such as grass tussocks and branches with leaves added to provide hides. Be careful the individual cannot use these to climb out. • Access to leaf litter or straw to allow the turtle to burrow and hide. • Easy access in and out of the water with broad logs is required. Rocks or logs can be used as basking platforms. <p>ENVIRONMENTAL VARIABLES</p> <ul style="list-style-type: none"> • Turtles should only be placed in outside ponds during the warmer months of the year, when the temperature is usually above 20°C. • Situated to receive both sunlight and shade. <p>PROVISION OF FOOD/WATER</p> <ul style="list-style-type: none"> • Food is placed in the pond.
	<p>Turtle size: >10 cm</p> <p>Minimum floor area: 2.0 x 1.0 m (2.0 m²)</p> <p>Minimum pond depth: 0.5 m</p> <p>Increased floor area for each additional turtle: 1.0 m²</p>	

Figure 3.9 A glass fish tank set up as intermediate/pre-release housing for a turtle.



Photo credit: Zoos Victoria

3.7 Feeding and nutrition

Keeping daily records of food offered (item and volume fed) and food consumed is good practice and will allow the rehabilitator to observe appetite, and whether the animal is consuming a balanced diet, or is preferentially consuming only certain food items offered.

Please note: Food suppliers and specific products mentioned in these guidelines are intended as examples only. Other suitable products may also be available.

This section refers to feeding and nutrition of turtles in rehabilitation.

Table 3.8 Daily feeding and diet guide for turtles during rehabilitation

Species	Broad-shelled turtle	Common long-necked turtle	Macquarie river turtle
Captive diet	Earthworms, crickets, cockroaches, mice, fish	Earthworms, crickets, cockroaches, mice, fish	Greens such as ribbon weed (<i>Elodea</i> sp.), duck weed, chopped endive and bok choy, earthworms, crickets, cockroaches, fish*
Feeding frequency	Adults: 3 x week during summer and warmer months, 2 x week if over wintered. Juveniles: daily.		
Amount to feed	Equivalent to the turtle's head size.		
Food placement	Water. Turtles do not eat on land.		
Feeding method	Do not hand feed.		
Uneaten food	Remove within 12 hours.		

*Please note that there are controls on the collection of some indigenous plants and declared noxious weeds from the wild in Victoria. There are restrictions on the growing of declared noxious weeds in Victoria including some aquatic species. Web search 'noxious weeds Victoria' and 'protected flora Victoria'.

3.8 Artificial incubation



If eggs are found in a gravid female that is euthanised, they can be incubated and the hatchlings released.

3.8.1. Equipment required

- Container, such as a ClickClack box, to hold the eggs
- Kimani or other incubator to hold the container
- Vermiculite
- Pencil
- Flashlight or mobile phone
- Disposable gloves.

3.8.2. Technique

- Use 50/50 vermiculite/water. For example mix 250 g vermiculite with 250 ml water until absorbed. Place the mix into a ClickClack box with a sealed lid and mark the lid with the date.
- Partially bury the eggs in the vermiculite/water mixture.
- Do not turn the eggs once laid.
- Number each egg with a pencil on the side facing up. This will ensure the egg is not rotated during the incubation period.
- Place the ClickClack box in the Kimani or incubator.
- The Kimani or incubator should be set to 28°C for the duration of the incubation period, which is approximately 60–90 days.
- Maintain humidity around 80–90%.
- Open the box once a week to allow air exchange and wipe any excess moisture off the inside of the container lid. It may be necessary to do this twice a week depending on moisture build up.
- Alternatively, a container with holes in the lid can also be used.
- Check the viability of the eggs periodically during incubation by candling them. Hold a flashlight or phone light on the bottom of the egg and shine it through the egg. If the egg is viable blood vessels will appear after approximately one week. As incubation progresses it should be possible to see the turtle forming. Closer to hatching the egg will develop darker areas where the shell and body have formed.
- When the turtles have hatched they can be set up in a small plastic tank kept at room temperature and containing approximately 5 cm of water and a few rocks to bask on. They can remain in this tank for two to three days prior to release. No feeding is required as they still have their egg yolk to provide nourishment.
- After this period of acclimatisation, the hatchlings can be returned to the wild where the female turtle was found.

3.9 Release protocol

Ideally, wild animals will be rehabilitated and released in a short timeframe. If this is not possible and the animal is in care for significant extended periods, ensure that the animal is regularly assessed against the five welfare domains to support decision-making. Animals in care for extended periods may have a reduced ability to survive in the wild. Talk to your veterinarian and consider whether euthanasia will provide the best welfare outcome for such individuals.

3.9.1. Pre-release assessment

Pre-release assessment of animals in care is essential to support improved outcomes once back in the wild. Animals should be assessed based on body condition, fitness and the ability to engage in natural species-specific behaviours prior to release.

The following information should be used to guide decision-making regarding release suitability for turtles:

- ☑ Turtle is in a state of good health – presenting injury/sickness is completely resolved (consider a pre-release veterinary check).
- ☑ Turtle is within a healthy weight range and appropriate body condition (see **Table 3.1**).
- ☑ Turtle displays ability to actively forage for and consume natural foods.
- ☑ Turtle can swim normally and dive to the bottom of the tank.

3.9.2. At the release site

Post release survival will be maximised by ensuring that both the release site and the way in which the animal is released are carefully considered.

- Adult turtles should be returned to their original location as soon as possible.
- Artificially hatched turtles should be released from September to April. The minimum water temperature that turtles are active will have an effect on the time of release:
 - Common long-necked turtles are active at water temperatures more than 12°C.
 - Broad-shelled turtles become active once the water temperature reaches 18°C.
 - Macquarie river turtles are active at water temperatures more than 16°C.
- Release at water temperatures below these may result in increased predation as the turtle is only capable of slow movements.

It is important to ensure that the site is suitable for release of the turtle. Important site features or factors to consider before releasing a turtle include:

- Common long-necked turtles are found in ephemeral ponds and swamps and respond to drought and rainfall by moving to nearby watercourses. They spend more time on land than the other species, but are usually found within 300 m of water. This species has adapted to living in urban environments by using drains and roadside culverts. If found in these modified urban environments, they should be returned to them.
- Broad-shelled turtles inhabit permanent watercourses that are more than 3 m deep. This species is cryptic and does not hibernate. They prefer turbid water and hide deep in the water to ambush their prey. As they are very dependent upon a particular habitat in watercourses they must be returned to their point of origin.
- Macquarie river turtles prefer large, deep (more than 2 m), clear, flowing, stable waterbodies.
- Overlap occurs between the three turtle species.

For more information on the ecological characteristics and requirements of turtles that may help with their release see **Table 3.1**.

3.9.3. Release checklist

Check all of the requirements of your authorisation are being met, and consider the following:

Release location

- A suitable environment is available.

Release procedure

- Turtles should be released during the warmest time of the day.
- Be conscious of transport temperatures to reduce the risk of thermal shock. For example avoid moving a turtle from a 25°C heated car straight into 12°C water.
- Place the turtle into shallow water at the edge of the watercourse. Choose a vegetated area that provides some shelter.
- Step away as the turtle may not move while it perceives that a threat is in the area.

3.10 Key references and additional reading

Cann, J. and Sadler, R. 2017. Freshwater turtles of Australia. CSIRO Publishing.

Cogger, H.G. 2018. Reptiles and amphibians of Australia, 7th Edition. Reed New Holland.

Egan, C. 2016. Australian Turtles: Their Care in Captivity. Quillpen Pty Ltd.

Robertson, P., and Coventry, A.J. 2019. Reptiles of Victoria. CSIRO Publishing.

Swanson, S. 2017. Field guide to Australian reptiles, 3rd Edition. Steve Parish Publishing.

Wilson, S., and Swan, G. 2017. A complete guide to the reptiles of Australia, 5th Edition. Reed New Holland.

Chapter 4. Frogs

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In Victoria, sick, injured or orphaned wildlife can only be rehabilitated by a wildlife shelter operator or foster carer who is authorised under section 28A of the Victorian *Wildlife Act 1975* (Wildlife Act). Wildlife rehabilitators are subject to strict conditions. The mandatory requirements that they must meet are set out in the Wildlife Shelter and Foster Carer Authorisation issued under the Wildlife Act. These conditions enforce the minimum standards required for the humane treatment and successful rehabilitation of wildlife in care. The Wildlife Rehabilitator Authorisation Guide: Things You Need To Know explains how wildlife rehabilitators can meet these mandatory requirements and can be found here: <https://www.vic.gov.au/wildlife-rehabilitation-shelters-and-foster-carers>.

