

# Standard Operating Procedure

## SC23-03 TEMPORARY MARKING OF MAMMALS, REPTILES AND BIRDS

Animal welfare is the responsibility of all personnel involved in the care and use of animals for scientific purposes.

Personnel involved in an Animal Ethics Committee approved project should read and understand their obligations under the *Australian code for the care and use of animals for scientific purposes*.

Version 1.2

June 2023



Department of **Biodiversity,  
Conservation and Attractions**

Department of Biodiversity, Conservation and Attractions  
Locked Bag 104  
Bentley Delivery Centre WA 6983  
Phone: (08) 9219 9000  
Fax: (08) 9334 0498

[www.dbca.wa.gov.au](http://www.dbca.wa.gov.au)

© Department of Biodiversity, Conservation and Attractions on behalf of the State of Western Australia 2023  
June 2023

This work is copyright. You may download, display, print and reproduce this material in unaltered form (retaining this notice) for your personal, non-commercial use or use within your organisation. Apart from any use as permitted under the *Copyright Act 1968*, all other rights are reserved. Requests and enquiries concerning reproduction and rights should be addressed to the Department of Biodiversity, Conservation and Attractions.

This document was prepared by Species and Communities Program, Biodiversity and Conservation Science, Department of Biodiversity, Conservation and Attractions.

Questions regarding the use of this material should be directed to:  
Species and Communities Program  
Department of Biodiversity, Conservation and Attractions.  
Locked Bag 104  
Bentley Delivery Centre WA 6983  
Email: [animalethics@dbca.wa.gov.au](mailto:animalethics@dbca.wa.gov.au)

The recommended reference for this publication is:  
Department of Biodiversity, Conservation and Attractions, 2023, *Standard Operating Procedure SC23-03 Temporary Marking of Mammals, Reptiles and Birds*, Department of Biodiversity, Conservation and Attractions, Western Australia.

### **Disclaimer**

The State of Western Australia and its employees do not guarantee that this publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence that may arise from you relying on any information in this publication.

This document is available in alternative formats on request.

Please note, URLs in this document which conclude a sentence are followed by a full point. If copying the URL, please do not include the full point.

## Revision History Log

Version	Date	Details	Author/Reviewer	Approved By	Approval
1.0	2009	Draft document created	V. Richter and C. Groom	M. Cowan and L. Gibson	Feb 2009
1.0	05/01/2013	Final document	R. Bloomfield	M. Cowan and L. Gibson	Feb 2013
1.1	23/05/2017	Minor revision	G. Yeatman, G. Anderson and M. Page	M. Page	August 2017
1.2	29/07/2022	Revision of content [& clarification of procedures]	A. Robey, L. Povh, M. Blythman	M. Dziminski	June 2023

### Approvals: Version 1.2

Approved by the DBCA Animal Ethics Committee:

**Dr Martin Dziminski**

Chair, Animal Ethics Committee

Department of Biodiversity, Conservation and Attractions

# Contents

1	Acknowledgements.....	5
2	Purpose .....	6
3	Scope.....	6
4	Animal Welfare Considerations .....	7
4.1	Injury and unexpected deaths .....	7
4.2	Level of impact.....	7
5	Approved Temporary Marking Methods .....	8
5.1	Paint, pen ink, fluorescent powder and dye (mammals, reptiles and birds).....	8
5.2	Adhesive tapes, streamers and thread (mammals and reptiles).....	9
5.3	Hair/fur removal (mammals) .....	9
5.4	Marking birds using colour bands.....	9
6	Procedure Outline.....	10
6.2	Animal handling .....	10
6.3	Applying a temporary marker .....	10
6.4	Hygiene .....	12
7	Competencies .....	12
8	Approvals .....	14
9	Occupational Health and Safety.....	14
10	Further Reading .....	14
11	References .....	15
12	Glossary of Terms.....	15

# 1 Acknowledgements

This standard operating procedure was originally developed by Christine Freegard and Vanessa Richter, with contributions from Teagan Johnston, Nicole Godfrey, Manda Page, Mark Cowan and Lesley Gibson.

## 2 Purpose

Many monitoring activities require individual animals to be identifiable in the event of recapture during the same trapping period/event, or from a distance (Powell and Proulx, 2003). Temporary markers are useful for short term identification and are often used in conjunction with permanent, less visible methods (e.g., microchipping).

