Charles Darwin University Animal Ethics Committee

Standard Operating Procedure:

TEMPORARY MARKING OF MAMMALS, REPTILES AND BIRDS (WA DBCA)

Version No:	Version 1.3
Date of Approval by the CDU AEC:	04/02/2026
Date for Review by the CDU AEC:	04/02/2029

Please note: this SOP has been developed for animal use in WA. Consideration should be taken to the specific conditions of the region in which your work is being conducted, and modifications to procedures made accordingly to ensure the best welfare of the animal and safety of the project participants. Any modifications required should be outlined in the project application.

CHARLES DARWIN UNIVERSITY AUSTRALIA

Standard Operating Procedure

SC25-03 TEMPORARY MARKING OF MAMMALS, REPTILES AND BIRDS (APRIL 2025)

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 1.3

April 2025

GOVERNMENT OF WESTERN AUSTRALIA

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The recommended reference for this publication is:
Department of Biodiversity, Conservation and Attractions, 2025, *Standard Operating Procedure SC25-03 Temporary Marking of Mammals, Reptiles and Birds,* Department of Biodiversity, Conservation and Attractions, Western Australia.

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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
1.3	09/04/2025	Revision of content	M. Sheehan, A. Raycraft, M. Blythman, S. Cowen, P. Dickens and M. Drew	J. Richards	April 2025

Approvals: Version 1.3

Approved by the DBCA Animal Ethics Committee: 

Dr Jacqui Richards

Chairperson, Animal Ethics Committee

Department of Biodiversity, Conservation and Attractions

Contents

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 marking methods may be used for specific research purposes, such as fluorescent powders for tracking or locomotion studies (e.g., Ramirez *et al.*, 2017; Tay *et al.*, 2023).

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 approved 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 personnel involved in fauna research and management undertaken by the department should be familiar with the content of this document.

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 (https://www.nhmrc.gov.au/about-us/publications/australian-code-care-and-use-animals-scientific-purposes).

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 animal handling and marking and contingencies for managing welfare issues have been identified. Ensure all personnel involved in the project are aware of the potential issues they may encounter, the options that are available for reducing impacts 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 AEC. All personnel involved in animal handling must be identified during the application process. 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 an unplanned requirement for 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 AEC, adverse events must be reported in writing to the AEC Executive Officer as soon as possible after the event by completing an *Adverse Event Form*. Guidance on field euthanasia procedures is described in the Department SOP *First Aid for Animals* and *Euthanasia of Animals Under Field Conditions*. Where infectious disease is 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 (caused by discomfort, social isolation, separation of mother and young etc.).
- Trauma (possible injury to the animal during restraint).
- 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.).
- Reduced sexual fitness or individuals treated differently by conspecifics due to altered visual appearance.
- Hypothermia and/or sunburn from removing excessive amounts of hair.
- Entanglement/snagging on branches or other objects.

Project planning must involve the identification and mitigation of all potential welfare risks to minimise their impacts as much as possible. Note 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 capture and handling. Investigators must be aware that the effects of a series of stressors, such as capture, 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 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 and reptiles)

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 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.

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 without injury. Adhesive tapes and streamers that do not degrade or drop off the animal must be removed.

ANIMAL WELFARE: Some tape, streamer or spool markers can lead to injury or even dying if an animal becomes entangled in the device or snags it on vegetation. The placement and attachment of these markers or trailing devices should be carefully considered for each species to ensure minimal welfare impacts. The attachment of the trailing devices must be weak enough so the device can break free without injury if it becomes caught.

If tapes/streamers are to be used, the department's AEC 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 provided 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

There are a variety of methods to temporarily mark birds. Which to use depends on the species and the reason for marking. Non-toxic paint, pens, powder, dye or UV markers can be applied to the feathers, leg scales, toenails or the bill of a bird, which may allow for identification in the field. Birds do not always need to be captured to apply a marker. For instance, water pistols containing diluted food colouring have been used to mark the white feathers of Silver Gulls on Rottnest Island. The duration of time the marker remains visible

depends on the marker and where it is applied. For example, marked feathers will only last on the bird until the feather has been moulted, usually <12 months but painted leg scales may remain visible for longer. UV markers would be best used on nocturnal birds such as owls.