The Victorian Wildlife Rehabilitation Guidelines have been developed to incorporate evidenced-based best practice in wildlife care and rehabilitation to equip rehabilitators to deliver positive welfare outcomes for individual animals in their care from first aid to post-release into the wild.

You must comply with the conditions of your authorisation. These guidelines must be read in conjunction with the conditions of your authorisation.



STOP – If there is any suspicion that an animal may have chytrid fungus (see Section 4.5.3 to assist with this determination), it should be euthanised immediately. Never release unhealthy frogs back into the wild. Chytrid fungus has caused extinctions of Australian frogs in the wild. Do not spread it further.

4.1 Introduction

Several frog species are listed as threatened in Victoria. To determine if a frog species is threatened, consult the *Flora and Fauna Guarantee Act 1988* Threatened List (**Flora and Fauna Guarantee Act Threatened List** (environment.vic.gov.au)).



STOP – If a threatened species come into care, please STOP and refer to your authorisation for mandatory conditions including notification and release requirements.

Rehabilitation of frogs requires careful consideration given the high risk of transmitting infectious diseases to wild populations (for example chytrid fungus). All rehabilitated frogs must be returned to the location where they were found. If this location is a national park, then DEECA should be contacted pre-release.

When frogs come into care it is the responsibility of the wildlife rehabilitator to ensure that the five domains of animal welfare are satisfied. These include providing optimal nutrition and an environment appropriate to the stage of rehabilitation. The focus should be on the frog's return to health and release, which is facilitated through regular collaboration with a veterinarian. It is also important to consider the animal's mental state and ability to exhibit normal behaviours without detrimentally affecting its recovery. Welfare may be temporarily compromised by the necessity of a gradual return to normal activity, depending on its stage of rehabilitation. Further information about the five domains of animal welfare can be found in Part A of these guidelines.

4.2 Species information


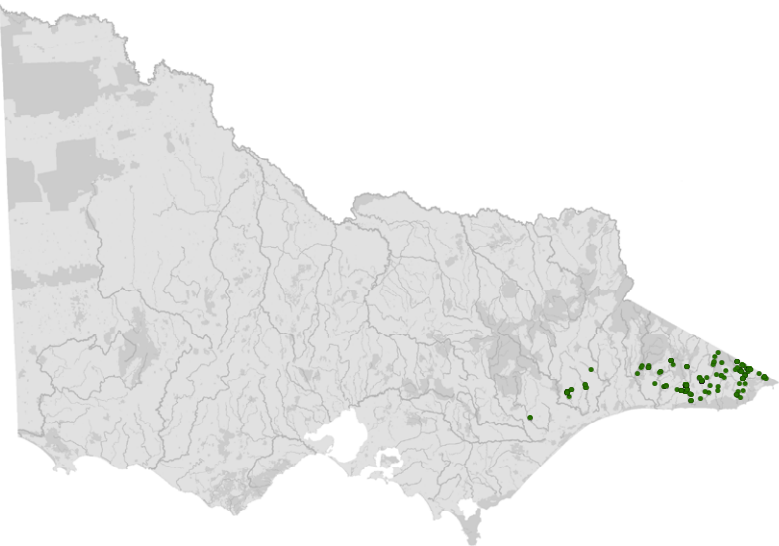


Profiles for some of the frog species found in Victoria are detailed in the tables below. It does not describe the entire 36 frog species found in Victoria. Many of these species may have more than one common name. Variation in colour occurs frequently.


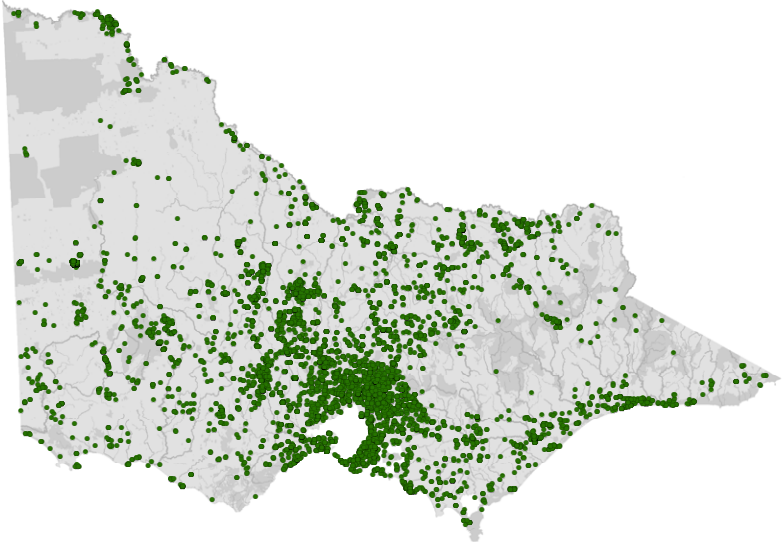
Frogs may be presented for identification by concerned members of the public. Some frogs, such as banjo frogs, are presented as suspected cane toads. It is preferable to leave the frog where it is and ask to see an image instead. If the

frog has no injuries, it should be returned to the location where it was found as soon as possible. For assistance in identification of frog species refer to the recommended reading and reference material at the end of this chapter.

Table 4.1 Species Profiles

Species	Blue mountains tree frog (<i>Litoria citropa</i>)
 <p data-bbox="129 1227 384 1272">Photo credit: David Paul, Museums Victoria</p>	<p data-bbox="560 958 772 987">Distribution map</p>  <p data-bbox="560 1576 1283 1626">Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
<p data-bbox="129 1659 384 1688">General appearance</p>	<p data-bbox="560 1666 1126 1695">Brown back. Green on side of head and flanks</p>
<p data-bbox="129 1731 384 1760">Conservation status*</p>	<p data-bbox="560 1738 676 1767">Not listed</p>
<p data-bbox="129 1803 384 1832">Adult morphometrics</p>	<p data-bbox="560 1809 692 1839">60–90 mm</p>
<p data-bbox="129 1874 225 1904">Habitat</p>	<p data-bbox="560 1881 927 2009">Terrestrial Heaths, wet and dry forest Hides under rocks near water</p>

Species	Blue mountains tree frog (<i>Litoria citropa</i>)
Natural activity peak	Nocturnal
Diet	Insects
Breeding season	Late winter to early summer
Tadpole development	2–4 months

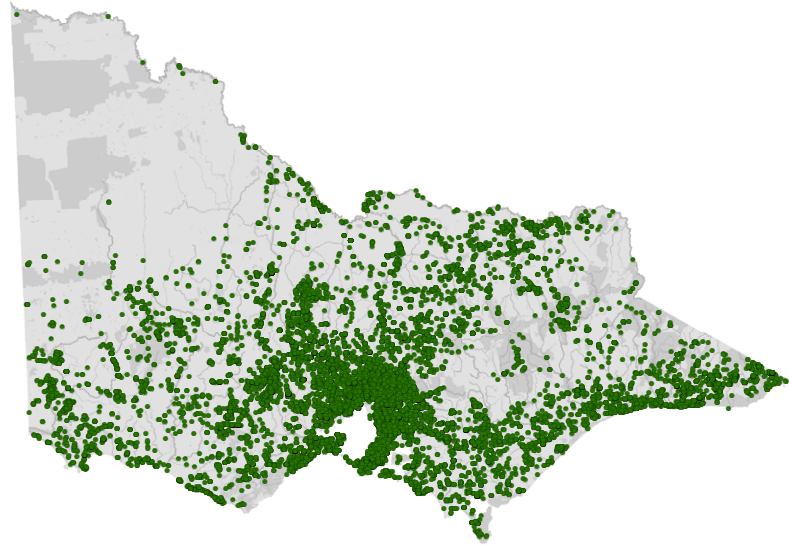
Species	Eastern banjo frog (Pobblebonk) (<i>Limnodynastes dumerilii</i>)
 <p>Photo credit: Ian R McCann, Museums Victoria</p>	<p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</p>
General appearance	Grey or brown above. Pale strip below eye to front leg
Conservation status*	Not listed
Adult morphometrics	60–90 mm
Habitat	Permanent water: stream, dam, swamp
Natural activity peak	Nocturnal
Diet	Insects
Breeding season	Spring–autumn
Tadpole development	4–5 months