Temporary markers are usually visible on the animal and generally only last a short time (usually <12 months) (Powell and Proulx, 2003, Mellor *et al.*, 2004). The type of temporary marker used must be matched to monitoring aims and must be appropriate for the animal's size, future growth, body shape and behaviour. Temporary markers are commonly available, versatile, cost effective, and quick and easy to apply. There is usually no need to recapture the animal to remove markers as they generally wear off over time.

Temporary marking of fauna as described in this SOP can include the use of:

- Paints, pens, fluorescent powder and dyes.
- Adhesive tapes and streamers.
- Fur removal.

This Standard Operating Procedure (SOP) provides general advice on temporary marking methods of mammals, reptiles and birds.

## 3 Scope

This SOP has been written specifically for scientific and education purposes, and endorsed by the Department of Biodiversity, Conservation and Attractions' (DBCA) Animal Ethics Committee (AEC). However, this SOP may also be appropriate for other situations.

This SOP applies to all fauna survey and monitoring activities involving the use of temporary marking of mammals, reptiles and birds undertaken across Western Australia by DBCA (hereafter department) personnel. It may also be used to guide fauna related activities undertaken by Natural Resource Management groups, consultants, researchers and any other individuals or organisations. All department personnel involved in fauna research and management should be familiar with the content of this document.

Projects involving wildlife may require a licence/authorisation under the *Biodiversity Conservation Act 2016*. Personnel should consult the department's Wildlife Licensing Section and Animal Ethics Committee Executive Officer for further guidance. In Western Australia any person using animals for scientific purposes must also be covered by a licence issued under the *Animal Welfare Act 2002*, which is administered by the Department of Primary Industries and Regional Development. This SOP complements the *Australian code of practice for the care and use of animals for scientific purposes* (The Code). The Code contains an introduction to the ethical use of animals in wildlife studies and should be referred to for all AEC approved projects. A copy of the code may be viewed by visiting the National Health and Medical Research Council website (<http://www.nhmrc.gov.au>).

## 4 Animal Welfare Considerations

To reduce the level of impact of temporary marking on the welfare of animals, personnel must consider, address and plan for the range of welfare impacts that may be encountered. Strategies to reduce impacts should be identified during the planning stage to ensure that they can be readily implemented during temporary marking, and to ensure that contingencies for managing welfare issues have been identified. Ensure that all handlers and volunteers involved in the project are aware of the range of issues that they may encounter, the options that are available for reducing impact and improving animal welfare, and the process for managing adverse events.

Department projects involving temporary marking of mammals, reptiles and birds will require approval from the department's Animal Ethics Committee.

The key animal welfare considerations that should be considered when temporarily marking mammals, reptiles and birds are listed below and are highlighted throughout the document.

### 4.1 Injury and unexpected deaths

If adverse events including injury, unexpected deaths or euthanasia occur then it is essential to consider the possible causes and take action to prevent further issues. Adhering to the guidance in this SOP will assist in minimising the likelihood of adverse events. For projects approved by the department's Animal Ethics Committee, adverse events must be reported in writing to the AEC Executive Officer as soon as possible after the event by completing an *Adverse Events Form*. Guidance on field euthanasia procedures is described in the Department SOP for *Euthanasia of Animals Under Field Conditions*. Where disease may be suspected, refer to the Department SOP for *Managing Disease Risk and Biosecurity in Wildlife Management* for further guidance.

### 4.2 Level of impact

Potential animal welfare impacts when temporarily marking mammals, reptiles and birds include:

- Distress (from handling, social isolation, separation of mother and young etc.).
- Trauma (e.g., injury to the animal during restraint).
- Extra weight of marking resulting in a reduction in mobility.
- Reaction to paints/dyes and glue.
- Increased risk of predation because of increased visibility.
- Inhibition of normal behaviours (e.g., interference with ability to fly, burrow, etc.).
- Hypothermia and/or sunburn from removing excessive amounts of hair.
- Entanglement/snagging on branches or other objects.

It should be noted that whilst these impacts are specifically associated with the techniques of temporary marking, an animal may also experience other impacts from associated procedures such as trapping and capture. Investigators must be aware that the effects of a series of stressors, such as trapping, handling, transportation and marking can be cumulative.

## 5 Approved Temporary Marking Methods

**ANIMAL WELFARE:** Non-biodegradable markers can become a hazard for other animals which may ingest them or get snared/entangled in them once they fall off. Therefore, markers that will not degrade or drop off the animal must be removed from the animal, which means the animal will have to be recaptured. Wherever it is possible or practical, biodegradable materials should be used.

