

Standard Operating Procedure

SEMI-PERMANENT MARKING OF MAMMALS USING EAR TAGS

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

Prepared for: Animal Ethics Committee

Version 1.1

October 2017



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The recommended reference for this publication is:

Department of Biodiversity, Conservation and Attractions (2017). *Standard Operating Procedure: Semi-permanent Marking of Mammals using Ear Tags*. Perth, WA: Department of Biodiversity, Conservation and Attractions.

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Revision history log

Version	Date	Details	Author/Reviewer	Approval
1.0	2009	Document created	Christine Freegard & Vanessa Richter	May 2009
1.1	22/05/2017	Minor revisions	Georgina Yeatman and Manda Page	August 2017

Approvals


Version 1.1


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Version 1.0

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Acknowledgments

This standard operating procedure was originally developed by Christine Freegard and Vanessa Richter, with contributions from Neil Thomas, Nicky Marlow and Nicole Godfrey.

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1 Purpose

Ear tagging is a marking method used in fauna survey and monitoring activities to identify previously caught individuals. Ear tagging must be matched to monitoring objectives and must be appropriate for the animal's size, future growth, body shape and behaviour. Ear tagging is considered a semi-permanent method of marking because although tags are sturdy enough to last the lifetime of the animal, they may be lost. A tag can be applied in each ear which means that in the event that one is lost, the animal can still be identified. Ear tags must not be used on species with delicate ears, as rate of tag loss and injury to animals is high (e.g. bilbies).

Advantages of ear tagging fauna include the ease with which they are applied, cost effectiveness, and the visibility at a distance reducing the need for recapture (Mellor *et al.*, 2004).

This standard operating procedure (SOP) provides advice on the safe administration of ear tags to mammals.

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 the use of ear tags for semi-permanent marking of mammals 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 monitoring using ear tags should be familiar with the content of this document.

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

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.

Ear tags: A type of marker made from metal or plastic, fitted to the ear of an animal. They can be self-piercing or inserted through a punched hole (see Figure 1 and Figure 2).

Semi-permanent marker: A marker designed to last for months to years on animal. Most semi-permanent marks are lost during the animal's lifetime or are removed at the end of the monitoring (Sharp *et al.*, 2007), however the removal of ear tags at the end of monitoring activities does not occur.

Sterilising solution: A solution that sterilises equipment in one step (e.g. Alconox[®]).

4 Approved Ear Tags

4.1 Monel self-piercing ear tags

These tags are made of metal and are stamped with numbers which enable individual animals to be identified by reading the tag (see Figure 1). Most Monel ear tags used in Western Australia are sourced from the National Band and Tag Company (USA). Tag numbers can be prefixed with letters to identify sites or study/project names. These prefixes and number ranges can be specified when ordering. It is recommended that all tags for Department use are ordered through the Western Shield Zoologist to ensure there are no duplications in prefixes and numbers. This is particularly important when more than one study is being conducted in an area where individual animals may be observed by either study.



Figure 1 A Monel self-piercing ear tag. Photo: Vanessa Richter/DBCA.

4.2 Two-piece sheep swivel tag

Two piece swivel tags (see Figure 2) are manufactured for applying to sheep; however they are also useful for marking large native mammals such as kangaroos and wallabies. The swivel action means that there is no loop, so the chances of the device being caught and ripping the ear is reduced.



Figure 2 A two-piece sheep swivel tag – female part on the top and male part on the bottom. Photo: Vanessa Richter/DBCA.

The tags can be ordered in a variety of colours. Different colours can be used to identify different cohorts or study groups. Coloured reflective tape can be applied to distinguish between sexes and increase visibility when spotlighting. If individual identification is also required it is recommended to fit a swivel tag in one ear and an individually numbered metal tag in the other.

This method of tagging has been used on large macropod species that are difficult to re-trap but may be observed via spotlighting.

4.3 Choosing an appropriate ear tag

Ear tags of an appropriate material, size and colour must be used to minimise potential negative impacts on the animal. Table 1 provides guidance on the most commonly used ear tags.

Table 1 Approved ear tag types and the species to which they may be applied

Ear Tag Type	Recommended Species
Monel self-piercing ear tag, Size 1 (1005-1)	Woylie, chuditch, western ringtail possum and quenda (if microchips are not available)
Monel self-piercing ear tag, Size 3 (1005-3)	Adult brushtail possum and small wallabies (incl. tammar wallaby, black-flanked rock wallaby and western brush wallaby)
Two-piece sheep swivel tag with reflective tape	Wallabies and kangaroos

Ear tags are generally not appropriate for species with delicate or small ears. Ear tags should not be applied to rodents, phascogales, dunnarts, small dasyurids and in particular, bilbies and western barred bandicoots. Use of ear tags on these species can result in significant damage to the ears. Other marking methods including ear notching (refer to the Department SOP for *Permanent Marking of Mammals using Ear Notching*) and microchipping (refer to the Department SOP for *Permanent Marking of Vertebrates using Microchips*) may be better suited to those species.

5 Procedure Outline

5.1 Materials required

The following materials are needed to undertake ear tagging of mammals:

- ear tag(s)
- tagging tools (e.g. swivel tag applicator pliers or standard tag applicator)
- topical antiseptic solution (e.g. Betadine®)
- gauze swabs or tissues

If tags are not self-piercing, or to achieve a cleaner result, a sharp hole punch may also be required. If the punched tissue is to be collected for DNA analysis, refer to Department SOP for *Tissue Sample Collection and Storage for Mammals*.

5.2 Preparing tagging equipment

- (a) Select the appropriate tag applicator (pliers).