Species

Eastern common froglet (*Crinia signifera*)

Photo credit: Nick Clemann, DEECA

Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023

www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

General appearance

Variable colour: grey to brown. Dark band from eye to groin

Conservation status*

Not listed

Adult morphometrics

18–30 mm

Habitat

Widely varied habitat: coast to inland. Hides under logs and rocks

Natural activity peak

Diurnal

Diet

Insects

Breeding season

Year round

Tadpole development

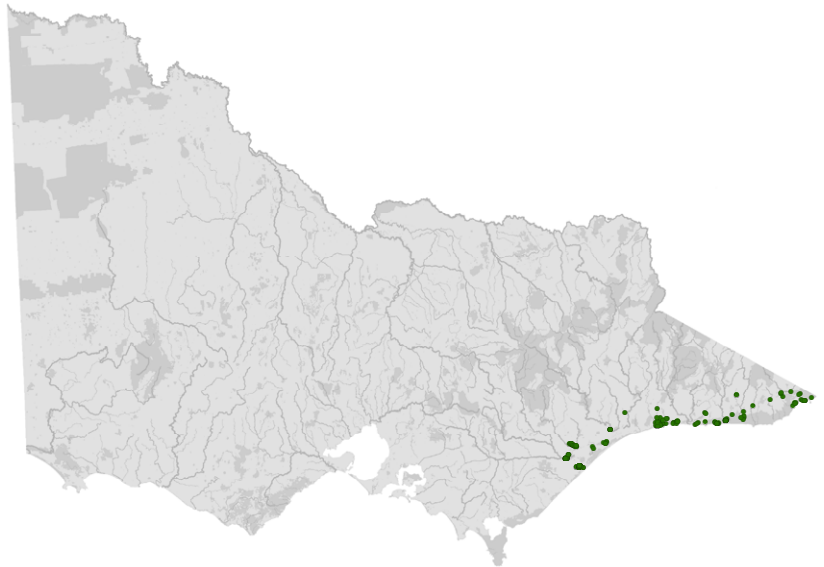
2.5–3 months

Species

Green and golden bell frog (*Litoria aurea*)

Photo credit: David Paul,
Museums Victoria

Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023
www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

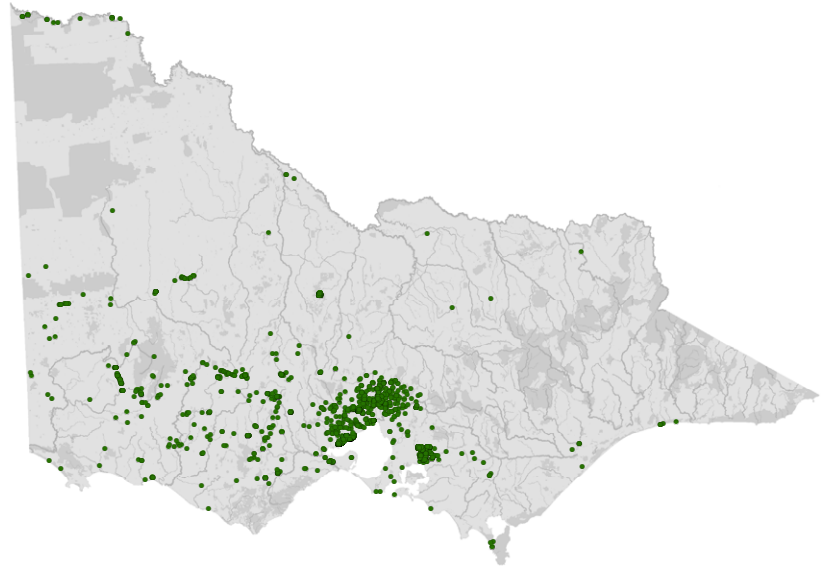
General appearance	Green and gold spots on back, smooth back. Yellow strip from head to groin. Groin is blue. Male and female shown
Conservation status*	Not listed
Adult morphometrics	55–100 mm
Habitat	Aquatic Near permanent water
Natural activity peak	Diurnal
Diet	Insects, earthworms, slugs, freshwater crayfish
Breeding season	Spring–summer
Tadpole development	3–11 months

Species

Growling grass frog (*Litoria raniformis*)

Photo credit: Nick Clemann, DEECA

Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023

www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

General appearance

Back is green and brown with large warts

Conservation status*

Vulnerable

Sexual dimorphism

Male: 55–65 mm

Female: 60–100 mm

Adult morphometrics

55–100 mm

Habitat

Aquatic, close to or in water or very wet areas in woodlands, shrublands and open and disturbed areas

Natural activity peak

Diurnal and nocturnal

Diet

Invertebrates, frogs, lizards, small fish

Sexual maturity

Male: 43 days

Female: 113 days

Breeding season

Spring–summer

Tadpole development

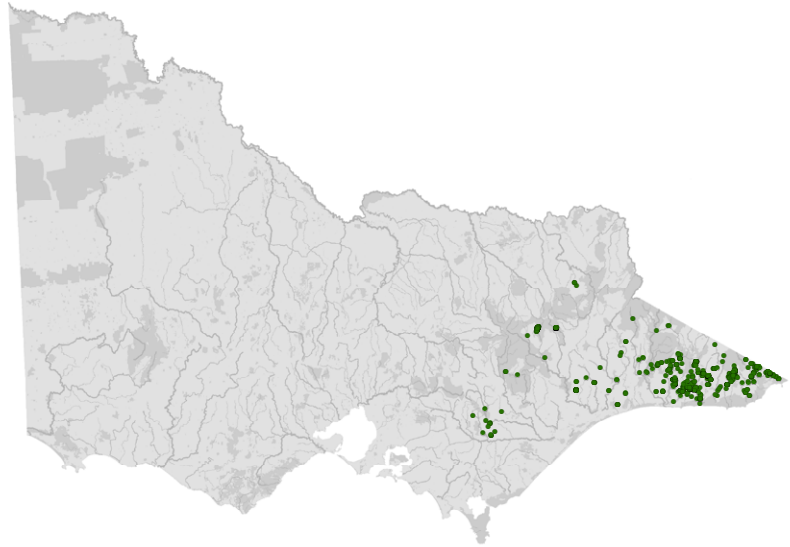
3–12 months

Species

Leaf green tree frog (*Litoria nudidigitus*)

Photo credit: David Paul,
Museums Victoria

Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023

www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

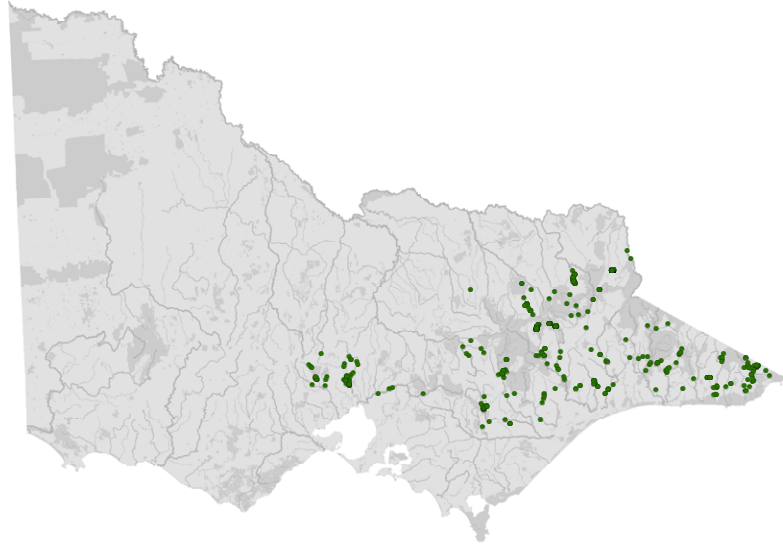
General appearance	Bright green above, often with scattered white spots on the sides and occasionally on the back. Ventral surface white
Conservation status*	Not listed
Adult morphometrics	25–40 mm
Habitat	Aquatic, rocky rivers and streams in rainforest and wet forest
Natural activity peak	Nocturnal
Diet	Small invertebrates
Breeding season	Spring–summer
Tadpole development	>2 months

Species

Lesueur's frog (*Litoria lesueuri*)

Photo credit: Nick Clemann, DEECA

Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023

www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

General appearance

Back is yellow to brown, Black stripe from nose to shoulder.
Back of thigh is black