Marking methods must be selected carefully. The type of marker chosen should minimise distress and cause the least interference with the normal functioning of the animal. Markers that require limited or no handling to detect/read should also be given preference (Sharp *et al.*, 2007). Markers must be appropriate for the species physically (i.e. suitable for body covering), physiologically and behaviourally. Different marking methods vary in their longevity so always consider the overall purpose when deciding which method to use.

**ANIMAL WELFARE:** Visibility of marked animals to predators may increase with the use of temporary markers and care should be taken to choose a marker that limits this possibility. Paints and dyes may have unknown effects on an animal's cryptic colouration and therefore on predation (Bourne, 2004). The use of excessive amounts of paint on reptiles should be avoided to reduce the impact the mark might have on survivorship (Ferner, 1979).

This SOP covers marking techniques that are temporary in nature; however, some methods last longer than others. Those that last longer will potentially impact the animal for longer. Those that last for a short period of time may result in the animal requiring recapture and handling more often to reapply the marking technique.

### 5.1 Paint, pen ink, fluorescent powder and dye (mammals, reptiles and birds)

Using paint, pen, powder or dye can be of immense value for short-term studies as it allows identification without repeated recapture of the marked animals. Non-toxic paint, pen, powder or dye can be applied to the body covering of the animal (with dyes producing longer lasting results) and is usually lost over time through wear or hair/skin/feather shedding (Mellor *et al.*, 2004). These markers are particularly useful where the body covering of the animal is light in colour, but this also increases the visibility of the animal and potentially increases the risk of adverse outcomes such as predation.

**This method of marking is NOT suitable for amphibians.**

**ANIMAL WELFARE:** Caution must be used when selecting markers for use on animals as some paints and solvents may be toxic and, if absorbed through the skin, could cause illness or death of the marked animal. Non-toxic and xylene-free glue, paint, dye, pens and powders must always be chosen to reduce the risk of illness and even death through ingestion or absorption of the product. Any paint/dye used must also be fast drying. Markers designed for rapid removal, such as whiteboard markers, should not be used.

## 5.2 Adhesive tapes, streamers and thread (mammals and reptiles)

Coloured or reflective tapes can be attached to the animal to increase its visibility for a short period of time, and spools of thread can be used as temporary trailing markers. Markers should contrast with the natural colour or texture of the animal and are generally attached to the body covering (e.g., skin, hair or shell ) using non-toxic glue (Mellor *et al.*, 2004). Adhesive tape, streamers and thread will increase the visibility of an animal and therefore will increase the risk of predation.

Some of these markers can potentially lead to the animal becoming entangled in the device or getting snagged, causing injuries or death. The marker must be attached in a way that if the marker gets snagged, the animal can break free. Adhesive tapes and streamers that do not degrade or drop off the animal must be removed. Consideration must be given as to whether this technique is appropriate for the species.

**ANIMAL WELFARE:** Some tape, streamer or spool markers can lead to the animal being injured or even dying by becoming entangled in the device or getting snagged. The placement and attachment of these markers should be carefully considered to ensure minimal impacts on animals. The attachment of the trailing devices must be weak enough so the device can break free if it becomes caught. Markers which will not degrade or drop off the animal must be removed.

If tapes/streamers are to be used, department's Animal Ethics Committee requires justification of the proposed attachment system and position. It is recommended that the marker should be < 5% of the animal's body mass.

## 5.3 Hair/fur removal (mammals)

This type of temporary marker is suitable for animals with sufficient hair/fur. Groups or individuals may be identified by using combinations of different numbers, patterns and/or mark locations (Mellor *et al.*, 2004). Remove small patches of hair/fur by shearing or clipping. Use of electric clippers is permitted as long as the noise and vibration caused by their operation does not produce undue stress. **Chemical depilatory pastes are unacceptable due to skin irritation.**

**ANIMAL WELFARE:** Depilatory creams used for hair removal can cause pain and skin irritations and their use is NOT endorsed.

**ANIMAL WELFARE:** Any clippers used to remove fur from animals must emit minimal noise and vibration to minimise stress to the animals.

