

Charles Darwin University Animal Ethics Committee

Standard Operating Procedure:

Temporary marking of mammals, reptiles, and birds (DBCA, 06/2023)

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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. Consideration should particularly be given to the weather conditions of the Northern Territory and the presence of extreme hazards such as crocodiles.

Standard Operating Procedure

TEMPORARY MARKING OF MAMMALS, REPTILES AND BIRDS

Prepared by: Species and Communities Branch, Science and Conservation, Department of Biodiversity, Conservation and Attractions

Prepared for: Animal Ethics Committee

Version 1.1

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Contents

1 Purpose	5
2 Scope	5
3 Definitions	6
4 Approved Temporary Marking Methods	6
4.1 Paint, pen ink and dye (mammals, reptiles and birds)	6
4.2 Adhesive tapes, streamers and thread (mammals and reptiles)	6
4.3 Hair/fur removal (mammals)	7
5 Procedure Outline	7
5.1 Animal handling.....	7
5.2 Applying a temporary marker	7
5.3 Hygiene.....	8
5.4 Marking birds using colour.....	9
6 Level of Impact.....	9
7 Ethical Considerations.....	9
7.1 Animal handling.....	9
7.2 Animal conspicuousness and longevity of markers	10
7.3 Toxicity of glue, paint, dye and powders	10
7.4 Stress caused by clippers	10
7.5 Pain/Irritation/infection	10
7.6 Snagging and entanglement.....	10
7.7 Hazards for other animals	11
7.8 Altered behaviour	11
7.9 Damage to body covering	11
7.10 Injury and unexpected deaths.....	11
7.11 Spread of disease or parasites.....	11
8 Competencies and Approvals.....	12
9 Occupational Health and Safety.....	13
9.1 Animal bites, stings and scratches	13
9.2 Zoonoses	13
9.3 Allergies.....	13
9.4 Sharp Equipment.....	14
10 Further Reading.....	14
11 References.....	14

1 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 more 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 objectives 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 and dyes
- adhesive tapes and streamers
- hair/fur removal

This standard operating procedure (SOP) provides general advice on temporary marking methods of mammals, reptiles and birds. If colour marking (paint/dye) wild birds, this SOP must be used in conjunction with the Australian Bird and Bat Banding Scheme (ABBBS) and *Australian Bird Bander's Manual* (Lowe, 1989).

2 Scope

This SOP has been written specifically for scientific and education purposes, and endorsed by the Department's Animal Ethics Committee. However, this SOP may also be appropriate for other situations.

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

All projects involving the temporary marking of fauna must be approved by the Department's Animal Ethics Committee. Other temporary marking methods not described in this SOP, such as staining techniques (e.g. methylene blue staining on amphibians) and application of fluorescent pigments on amphibians and reptiles, may also be appropriate and their use is not excluded. Approved projects that prefer alternative temporary marking techniques to those mentioned here may do so if the differences are described in detail, demonstrated to be effective and have acceptable levels of impact on animals.

Projects involving wildlife may require a licence under the provisions of the *Wildlife Conservation Act 1950* and/or 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 provisions of 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 broader issues. A copy of the code may be viewed by visiting the National Health and Medical Research Council website (<http://www.nhmrc.gov.au>).

3 Definitions

“A” Class Authority: An authority issued to competent bird banders who have sufficient skills and experience to undertake banding without supervision (Lowe, 1989).

Analgesic: A remedy 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.

Capture myopathy: A condition associated with the capture and handling of many species of mammals and birds that results in degeneration of skeletal and/or cardiac muscle.

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. They tend to be more visible from a distance than more permanent markers (Mellor et al., 2004).

4 Approved Temporary Marking Methods

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.

4.1 Paint, pen ink and dye (mammals, reptiles and birds)

Using paint, pen 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 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 therefore increases the risk of predation.

This method of marking is NOT suitable for amphibians.

4.2 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, shell or feather) 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.

4.3 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. Electric clippers are permitted as long as their operation does not produce excessive noise and/or vibration. Chemical depilatory pastes are unacceptable due to skin irritation.

5 Procedure Outline

5.1 Animal handling

Temporary marking methods require animals to be captured and/or 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.