Conservation status*

Not listed

Adult morphometrics

30–60 mm

Habitat

Terrestrial

Can be away from water

Dry forest, heath, rainforest, often found long distances
from water

Natural activity peak

Nocturnal

Diet

Small invertebrates

Breeding season

Spring–summer

Tadpole development

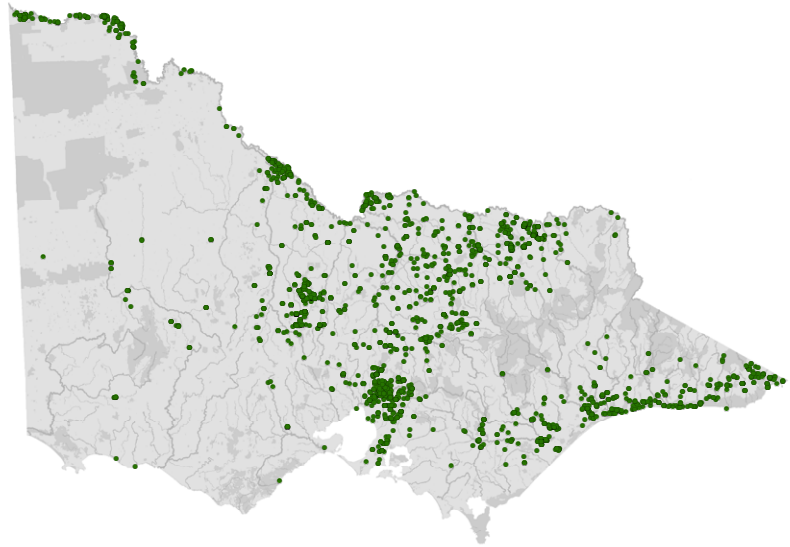
>2 months

Species

Peron's tree frog (*Litoria peronii*)

Photo credit: Rodney Start, Museums Victoria

Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023

www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

General appearance

Grey or brown above with irregular darker mottling and small, bright green emerald spots. Ventral surface cream or yellow with scattered dark brown flecking on throat. Cross-shaped appearance to iris

Conservation status*

Not listed

Adult morphometrics

45–70 mm

Habitat

Terrestrial

Pools, dams, ditches in forested habitats and grassland

Natural activity peak

Nocturnal

Diet

Insects

Breeding season

Spring to summer after rain

Tadpole development

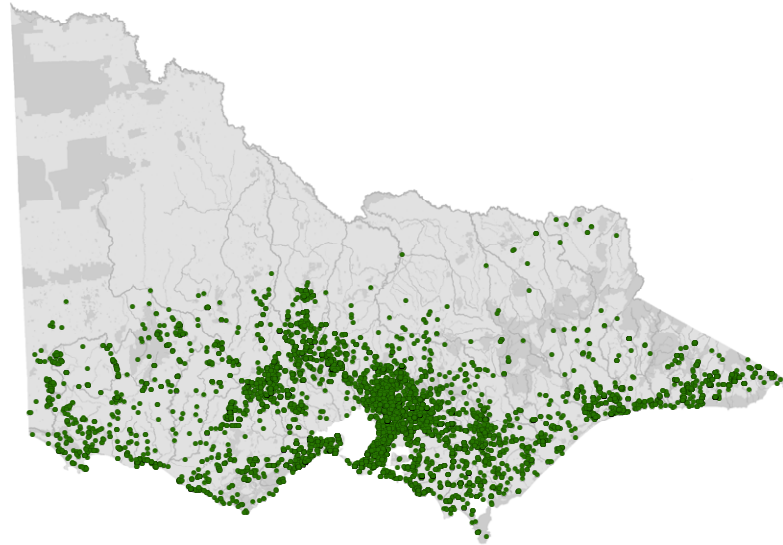
3–4 months

Species

Southern brown tree frog (*Litoria ewingii*)

Photo credit: David Paul,
Museums Victoria

Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023

www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

General appearance

Pale to cream-brown back, yellowish-white, cream or white belly.
Yellow to red-orange backs of thighs and groin

Conservation status*

Not listed

Adult morphometrics

30–60 mm

Habitat

Terrestrial

Preference for flooded grasslands or marshes but found in
all habitat types

Common in gardens

Natural activity peak

Nocturnal

Diet

Insects

Breeding season

Year round

Tadpole development

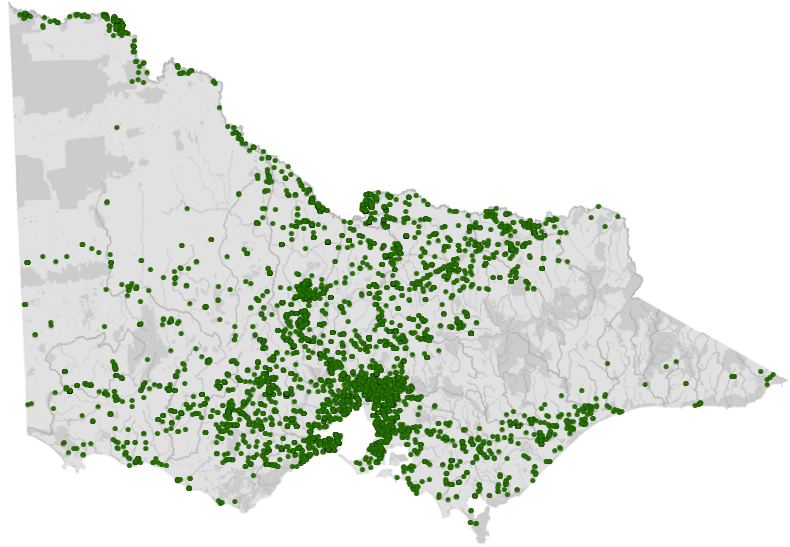
6–7 months

Species

Spotted marsh frog (*Limnodynastes tasmaniensis*)

Photo credit: Ian R McCann,
Museums Victoria

Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023
www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

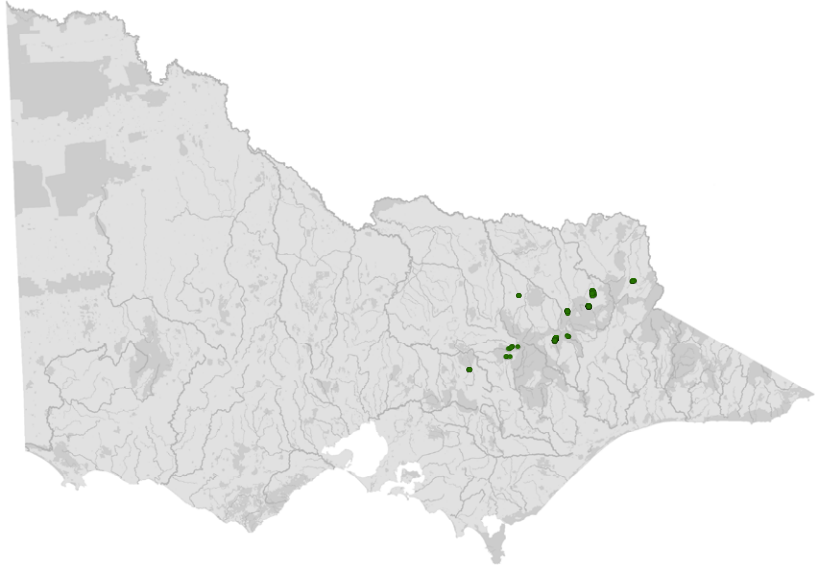
General appearance	Large olive-green blotches on the back, and sometimes a yellow, red or orange mid-dorsal stripe
Conservation status*	Not listed
Adult morphometrics	30–60 mm
Habitat	Terrestrial Wet coastal to dry interior. Hides under logs
Natural activity peak	Nocturnal
Diet	Insects and spiders
Breeding season	Spring–autumn
Tadpole development	>3.5 months

Species

Spotted tree frog (*Litoria spenceri*)

Photo credit: D Goodall, Zoos Victoria

Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023
www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

General appearance	Back is brown and green. Groin is orange
Conservation status*	Critically endangered
Adult morphometrics	42–70 mm
Habitat	Semi-aquatic, among boulders or debris in or beside fast flowing mountain streams
Natural activity peak	Diurnal and nocturnal
Diet	Insects
Breeding season	Spring–summer
Tadpole development	3 months

*From the *Flora and Fauna Guarantee Act 1988* Threatened List June 2023. This list is updated regularly throughout the year. For the most current list, please visit <https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list>.