Strings, rubber bands, cable ties etc. applied to the legs of birds are not appropriate methods of temporarily marking birds and should not be used.

The Australian Bird and Bat Banding Scheme (ABBBS) oversees the use of both permanent and temporary colour markings on birds for research purposes in Australia. To prevent confusion or interference with ongoing studies, it is recommended to contact the ABBBS before applying colour marks to wild birds.

Coloured leg bands, leg flags, wing tags and nasal tags are considered a permanent marking technique and are not covered by this SOP.

6 Procedure Outline

6.1 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 AEC 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 AEC. 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.

6.2 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 not visible when the animal is in its normal posture. This may be achieved by placing marks ventrally, so that dorsal colouration is not

disrupted. Where identification of an individual by visual means without recapture is required, central, dorsal or lateral markings may be appropriate.

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

Fauna Class	Recommended Placement
Mammal	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)
Reptile	Back or belly
Bird	White or pale parts of plumage or exposed body parts such as legs or bills (Figure 1). Paint/dye applied to the wings of birds should be avoided where possible due to the possibility of it affecting the aerodynamic properties of the wings (Sharp *et al.*, 2007).

(b) 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 deployment of temporary markers, the appropriate restraint, and antiseptic measures must be taken to avoid pain, irritation and/or infection if required. Refer to the department SOP for *First Aid for Animals* for further information.

(c) Apply the approved marker. 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 the pouch. The attachment of the trailing devices must be weak enough so the device can break free without injuring the animal if it becomes caught but 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 total handling process up to this point should not exceed five minutes per animal.

(d) Release the animal at point of capture unless a suitable alternative has been approved by the department's AEC.

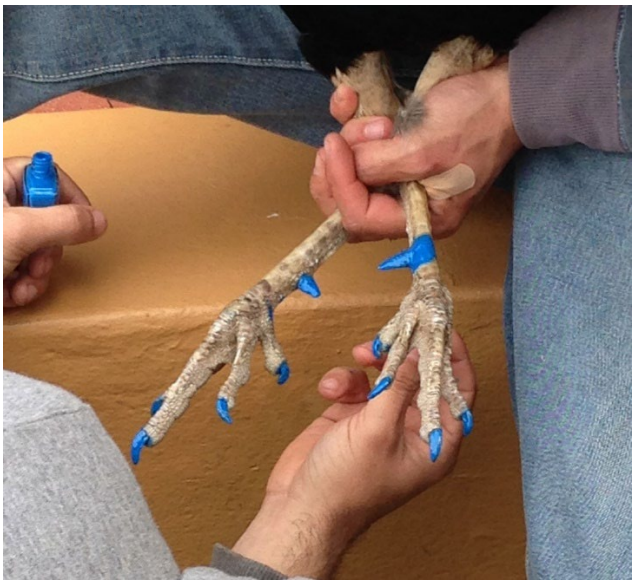

Figure 1 Example of paint being applied to a peacock to facilitate a census on Rottnest Island. Photo: Mark Blythman (DBCA)

6.3 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 handle and mark animals successfully, and appropriately manage adverse events as required. Department personnel, and other external parties covered by the department's AEC, 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.

Note that sampling design details such as intensity and scope of the study being undertaken will determine the level of competency required. 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
Knowledge	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) 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.
Animal handling and marking skills/experience required	Experience handling mammals, reptiles and birds	Personnel should be experienced at hand restraint of species temporarily marked. This experience is best obtained under supervision of more experienced personnel until deemed competent. In applications and DBCA AEC Competency Forms, provide details on the longevity, frequency and 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 temporary 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:

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

Note some personnel with experience may still require initial supervision with species they have not encountered previously.

8 Approvals

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.

Projects involving wildlife may require a licence/authorisation under the *Biodiversity Conservation Act 2016* (Examples below). Personnel should consult 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 Wildlif*e.

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

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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.