If an animal is injured during temporary marking, refer to the Department SOP for *First Aid for Animals*. Any superficial wounds can be treated with a topical antiseptic (e.g. Betadine®). If an animal is seriously injured, refer to the flowchart in the Department SOP for *Humane Killing of Animals under Field Conditions* to make the decision on whether to euthanase or seek veterinary care. Any injuries to animals must be reported to the Department's Animal Ethics Committee Executive Officer.

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, within 24 hours of capture (unless otherwise approved). Animals should be released at a time when they are normally active.

5.2 Applying a temporary marker

(a) Decide on the optimum placement of the mark giving consideration to the purpose of marking as well as the welfare of the animal. 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 mark the animal in a discrete location where possible to reduce any significant change to its "normal visibility". 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) Firmly 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.

(c) Apply the marker approved by the Department’s Animal Ethics Committee. Comments on the application of particular markers are as follows:

Paint, pen ink and dye: Apply non-toxic paint/dye or xylene free pen 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. Care must be taken not to saturate the animal’s fur/feathers in order to avoid hypothermia or matting of feathers/fur.

Allow marker to dry. For birds, hold painted feathers apart to allow them to dry (this ensures feathers do not stick together and impede flight).

Table 1 Recommended placement of paint, pen ink or dye on the body of an animal.

Fauna Class	Recommended Placement
Mammal	Back, upper inside or back of the ear
Reptile	Back or belly (reptiles trapped in pits can be marked on the belly because they must be handled anyway)
Bird	Tail, back or chest 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).

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

Note: The process up to this point should not exceed 5min per animal.

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

5.3 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 in Wildlife Management*.

5.4 Marking birds using colour

The ABBBS is responsible for authorising and coordinating all forms of colour marking of birds in Australia. Wild birds must only be marked by personnel with a Bird Banding Authority (Colour Marking Authority) and in accordance with the Australian Bird and Bat Banding Scheme (ABBBS) guidelines. Prior to commencing any type of marking, banders are required to apply in writing, stating the reasons for undertaking colour marking (Lowe, 1989). Only personnel with an “A” Class Authority are able to apply for a Colour Marking Authority.

All colour marking must be recorded with the banding details and forwarded to the Banding Office on *Type II Data Sheets*. Refer to the *Australian Bird Bander’s Manual* (Lowe, 1989) for more information.

6 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, scratching/biting itself)
- 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.

7 Ethical Considerations

To reduce the level of impact of temporary marking on the welfare of animals there are a number of ethical considerations that should be addressed. Department projects involving temporary marking of mammals, reptiles or birds will require approval from the Department’s Animal Ethics Committee.

7.1 Animal handling

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). They must be released within 24 hours of capture (unless otherwise approved). Improper restraint, especially when dealing with a stressed and frightened animal can lead to major physiological disturbances (hyperthermia, stress, shock, capture myopathy). It is preferable that handling is done during the cooler periods of the day (dawn/dusk). Refer to the Department SOPs for *Animal Handling and Restraint using Soft Containment* and *Hand*

Restraint of Wildlife.

7.2 Animal conspicuousness and longevity of markers

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).

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.

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.

7.3 Toxicity of glue, paint, dye and powders

Caution must be used when selecting paint/dye 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 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. Paints and dyes should never be used on amphibians due to their highly absorbent skin.

7.4 Stress caused by clippers

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

7.5 Pain/Irritation/infection

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.

Depilatory creams used for hair removal can cause pain and skin irritations and their use are NOT endorsed.

Refer to the Department SOP for *First Aid for Animals* for further information.

7.6 Snagging and entanglement

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 a maximum of 10% (preferably < 5%) of the animal's body mass.

7.7 Hazards for other animals

Once markers fall off an animal they have the ability to become a hazard for other animals which may ingest them or get snared/entangled in them. Therefore, markers that will not degrade or drop off the animal must be removed from the animal. Wherever it is possible or practical, biodegradable materials should be used.

7.8 Altered behaviour

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).

7.9 Damage to body covering

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.

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).

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.

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).

7.10 Injury and unexpected deaths

If injury, unexpected deaths or euthanasia occur then it is essential to consider the possible causes and take action to prevent further deaths. For projects approved by the Department's Animal Ethics Committee, adverse events such as injury, unexpected deaths or euthanasia must be reported in writing to the AEC Executive Officer on return to the office (as per 2.2.28 of The Code) by completing an *Adverse Events Form*. Guidance on field euthanasia procedures is described in the Department SOP for *Humane Killing of Animals under Field Conditions*. Where disease may be suspected, refer to the Department SOP for *Managing Disease Risk in Wildlife Management* for further guidance.