Exotic and non-endemic native species (contact your local DEECA authorised officer)

Non-endemic native species, such as those listed below, are Australian species that are not found in Victoria and come into care in this state. They may be pet frogs that escape their enclosures or stowaways that arrive in containers or boxes with shipped goods. For example frogs from other states often arrive in fruit and vegetable boxes. These frogs may not be injured but may be dehydrated and sick. They may have been sprayed with pesticides or frozen/refrigerated.


Non-endemic native species **must not** be released into the wild in Victoria as survival chances are low and they may spread disease. An authorised officer of DEECA should be contacted to determine the best course of action for the animal.


In cases where the frog is suspected to be an escaped pet, take the animal to a veterinarian to be scanned for a microchip. If an owner can


be identified, the animal should be returned as soon as possible.

Occasionally exotic frog species come into care. An example of this is the cane toad (*Bufo marinus*) – an olive-brown, warty toad found in New South Wales, the Northern Territory and Queensland. Exotic frogs also occasionally enter Australia and Victoria as stowaways from overseas in shipping containers and with international travellers. An example of this is the Asian black-spined toad (*Duttaphrynus melanostictus*) which has been known to hide in the shoes of travellers returning from south-east Asia. Exotic species must be euthanised as they are a pest and pose a threat to many native species. It is illegal to be in possession of such species. Notify Agriculture Victoria of stray, captured or surrendered exotic animals on 136 186 or email highrisk.invasiveanimals@agriculture.vic.gov.au.


Table 4.2 Some non-endemic frog species that may be found in Victoria

Species	Dainty green tree frog (<i>Litoria gracilentia</i>)
General appearance  <p>Photo credit: Zoos Victoria</p>	Green back, yellow abdomen
Distribution map	Far north Qld to Sydney, NSW
Adult morphometrics	Up to 45 mm
Habitat	Dense vegetation and reeds associated with water. Ditches, marshes, lagoons and stream banks
Breeding season	Spring to summer after heavy rain
Tadpole development	>2 months

Species	Eastern dwarf tree frog (<i>Litoria fallax</i>)
General appearance  <p>Photo credit: Zoos Victoria</p>	Small, green back, orange legs
Distribution map	Far north Qld to Sydney, NSW
Distribution map	Qld, NSW
Adult morphometrics	Up to 25 mm
Habitat	Swamps, lagoons, ditches, ponds and dams. Found in reeds, bromeliads and banana trees
Breeding season	Year round
Tadpole development	2.5–4.5 months

Species	Green tree frog (<i>Litoria caerulea</i>)
General appearance  <p>Photo credit: Jonny Pickvance</p>	Large, green, fold around ear
Distribution map	WA, NT, Qld, NSW
Adult morphometrics	Up to 110 mm
Habitat	Swamps, flooded ditches, ponds, tree hollows and human associated water bodies
Breeding season	Spring–summer
Tadpole development	>1 month

Species	Red-eyed green tree frog (<i>Litoria chloris</i>)
General appearance  <p>Photo credit: ©The State of Queensland</p>	Orange eye, green back, yellow abdomen
Distribution map	Qld to Sydney, NSW
Adult morphometrics	Up to 65 mm
Habitat	Flooded grasslands, streams and ponds
Breeding season	Spring to summer after heavy rain
Tadpole development	>2 months

Species	White-lipped green tree frog (<i>Litoria infrafrenata</i>)
General appearance  <p>Photo credit: Zoos Victoria</p>	Green back, white abdomen, white stripe around lower jaw
Distribution map	Far north Qld
Adult morphometrics	Up to 135 mm
Habitat	Pools, swamps and garden ponds
Breeding season	Late spring to summer
Tadpole development	1–2.5 months

4.3 Animal and human safety considerations



In general, animals in the wild have limited contact with people, pets, and the hustle and bustle of our daily lives. When sick, injured or orphaned wild animals come into care this unnaturally close contact can carry risks to the health and safety of both people and animals. For general information on biosecurity and approaches to minimise these risks see Part A of these guidelines. Specific information on enclosure hygiene and biosecurity for frogs is in **Section 4.6.2**.

The following information relates to the human and animal health and safety considerations specifically related to the rehabilitation of frogs.

4.3.1. Human safety considerations

- Native frogs do not secrete harmful substances in their skin, unlike the cane toad.
- Wash hands with soap and water after handling frogs to minimise the risk of infection with zoonotic disease agents such as *Salmonella*.

4.3.2. Animal safety considerations

- Frogs may be preyed upon by domestic pets. Restrain any pets before capture is attempted. The capture may involve the use of a net or hands to catch the frog. These frogs may be injured.

- Rough handling of frogs can damage their skin or break limbs.
- Be aware that frogs can make unpredictable movements and may leap out of your hands and escape.
- Chemicals and other substances on human skin can harm the frog. Important: Detergents must be avoided if the enclosure is housing frogs due to their semi-porous skin and sensitivity to toxins. Hot dechlorinated water and scrubbing will suffice.
- Chytrid fungus has been implicated in the decline and extinction of several frog species in Australia. It is transferred by exposure to infected water and direct contact between frogs and tadpoles. The disease kills frogs and quickly spreads through populations of frogs in streams and ponds. See **Table 4.5** and **Section 4.6.2** for more information.

4.4 Capture, restraint, and transport



STOP – A visual examination must be done **BEFORE** the animal is captured. This applies to the initial capture from the wild as well as prior to captures which occur during time in captive care. See Section 4.4.1 for information on what to look for when conducting a visual health assessment.

Refer to Part A of these guidelines for general advice on wildlife welfare, biosecurity and hygiene, and record requirements. The following information relates to the capture, restraint, and transport of sick, injured and orphaned frog species.

4.4.1. Visual observations

Visual observations of wildlife should be conducted prior to any attempts to capture the animal. This is just as important prior to the first capture from the wild as it is before any capture conducted while an animal is in captive care. Observations should be conducted quietly, by

one person, and from a distance which provides a clear view of the animal with as little disturbance as possible. Visual observation should focus on the animal's demeanour, behaviour, movement and posture. Check for evidence of injury/severe disease or deterioration and assess their breathing as demonstrated in the following table.

Table 4.3 Visual health observations in frogs

What to look for	
Demeanour	<ul style="list-style-type: none"> Bright, alert with eyes open Reactive to being approached, may try to avoid capture
Behaviour	<ul style="list-style-type: none"> Sits quietly Suddenly hops – be mindful of this to prevent injury to the frog
Movement and posture	<ul style="list-style-type: none"> Sits up with all four legs tucked against the body Able to use all four legs without dragging any of them Alignment of spine appears straight/normal
Breathing	<ul style="list-style-type: none"> Regular with no obvious effort Nostrils are clear and open, free from discharge

4.4.2. Equipment

- **Gloves:** Nitrile or latex gloves free from powder should be used when handling frogs. If more than one frog is to be handled the 'one glove, one frog' approach must be taken. Note: Gloves should not be used for handling tadpoles. Latex and nitrile gloves are toxic for tadpoles.
- **Net:** Frogs are easily captured using small aquarium fish nets. Do not use a fish net that has been used in a domestic aquarium. Fish nets need to be sterilised in 1 per cent bleach solution for one minute or a 1:250 solution of F10 SC for a minimum of 1 minute and thoroughly rinsed between different sites.
- **Transport container:** Frogs can be transported in cheap and disposable plastic containers, such as takeaway food containers or small plastic carry cages with holes for ventilation.

Figure 4.1 A plastic tub with holes for ventilation makes a simple transport container for frogs.



Image: Zoos Victoria

4.4.3. Technique

It is beyond the scope of these guidelines to outline techniques for every situation that may be encountered. Examples of techniques for some specific situations are outlined in the following section.

In addition to this information, for further advice please also refer to the recommended reading list, zoological institutions, veterinarians and/or wildlife experts. Inexperienced rescuers should request assistance where possible.

Given the risks associated with the transfer or spread of chytrid fungus, hygiene and quarantine protocols are critical when handling and caring for frogs.

- Use gloves rather than bare hands. This also protects the frog's sensitive skin from residue on your hands.
- The gloves should be moistened with water from the enclosure or waterway before picking up the frog.
- Restrain the frog by cupping one hand around it and supporting the abdomen with the other hand (see **Figure 4.2**).
- A hand may be held in front of the frog, blocking its line of sight to reduce the likelihood of it jumping forward.
- Tadpoles can be scooped up in a net or jar.