## 5.4 Marking birds using colour bands

Colour bands are used by researchers to identify birds without having to capture them. The application of colour bands to birds should only be undertaken by experienced personnel with the appropriate permits. The Australian Bird and Bat Banding Scheme (ABBBS) must approve the use of colour bands when they are applied to any birds that are also banded with ABBBS

bands. The ABBBS coordinates colour marking projects in Australia, and the application of unauthorised colour bands has the potential to provide false data that is used by researchers to determine movements, behaviours and life strategies of birds.

## 6 Procedure Outline

### 6.2 Animal handling

Temporary marking methods require animals to be captured and restrained in order to apply the marker. General advice on suitable handling and restraining methods is contained in the department SOPs for *Hand Restraint of Wildlife* and *Animal Handling and Restraint using Soft Containment*. All handling of animals should be done by (or under the guidance of) experienced personnel.

**ANIMAL WELFARE:** To ensure minimal stress to the animals they should only be handled for as long as required to mark them and to collect any necessary measurements (usually no more than five minutes). Improper restraint, especially when dealing with a stressed and frightened animal can lead to major physiological disturbances (hyperthermia, stress, shock, exertional/capture myopathy).

If an animal is injured during temporary marking, refer to the department SOP for *First Aid for Animals*. Any injuries to animals must be reported to the department's Animal Ethics Committee Executive Officer as an adverse event.

Captured animals must be released at point of capture (unless otherwise approved). Animals must be released, or reach an alternate endpoint approved by the department's Animal Ethics Committee. Animals should be released as soon as possible after processing or, if additional holding is necessary, as soon as practicable allowing for animal welfare considerations. Animals should be released at a time when they are normally active.

### 6.3 Applying a temporary marker

- (a) Decide on the optimum placement of the mark considering the purpose of marking as well as the welfare of the animal (Table 1). This should form part of the planning for any temporary marking project. If the animal is to be recaptured via trapping, it is preferable to place the mark in a location that is invisible when the animal is in its normal posture. This may be achieved by placing marks ventrally. Where identification of an individual by visual means without recapture is required, central, dorsal or lateral markings may be appropriate.

(b) **ANIMAL WELFARE:** Animals captured in pitfall traps must be handled so that marks are easy to apply, preferably to the underside of the animal. This means that a reptile's cryptic dorsal colouration is not disrupted.

Table 1 Recommended placement of markers on the body of an animal.

Fauna Class	Recommended Placement
<b>Mammal</b>	Back, upper inside or back of the ear, base of the ventral side of the tail Feet or hind limbs (i.e. fluorescent powder for tracking)
<b>Reptile</b>	Back or belly
<b>Bird</b>	Preferred applied to white or pale parts of plumage or to legs (Figure 1). Paint/dye should not be applied to the wings of birds due to the possibility of it affecting the aerodynamic properties of the wings (Sharp <i>et al.</i> , 2007).

- (c) Restrain the animal (refer to department SOPs for *Hand Restraint of Wildlife* and *Animal Handling and Restraint using Soft Containment*), exposing the marker application site and leaving the rest of the body in the handling bag or covered with a towel to keep the animal calm.

**ANIMAL WELFARE:** For any tissue anchorage of temporary markers, the appropriate restraint, anaesthetic, analgesic and antiseptic measures must be taken to avoid pain, irritation and/or infection. Refer to the department SOP for *First Aid for Animals* for further information.

- (d) Apply the marker approved by the department's Animal Ethics Committee. Comments on the application of particular markers are as follows:

Paint, pen ink, powder and dye: Apply to the area of the animal that will be most visible to the observer (see Table 1). Stencils may be used if individual animals need to be differentiated/identified (Sharp *et al.*, 2007). These markers must never be applied to an area containing a wound and care must also be taken to avoid sensitive areas such as the eyes, nose and ears. Allow marker to dry. For birds, paints/dyes must be used sparingly on feathers because of the impacts on feather structure and function (Gaunt *et al.*, 1997). Caution is required when applying dyes/paints as the alcohol or detergent base can remove oil from bird's feathers and wetting can lead to hypothermia. All birds must be thoroughly dried prior to release (Gaunt *et al.*, 1997).

**ANIMAL WELFARE:** Over-application of paint/dye can leave an animal wet and susceptible to hypothermia. It is recommended that quick drying paint/dyes be used when marking animals to avoid this.

**ANIMAL WELFARE:** The application of paint to thickly furred animals is not advised. Paint tends to cause clumping and matting of fur and can lead to fur loss or problems in the underlying skin, or to excessive ingestion during grooming (Beausoleil *et al.*, 2004).