7.11 Spread of disease or parasites

Personnel must be aware of the possibilities of transferring disease or parasites from animal to animal as well as from one location to another if handling animals at multiple sites.

Good hygiene practices should be maintained to reduce the risk of spreading pathogens between animals and sites. Refer to the Department SOP *Managing Disease Risk in Wildlife Management* for further advice.

8 Competencies and Approvals

Department personnel, and other external parties covered by the Department's Animal Ethics Committee, undertaking monitoring projects involving temporary marking of mammals, reptile or birds require approval from the committee and will need to satisfy the competency requirements detailed in Table 1. This is to ensure that personnel involved have the necessary knowledge and experience to minimise the potential impacts of temporary marking on the welfare of the animals. 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 basic animal welfare legislative obligations.

It should be noted that details such as intensity of the study being undertaken will determine the level of competency required and Table 2 provides advice for basic 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
Wildlife licences	Licence to take fauna for scientific purposes (Reg 17) OR Licence to take fauna for educational or public purposes (Reg 15) OR IF MARKING BIRDS Licence to capture and mark birds or bats (Reg 23) (with an ABBBS Banding and/or Colour Marking Authority)	Provide licence/permit number
Formal training <i>Note: Suitable levels of skills/experience can substitute for formal training requirements</i>	Department Fauna Management Course or equivalent training	Provide course year
General skills/experience	Relevant knowledge of species biology and ecology	Personnel must be able to correctly identify the likely species to be encountered at the site/s being studied. This knowledge may be gained by sufficient field experience and/or consultation of field guides and other literature. Estimated total time in field: Min 1 year involved in similar projects.
Animal handling and processing	Experience in handling terrestrial mammals	Personnel must be confident at handling mammals, reptiles and

skills/experience <i>Note: any of the following may be required depending on the purpose of the study.</i>	Experience in handling terrestrial reptiles and amphibians	birds in the application of various temporary marking techniques likely to be used in fauna monitoring and surveying. This experience is best obtained under supervision of more experienced personnel. Estimated total time in field: Min 1 year involved in similar projects.
	Experience in handling birds	
	Experience in measuring and marking non-bird and non-bat vertebrates	

9 Occupational Health and Safety

Always carry a first aid kit in your vehicle and be aware of your own safety and the safety of others as well as the animals when handling.

A job safety analysis is recommended prior to undertaking any monitoring which involves hand capture. This safety analysis should include the following considerations.

9.1 Animal bites, stings and scratches

Care should be taken when handling animals to avoid bites, stings or scratches. All inflicted injuries (even superficial ones) should be appropriately treated as soon as possible to ameliorate possible allergic reaction, prevent infection and promote healing.

To improve safety, field personnel should be aware of the treatment for snakebite and carry appropriate pressure bandages. Personnel should also have up-to-date tetanus vaccinations. Department personnel must not capture bats unless fully vaccinated against Australian Bat Lyssavirus.

If Department personnel or volunteers are injured, please refer to the Department’s Health and Safety Section’s ‘Report a Hazard, near-miss or incident’ intranet page, which can be found at http://intranet/csd/People_Services/rm/Pages/ReportingHazards,Near-MissesandIncidents.aspxZoonoses.

9.2 Zoonoses

There are a number of diseases carried by animals that can be transmitted to humans (i.e. zoonoses such as Toxoplasmosis, Leptospirosis, Salmonella). All personnel must take precautions to minimise the risk of disease transmission to protect themselves, their families and wildlife populations.

Advice on minimising disease risk is contained in the Department SOP for *Managing Disease Risk in Wildlife Management*.

9.3 Allergies

Some personnel may develop allergies when they come in contact with animal materials such as hair and dander. Personnel known to develop allergies should wear gloves when handling animals and long sleeved pants/shirt.

People with severe allergies associated with animals, with immune deficiency diseases or on immunosuppressant therapy should not engage in the handling of wildlife.

9.4 Sharp Equipment

Care must be taken when using sharp implements such as scissors to avoid injury.

10 Further Reading

The following SOPs have been mentioned in this advice regarding temporary marking of mammals, birds and reptiles, and it is recommended that they are consulted when proposing to conduct fauna monitoring.

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

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