Figure 4.2 Restraint of a white-lipped green tree frog in the hand. Note the gloves are wet.



Photo credit: Zoos Victoria

4.4.4. Transport

- Minimise travel time.
- Ensure that the enclosure has adequate ventilation and is not exposed to direct sunlight during travel.
- If travel in hot conditions is unavoidable, the vehicle must have adjustable climate control facilities that ensure the area containing the frog is maintained at a temperature of 25°C or less for the duration of transport.
- A small amount of water from the waterway in which the frog was found may be placed in the container, but it is preferable to use damp tissue or paper towel.
- Do not place rocks or pebbles in the transport container, as these may cause crush injuries.
- Cover the transport container to prevent the frog from injuring itself by jumping against the sides.

4.5 Monitoring animal health and welfare



The goal of wildlife rehabilitation is to address health and welfare concerns quickly and effectively so wildlife can be released back to the wild as soon as possible. Decision-making from the time of capture through to release should be guided by an accurate understanding of the animal's true state of health and welfare. Careful monitoring throughout the rehabilitation period ensures that significant issues, or deterioration in health condition, are identified immediately and rapidly addressed.

It is preferred that all sick, injured or orphaned wildlife be assessed by a veterinarian to ensure that non-obvious signs of trauma or disease can be assessed and treated as soon as practicable. No medication should be provided prior to this assessment, as this can mask clinical signs and make an accurate health assessment by the veterinarian very difficult.

Templates for record-keeping visual and physical observations and daily care can be found in Part A of these guidelines.

This section provides guidance on health assessments on arrival and on effective monitoring of the health and welfare of individuals in care through minimising human-animal interactions and stress to the animal to maximise successful release back to the wild.

4.5.1 Physical examination

Once visual observations are complete, and the animal is stable enough to withstand capture and handling, a basic physical examination should be conducted. This can be repeated when required any time the carer has the animal in the hand, such as for an enclosure change. However, if a full physical exam is not conducted, body condition and weight should be assessed every time the animal is in the hand for other reasons. Carers should make sure weighing scales are available and ready to use before capturing the animal. Physical examinations are also required if the carer notices any changes suggestive of deteriorating health or an injury.

Always record the physical examination findings so that you can compare findings as the

animal's rehabilitation progresses. This ensures any health concerns are identified as soon as possible, and the carer can plan release as soon as this is appropriate. **A template for recording physical examination findings can be found in the appendices to Part A of these guidelines.**

Examinations should be conducted in a quiet location, away from domestic animals. Only one person should handle the animal, while a second person takes notes. All other people should move away, and noise kept to a minimum. Handling should also be kept to a minimum, with careful monitoring for any signs of distress (such as sudden deterioration in demeanour or limp posture). If these are seen, the examination should be stopped immediately, and the animal returned to its catch bag, transport box or enclosure and allowed to recover.

Species specific considerations:

- Frogs can be examined while conscious, under manual restraint. However, for painful conditions or deep injuries examination under anaesthesia is required.
- The frog can be held in one hand and limbs gently extended with the other, looking for obvious abnormalities.
- Be careful that the frog does not leap out of the hand as it can fracture a leg if it lands on the ground.
- A tongue depressor, guitar pick or credit card can be used to open the mouth. Be gentle to avoid damaging the mouth.
- **Table 4.4** provides additional guidance on what to look for during physical examinations.

Table 4.4 Physical examination

What to look for	
Body weight	<ul style="list-style-type: none"> Record body weight on arrival and weekly while in care. A greater than 10% change in body weight is cause for concern, and the carer should seek veterinary advice immediately. It is important to know species specific normal size and weights, some small species may not tolerate weight fluctuations.
Body condition	<ul style="list-style-type: none"> Body condition is scored by evaluating muscle coverage over the spine and hips. See Figure 4.3. Body condition can be described as follows: <ul style="list-style-type: none"> Under condition: The pelvis and spine are prominent. Ideal condition: Top of the pelvis can just be seen. Over condition: Unable to see the spine or outline of the pelvis.
Hydration status	<ul style="list-style-type: none"> Frog skin should be moist. A dehydrated frog has dry, tacky skin that may be darker than normal, appears wrinkled and shrivelled and feels leathery to the touch.
Eyes	<ul style="list-style-type: none"> Open, surface is clear with no opacities. Eyes should both be open, shiny and clear, with no bubbles or discharge Basic internal structures of eyes (e.g. pupil, iris) appear symmetrical.
Mouth	<ul style="list-style-type: none"> Symmetrical, no blood visible, light pink inside. Jaw/mouth aligned normally, no evidence of displacement or fracture.
Skin	<ul style="list-style-type: none"> Smooth, moist, no tears or masses. Pigmentation should be consistent with the species.
Limbs	<ul style="list-style-type: none"> Hind legs tucked in when sitting. No limbs hanging abnormally.
Sex determination	<ul style="list-style-type: none"> Females tend to be larger. Males call during the breeding season and may have nuptial pads on their fore fingers.

Figure 4.3 Body condition scoring in frogs. a. A thin Peron's tree frog. The spine and pelvic bones are visible. b. A white-lipped green tree frog in ideal condition. The top of the pelvis can just be seen. c. An overweight spotted marsh frog. Note that it is difficult to see the pelvis.

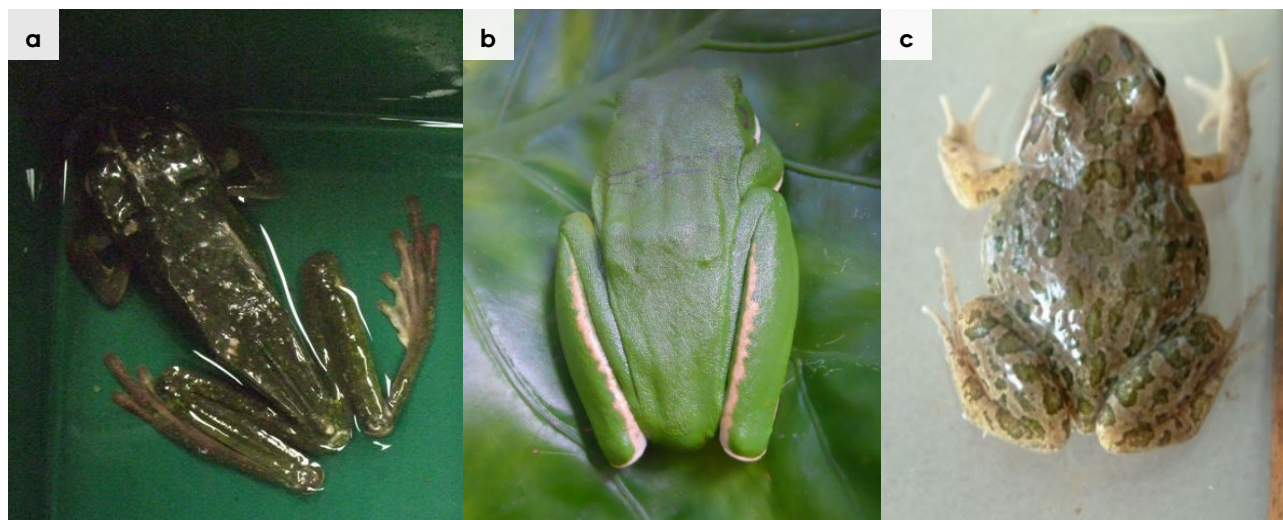


Photo credit: Anne Fowler

4.5.2. Ongoing monitoring of health and welfare

The aim of wildlife rehabilitation is to ensure animals recover and can be released back to the wild as quickly as possible. Careful, daily monitoring is required to ensure that animals are responding as expected to the treatment being provided and so that any deterioration or welfare concerns can be identified and addressed as soon as possible. Rehabilitators should ensure that record-keeping is a priority to maximise positive welfare outcomes. Templates to assist wildlife rehabilitators to record and monitor wildlife health and welfare can be found in the appendices to Part A of these guidelines. These records will be valuable tools to share with veterinarians to support decision-making.

The following is recorded daily:

- demeanour
- food consumption
- faecal/urine output
- behaviour observed
- medical treatment provided
- evidence of overnight activity.

The following is recorded weekly:

- weight
- body condition.

Over time, regular monitoring will also help to develop carer skills and knowledge, as regular

observations and recording will result in a deep understanding of the expected behaviour and response to treatment for the species in care.