Some animals will increase the time spent grooming due to the application of paint and care must be taken to place the marker in an area which limits this behaviour (e.g., apply mark to the back of the head which is difficult to reach).

Adhesive tape or streamers: Secure the marker to the animal by either gluing it directly onto the skin/fur with non-toxic glue or by taping it in place by wrapping the tape around a section

of the body and then gluing the marker onto the animal (the tape must be removed once the marker has adhered to the animal). For marsupials with pouches, take care that the adhesive does not restrict access to pouch. The attachment of the trailing devices must be weak enough so the device can break free if it becomes caught and must not be so tight that it restricts movement. Allow the marker to adhere to the animal.

Clipping hair/fur: Use blunt-ended, curved blade scissors or clippers to clip hair from a small area of the animal that will be most visible to the observer. Monitor the animal for any sign of stress caused from the noise/vibration of clippers.

**ANIMAL WELFARE:** The removal of hair or fur may affect thermoregulation and the ability of the animal to deal with its environment and the weather. Excessive amounts of hair/fur must not be removed (Bourne, 2004; Sharp *et al.*, 2007). Many mammal species have a different coloured undercoat and so it may only be necessary to remove the top layer of guard hairs to make an observable mark.

*Note: The process up to this point should not exceed five minutes per animal.*

- (e) Release the animal at point of capture unless a suitable alternative is approved by the department's Animal Ethics Committee.



*Figure 1 Example of paint being applied to a peacock to facilitate a census on Rottnest Island. Photo: Mark Blythman (DBCA)*

## 6.4 Hygiene

Precautions must be taken to prevent the spread of infectious disease from one animal to another and all equipment must be cleaned and disinfected between animals. Refer to the Department SOP *Managing Disease Risk and Biosecurity in Wildlife Management*.

## 7 Competencies

A person who is competent has the knowledge, skills, and experiences that allow them to capture and handle animals successfully, and appropriately manage adverse events as

required. Department personnel, and other external parties covered by the department’s Animal Ethics Committee, undertaking fauna-related activities require approval from the committee and will need to satisfy the competency requirements (Table 2). Other groups, organisations or individuals using this SOP to guide their fauna monitoring activities are encouraged to also meet these competency requirements as well as their animal welfare legislative obligations.

It should be noted that sampling design details such as intensity and scope of the study being undertaken will determine the level of competency required and Table 2 provides advice for standard monitoring only.

*Table 2 Competency requirements for Animal Handlers of projects involving temporary marking of mammals, reptiles and birds.*

Competency category	Competency requirement	Competency assessment
<b>Knowledge</b>	Broad understanding of the framework governing the use of animals in research and environmental studies in Western Australia	Training (e.g., DBCA Fauna Management Course or equivalent training). In applications, provide details on the course provider, course name and year.
	Understanding species biology and ecology	Personnel should be able to correctly identify the likely species to be encountered at the site(s) being studied and understand the species’ biology and ecology. This knowledge may be gained through sufficient field experience and consultation of field guides and other literature.
<b>Animal handling and marking skills/experience required</b>	Experience handling mammals, reptiles and birds	Personnel should be experienced at hand restraint of species being temporarily marked. This experience is best obtained under supervision of more experienced personnel. In applications, provide details on the longevity, frequency & recency of experience.
	Experience in applying temporary markers	Personnel should be experienced in the application of the proposed temporary marker. This experience is best obtained under supervision of more experienced personnel.
	Experience managing disease risk in wildlife management	Personnel should be familiar with hygiene procedures. This knowledge may be gained through sufficient field experience and consultation of literature.

In conjunction with possessing the required understanding and knowledge of the permanent marking technique and animal welfare requirements, a guide to the experience and skill requirements for an animal handler to be considered competent to apply temporary markers

to animals is as follows: (noting that some personnel with experience may still require initial supervision in unfamiliar locations or with species that they have not encountered previously):

- Currency of experience with similar methodology: within the past 8 years.
- Minimum 2 individuals of similar species temporarily marked using similar methods.

## 8 Approvals

A licence or authorisation may be required under the *Biodiversity Conservation Act 2016* (examples below). Contact the department's Wildlife Licensing Section for more information. It is your responsibility to ensure you comply with the requirements of all applicable legislation.

- Fauna taking (scientific or other purposes) licence (Reg 25)
- Fauna taking (biological assessment) licence (Reg 27)
- Fauna taking (relocation) licence (Reg 28)
- Section 40 Ministerial Authorisation to take or disturb threatened species.