Species specific considerations:

- The frog should be observed at least daily.
- Note the frog's demeanour and behaviour every time food is introduced or taken away, the frog is medicated or the enclosure is cleaned. Pay particular attention to any changes that have occurred since the previous day.
- A healthy frog should be sitting in a tucked position with its legs against its body and eyes open.
- A frog lying flat with legs out and eyes closed needs veterinary attention.
- Frogs are unlikely to imprint onto humans. However, they can become tolerant of handling, so this should be kept to a minimum during rehabilitation.
- Note faecal consistency daily. The frog should pass solid brown faeces. If diarrhoea is noticed, a faecal sample should be collected and submitted to the veterinarian for assessment as soon as possible. Do not treat on suspicion of a bacterial or parasitic infection, as this can make definitive diagnosis very difficult and potentially prolong the course of the disease.

4.5.3. Common presenting injuries and clinical signs of emerging health conditions

Clear guidance on conditions that may require euthanasia can be found in Part A of these guidelines.

Table 4.5 lists common clinical signs and possible causes of injury/disease. Carers should be aware that these are not exhaustive. Aside from first aid, carers should avoid administering medications prior to the provision of veterinary advice.

Unusual clinical signs or mass mortality events – a number of animals dying or found dead at the same time, with similar signs – may indicate an emergency animal disease, an emerging/new infectious disease or an environmental/human related toxicity which needs further investigation. Report these immediately to the Emergency Animal Disease Watch Hotline on 1800 675 888 (24 hours).

Table 4.5 Common injuries and clinical signs of emerging health conditions seen on presentation or during care

Injury or clinical signs	Possible causes	Carer observations and response
<p>Note: Do not provide pain relief or other medication, including antibiotics, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. Use of antibiotics when not indicated can contribute to antimicrobial resistance and reduce drug efficacy.</p>		
Fracture Nose trauma	Injury by predation Accident Rubbing nose on the side of the enclosure	<ul style="list-style-type: none"> • Seek urgent veterinary attention. Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Do not attempt to stabilise fractures as this is very painful and risks making the injury worse. Fracture stabilisation should only be attempted by a veterinarian following physical examination, x-rays and under general anaesthesia, with appropriate pain relief. • Do not provide pain relief or other medication unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. • Block the glass with a piece of cardboard, or something similar, to create a visual barrier and stop the frog from rubbing. • Mild cases of rostral trauma can be cleaned with a dilute salt solution (1 g salt in 40 ml fresh water) applied to the affected area 1–3 times per day.
Swelling Bleeding Skin wound, puncture	Injury from predation Garden tool injury or other accident	<ul style="list-style-type: none"> • Seek urgent veterinary attention. Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Do not provide pain relief or other medication unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals.

Injury or clinical signs	Possible causes	Carer observations and response
Tacky skin Shriveled appearance	Dehydration	<ul style="list-style-type: none"> • Seek veterinary attention. • Place the frog in a shallow bath of cool, aged or filtered water.
Poor body condition Inappetence Lethargy Discoloured, ulcerated or sloughing skin Red legs	Chytrid fungus (see Figure 4.4) Ranavirus Bacterial infection	<ul style="list-style-type: none"> • Seek veterinary attention. • The frog may show no clinical signs and still have chytrid. • If chytrid infection is confirmed (by a skin swab submitted to the laboratory), the frog should be euthanised. The welfare of wild frog populations overrides the fate of the individual. This action complies with the Federal Threat Abatement Plan for this disease. • The prognosis for an individual with chytrid is poor, affected frogs often die from the disease. • Skin ulcers and red legs could also be indicative of ranavirus infection or a bacterial infection. The prevalence and susceptibility of Australian frog species to ranavirus infection is not known. If this infection is suspected, it must be reported immediately.

Figure 4.4 a. Great barred frog with chytrid infection. Note the excessive amount of skin sloughing. **b.** Green tree frog with chytrid. Note the red skin on the legs and under the body



Photo credit: Lee Berger

4.5.4. Administering treatment

- Oral medication can be delivered by opening the mouth of the frog using a tongue depressor, guitar pick or credit card.
- Frog skin is quite permeable. Some medications can be administered topically or as a bath. Follow veterinary directions.

4.6 Housing

Below are several key considerations when housing frogs in care.

4.6.1. General housing information for frogs

Table 4.6 Key aspects of housing for frogs during rehabilitation

Term	Parameter
Housing	<ul style="list-style-type: none"> All frogs need to be housed individually for quarantine reasons and to avoid aggression and cannibalism. Do not house wild frogs near pet frogs. Sick frogs must be kept in an enclosure that can easily be kept clean – rather than a display cage for a healthy pet.
Cage furniture	<ul style="list-style-type: none"> The habits of the frog species will determine the cage furniture requirements: <ul style="list-style-type: none"> Burrowing frogs (eastern banjo frog) and frogs that hide under rocks and leaf litter (eastern common froglet, green and golden bell frog, growling grass frog and spotted marsh frog) should be offered soft soil or sphagnum moss for burrowing and rocks or bark for hiding. Rocks should not be too heavy otherwise they can pose a crush risk. Commercially purchased sphagnum moss contains high levels of ammonia so should be rinsed thoroughly before use. Coco peat is also a good burrowing frog substrate. Substrate changes should be completed frequently. Tree frogs (Peron's tree frog and southern brown tree frog) need branches to climb on and plants to hide under. Wash plants thoroughly before use and place bark in the pot to ensure frogs are not coming into direct contact with fertilisers in potted plant soil. Stream-dwelling frogs (Blue Mountains tree frog, leaf green tree frog, Lesueur's frog and spotted tree frog) require free-flowing water and access to rocks to hide under.
UV light	<ul style="list-style-type: none"> Do not house frogs in direct sunlight. Some vegetation or browse can be used to provide a dappled shade but still allowing some UV through. A normal day/night cycle should be provided with the use of a full spectrum light globe that emits both UVA and UVB. This is important for good bone health/density, particularly for frogs in long term rehabilitation settings.
Temperature	<ul style="list-style-type: none"> Provide a temperature range of 17–23°C. A sick frog should be housed at the higher end of the range. Heat may be offered with a 25W lamp at one end of the cage. Monitor the temperature with a thermometer to prevent over-heating. Displaced tropical frogs can be kept in the short term at 25–28°C. Water temperature should be maintained in the same range.

Term	Parameter
Humidity	<ul style="list-style-type: none"> • Provide a humidity level of 30–60% for Victorian frogs. • Displaced tropical frogs require a humidity range of 60–80%. • Humidity is maintained by spraying walls and foliage with boiled water or rainwater. • Maintaining appropriate airflow is equally important as humidity i.e. do not use completely sealed enclosures.
Water	<ul style="list-style-type: none"> • A water bowl for swimming and toileting needs to be large enough that the frog can completely sit in it. • If used with sick frogs, it needs to be shallow enough to prevent the frog from drowning and should contain branches, flat rocks, or pebbles to enable the frog to climb out. • For very sick frogs, use damp paper towel instead. • Water bowls must be changed daily. • Use of water from local waterways is not recommended as it may be polluted or transfer chytrid fungus. • Tap water should not be used straight from the tap. Leave to stand for 24–48 hours to remove chlorine before allowing any frog contact. A less desirable alternative is to treat it with a water aging conditioner. • For frogs that spend more than 50% of their time in the water, water quality must be tested weekly and meet the following parameters: Alkalinity > 50 mg/litre calcium carbonate, hardness = 75–150 mg/litre, pH = 6.5–8.5, salinity < 0.4 ppm, conductivity = 50–2000 μS, unionized ammonia < 0.02 mg/litre, nitrite < 0.1 mg/litre, nitrate < 50 mg/litre. • If ammonia, nitrite and nitrate build up, at least 20% of the water should be changed weekly.
Air quality	<ul style="list-style-type: none"> • Frogs are sensitive to aerosol sprays (e.g. deodorants, hairspray, fly spray), smoke and household cleaning products.

4.6.2. Enclosure hygiene and biosecurity

General information about hygiene and biosecurity can be found in Part A of these guidelines. New diseases emerge frequently and sick and injured animals in care are often more susceptible to picking up pathogens from the environment. It is important to maintain the highest levels of hygiene to avoid inadvertently transferring diseases between animals and from humans, and to protect the wild population where the animal will eventually return to.

Species specific considerations:

- Wash hands with soap and water after handling frogs to minimise the risk of infection with zoonotic disease agents such as *Salmonella*.
- Gloves must be worn when working with and handling frogs and changed between each frog.
- Left-over food and faecal matter should be spot cleaned daily from enclosures to ensure good levels of hygiene are maintained.
- Enclosures used to house sick/injured frogs, must be cleaned and disinfected between inhabitants.
- Enclosures and non-porous furniture should be cleaned with hot soapy water and then disinfected with 1% bleach or F10 SC diluted 1:250 and a 30-minute contact time. Enclosures and furniture should be thoroughly rinsed after disinfecting.
- Substrate should be completely replaced and furniture, such as branches or boxes made of unsealed wood, should be discarded as they cannot be effectively disinfected.
- Cage furniture, such as rocks, should be dried in sunlight or heated above 38°C for a minimum of eight hours before being used in the enclosure.
- To minimise the risk of spreading chytrid fungus, water used in an enclosure to house wild frogs should not be tipped directly down the sink. It should be treated in one of the following ways:
 - With F10 SC (1 ml F10 SC in 250 ml water) for a minimum of one minute and then poured onto soil.
 - With bleach (4% solution) 1 ml in 9 ml water for 10 minutes or 1 ml in 29 ml water for 40 minutes then discharged into the sewerage system.
 - By boiling the water continuously for two minutes. Allow the water to cool and then pour onto soil.

4.6.3. Housing types

Different set ups are required for animals at different stages of treatment and care. **Table 4.7** describes the housing type, suggested dimensions and requirements at each stage of care.

Table 4.7 Rehabilitation housing for frogs. TBL = Total body length

Intensive care housing		
Indications for use	Suggested min. dimensions	Suggested requirements
<p>Short-term critical care (<48 hours).</p> <p>One frog per container.</p> <p>Longer periods under veterinary supervision where strict cage rest/confinement is indicated.</p>	<p>Enclosure:</p> <p>0.4 x 0.4 m (0.16 m²) x 0.4 m (H)</p>	<p>ENCLOSURE CONSTRUCTION</p> <ul style="list-style-type: none"> • Ice-cream or take-away food container or plastic tub with a lid. • Ensure the enclosure has adequate ventilation. <p>ENCLOSURE FURNISHING</p> <ul style="list-style-type: none"> • Plastic cup or another receptacle used as a hide. <p>ENVIRONMENTAL VARIABLES</p> <ul style="list-style-type: none"> • The enclosure should be heated to between 17–23°C. • Damp paper towels can be used to provide humidity for very sick frogs. <p>PROVISION OF FOOD/WATER</p> <ul style="list-style-type: none"> • A small amount of water that is just deep enough to cover the hind legs can be left in the container. • Frogs are fed in a separate container and water is changed weekly.

Intermediate and pre-release housing (treatment/cage rest)

Indications for use	Suggested min. dimensions	Suggested requirements
<p>Provision of daily medication, close monitoring once animal is stabilised and no longer requires intensive care.</p> <p>Enclosure furnishings can be arranged to reduce opportunities to climb or move excessively so that 'cage rest' can be achieved with slightly more space/reduced contact.</p>	<p>Terrestrial frog enclosure: Length > 20 x TBL Height > 10 x TBL</p> <p>Arboreal frog enclosure: Length > 10 x TBL Height > 20 x TBL TBL = Total body length</p>	<p>ENCLOSURE CONSTRUCTION</p> <ul style="list-style-type: none"> • Glass aquarium with lid to prevent escape or a purpose-built frog vivarium. <p>ENCLOSURE FURNISHING</p> <ul style="list-style-type: none"> • Suitable substrates include peat, sphagnum moss or river pebbles that are large enough not to be swallowed. The substrate should be 10 cm deep. • Branches. • Rocks. • Water bowl large enough for the frog to be able to sit in. <p>ENVIRONMENTAL VARIABLES</p> <ul style="list-style-type: none"> • A normal day/night light cycle should be provided with a full-spectrum basking light, or a combination of lamps to provide both visible and UV light. These must be replaced as per the manufacturer's guidelines. UV meters are available commercially to measure UV output. Nothing should be positioned between the frog and the light source. Glass and most plastics filter out UV light, while metal mesh decreases the amount of UV light that reaches the frog by 30–50%. • A heat lamp should be placed at one end of the enclosure to provide a gradient, allowing the frog to regulate its body temperature by moving through the gradient. A thermometer should be used to monitor the temperature. <p>PROVISION OF FOOD/WATER</p> <ul style="list-style-type: none"> • Placing food on particulate substrates should be discouraged to prevent substrates being swallowed by the frog.

Figure 4.5 Intensive care housing with basic cage furniture: a cup to hide in, a shallow water bowl and a branch.



Photo credit: Zoos Victoria

Figure 4.6 An intermediate/pre-release enclosure for frogs. There are branches for climbing and leaves for hiding.



Photo credit: Zoos Victoria

4.7 Feeding and nutrition

Keeping daily records of food offered (item and volume fed) and food consumed is good practice and will allow the rehabilitator to observe how an animal is responding to food on offer and inform future choices.

Please note: Food suppliers and specific products mentioned in these guidelines are intended as examples only. Other suitable products may also be available.

Fresh water must be always available, provided in a stable/non-spill bowl. Water must be changed daily.

Caution is required when feeding mealworms. Their exoskeleton is indigestible and can cause serious digestive issues. Feed mealworms as a supplement only and in small quantities. Ensure relative size and quantity of mealworms and size of animal is considered and calculated prior to feeding.

Table 4.8 Feeding and diet guide for frogs during rehabilitation

Captive diet	Crickets, cockroaches, mealworms (occasionally), flies, fly pupae, moths (no silk moths). Insects should be smaller than the distance between the frog's eyes.
Supplements	Gut load invertebrates with Wombaroo Insect Booster or Vetafarm Herpagrub for a minimum of 24 hours prior to being fed out. Dust with calcium carbonate for at least one feed/week.
Feeding frequency	Every other day.
Amount to feed	About five invertebrates per individual.
Food placement	Place live invertebrates in the enclosure.
Uneaten food	Replace daily.

Figure 4.7 Enclosure used to hold crickets prior to feeding. Note the piece of egg carton, used to provide somewhere to hide, the yellow lid containing Insect Booster and the jar containing water.



Photo credit: Zoos Victoria

4.8 Release protocol



Ideally, frogs will be rehabilitated and released in a short timeframe. If this is not possible and the frog is in care for significant extended periods, ensure that it is regularly assessed against the five welfare domains to support decision-making. Frogs in care for extended periods may have a reduced ability to survive in the wild. Talk to your veterinarian and consider whether euthanasia will provide the best welfare outcome for such frogs.

4.8.1. Pre-release assessment

Pre-release assessment of animals in care is essential to support improved outcomes once back in the wild. Frogs should be assessed based on body condition, fitness and the ability to engage in natural species-specific behaviours prior to release.

The following check list should be used to guide decision-making regarding release suitability for frogs:

- ☑ Individual is in a state of good health – presenting injury/sickness is completely resolved (consider pre-release veterinary check).
- ☑ Individual is within a healthy weight range and appropriate body condition (see **Table 4.1**).
- ☑ Individual displays ability to actively forage for and consume natural foods.
- ☑ Individual moves normally. Arboreal frogs climb branches.

4.8.2. At the release site

Post release survival will be maximised by ensuring that both the release site and the way in which the animal is released are carefully considered.

Frogs require the following:

- A supply of invertebrates.
- A variety of shelters, such as rocks, fallen wood or reeds.

For more information on the ecological characteristics and requirements of frogs that may help with their release, please refer to **Table 4.1**.

4.8.3. Release checklist

Release location

Check all of the requirements of your authorisation are being met, and consider the following:

- ☑ Different frog species may be diurnal or nocturnal (see **Table 4.1**). Release should be timed to coincide with the species' peak period of activity.
- ☑ Frogs are best released while temperatures are in the range of 15–25°C.
- ☑ They should not be released when the temperature is below 15°C as they will likely be in torpor in the wild.

Release Procedure

- ☑ Return the frog to its original capture location to minimise the risk of spreading chytrid fungus.
- ☑ Select a feature that provides some protection from predation, such as leaf cover, rocks or logs and place the transport container on its side to permit the frog to hop away in its own time.

4.9 Key references and additional reading

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