## 9 Occupational Health and Safety

The following departmental SOPs for wildlife survey and monitoring activities are relevant to occupational health and safety:

- *SOP Managing Disease Risk and Biosecurity in Wildlife Management*
- *SOP Hand Restraint of Wildlife*

Departmental personnel, contractors and volunteers have duties and responsibilities under the Occupational Safety and Health Act 1984 and Occupational Safety and Health Regulations 1996 to ensure the health and safety of all involved. Fieldwork is to be undertaken in line with the department's corporate guidelines, policies and standard operating procedures, including but not limited to, risk management and job safety analyses. Further information can be found at

<https://dpaw.sharepoint.com/Divisions/corporate/people-services/HS/SitePages/SOPs.aspx>

If department personnel or volunteers are injured, please refer to the departmental Health, Safety and Wellbeing Section's 'Reporting Hazards, Near-misses and Incidents' intranet page, which can be found at

<https://dpaw.sharepoint.com/Divisions/corporate/people-services/HS/SitePages/Reporting-Hazards,-Near-Misses-and-Incidents.aspx>

## 10 Further Reading

The following SOPs have been mentioned in this advice and it is recommended that they are consulted when proposing temporary marking of mammals, reptiles and birds:

- Department SOP *Animal Handling and Restraint using Soft Containment*
- Department SOP *Hand Restraint of Wildlife*
- Department SOP *Managing Disease Risk and Biosecurity in Wildlife Management*
- Department SOP *First Aid for Animals*
- Department SOP *Euthanasia of Animals Under Field Conditions*

For further advice refer also to:

National Health and Medical Research Council (2013) *Australian code for the care and use of animals for scientific purposes*, 8th edition. Canberra: National Health and Medical Research Council

## 11 References

Beausoleil, N.J, Mellor, D.J, Personnelord, K.J (2004). *Methods for marking New Zealand Wildlife: amphibian, reptile and marine mammals*. New Zealand: Department of Conservation.

Bourne, D. (2004.). *Mammal husbandry and management*. United Kingdom: Wildlife Information Network.

Ferner, J.W. (1979). *A review of marking techniques for amphibians and reptiles*. Society for the Study of Amphibians and Reptiles.

Gaunt, A.S, Oring, L.W., Able, K.P, Anderson, D.W, Baptisa, L.F, Barlow, J.C and Wingfield, J.C. (1997). *Guidelines to the use of wild birds in research*. Washing, USA: The Ornithological Council.

Lowe, K.W. (1989). *The Australian Bird Bander's manual*. Australian Bird and Bat Banding Schemes and Australian National Parks and Wildlife Service.

Mellor, D.J., Beausoleil, N.J. and Personnelord, K.J. (2004). *Marking amphibians, reptiles and marine mammals: animal welfare, practicalities and public perceptions in New Zealand*. New Zealand: Department of Conservation.

Powell, R.A. and Proulx, G. (2003). *Trapping and marking terrestrial mammals for research: integrating ethics, performance criteria, techniques and common sense*. ILAR Journal 4(44): 259-276.

Sharp, T., Saunders, G. and Mitchell, B. (2007). *Model standard operating procedures for the humane research of pest animals in Australia*. New South Wales: Department of Primary Industries.

## 12 Glossary of Terms

**Analgesic:** A treatment that relieves or removes pain.

**Animal handler:** A person listed on an application to the department's Animal Ethics Committee who will be responsible for handling animals during the project.

**Exertional/Capture myopathy:** Exertional myopathy (EM) or capture myopathy (CM) is a condition which may be seen in many species of mammals and birds. It can result in sudden death, or death up to weeks later due to organ failure and a loss of mobility leading to higher susceptibility to predation. Among Australian species, macropods are particularly susceptible. Although EM is mostly associated with prolonged muscle exertion, it may also be seen in animals experiencing fear or anxiety without physical exertion, due to the prolonged and sustained effects of adrenaline on the circulation, as well as muscle damage and lactic acid build-up. Exertional myopathy may develop in susceptible species as a result of capture and restraint, transport, repeated handling, placing animals in an unfamiliar environment or close confinement, pursuit, or cumulative combinations of these events.

**Temporary marker:** A method for identifying individuals or cohorts of animals when identification is required to last only a short time, relative to the lifespan of the animal.