- (b) Metal Ear Tag: Place the ear tag in the applicator keeping the side of the tag with the hole flat against the jaw of the applicator with the indentation (see Figure 3).



Figure 3 Set up of a metal ear tag in the pliers. Photo: Christine Freegard/DBCA.

Two Piece Swivel Ear Tag: Place the swivel tag into the swivel tag applicator pliers (the female part of the tag sits on the side of the applicator with the hole and the male part to the solid side of the applicator). Make sure that both parts of the tag are pushed all the way into the applicator.

5.3 Animal handling

- (a) Techniques for handling animals vary depending on the species of mammal involved and the experience and skills of the personnel. General advice on handling of animals is contained in the Department SOP for *Hand Restraint of Wildlife*. All handling of animals must be done by (or under the direct guidance of) experienced personnel.
- (b) Use handlings bags appropriate for the species and length of containment as advised in the Department SOP for *Animal Handling and Restraint using Soft Containment*.
- (c) Animals must be maneuvered into a position that enables easy access to ears for tag application but also securely restrains the animal throughout the procedure. If the animal moves during tag application the ear may be torn. The eyes of the animal should remained covered whilst applying ear tags to keep the animal as calm as possible (see Figure 4).



Figure 4 Positioning a quenda for tagging. Photo: Christine Freegard/DBCA.

- (d) If an animal is injured during handling/ear tagging, treat any superficial wounds with a topical antiseptic (e.g. Betadine®) (refer to the Department SOP for *First Aid for Animals*).
- (e) Captured animals must be released at point of capture (unless the purpose of the trapping is translocation, specimen collection or for any other approved reason). Animals must be released, or reach an alternate endpoint approved by the Department's Animal Ethics Committee, within 24 hours of capture. Animals should be released at a time when they are normally active.

5.4 Applying a metal ear tag

- (a) Firmly restrain the animal (when ear tagging larger or difficult animals this is easier with two people, one holding the head and the other the rump), exposing the ears and leaving the rest of the body in the handling bag taking particular care to ensure eyes are covered.
- (b) If tags are stored in ethanol, disinfection of the tag site is not usually needed. If tags are not stored in ethanol, dip in ethanol prior to application and apply a dilute antiseptic solution to the section of ear where tag will be placed (e.g. medi-swab). Ensure that no solution runs into the animal's ears or eyes.
- (c) Ear tags must be applied so that they are positioned close to the head, and sit flush with the margin of the ear (see Figure 5).

The tag must be inserted so that the numbered side is on the outside of the ear and positioned on the front edge of the ear just above the spot where the ear starts to thicken prior to where it attaches to the head, avoiding blood vessels (blood vessels can be located shining a torch through the ear tissue of many species).

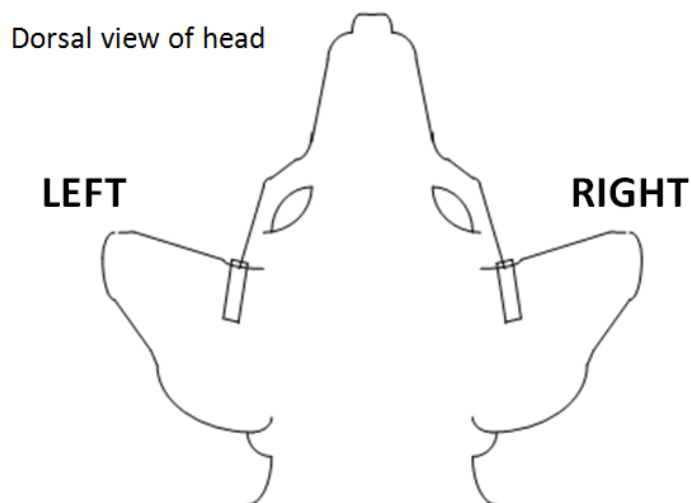


Figure 5 Diagram of ear tag positions (Orell, 1997).

- (d) When satisfied with the position of the tag, clinch the pliers swiftly but firmly and release before the animal pulls away (see Figure 6).



Figure 6 Applying an ear tag to a quenda Photo: Christine Freegard/DBCA.

(e) Check that the tag point has come through the hole and is bent over securing the tag. The tag should sit snugly against the edge of the ear without curling it over. If a tag has been fitted incorrectly it may be necessary to remove it with pliers or metal snips, however the risk of causing further damage should be weighed against the benefit to the animal of repositioning the tag.

(g) Repeat the procedure for the other ear if required.

5.5 Applying a two-piece swivel ear tag

(a) Determine the sex of the animal. Two piece swivel ear tags are usually only applied to one ear, the animal's right ear for males and the left for females (see Figure 6).

(b) Firmly restrain the animal, (when ear tagging larger or difficult animals this is easier with two people, one holding the head and the other the rump) exposing the ears and leaving the rest of the body in the handling bag taking particular care to ensure eyes are covered.

(c) Give the ear a good clean with dilute antiseptic solution (e.g. Betadine® or medi-swab).

(d) Before you insert the tag into the ear, gently squeeze the applicator together to ensure both parts of the tag are in alignment

(e) Dip the shaft of the male part of the tag into a dilute antiseptic solution (e.g. Betadine® or diluted ethanol) and set aside whilst the animal's ear is prepared. If an assistant is available they may be able to prepare the tag and tag applicator whilst the animal handler prepares the animal.

(f) Ear tag position is the same as for Section 5.4.

(g) These tags are self-piercing however the use of an ear punch first is recommended. For instructions on ear punching for application of the tag refer to the Department SOP for *Permanent Marking of Mammals using Ear Notching*.

(h) If the tissue from the punched hole is to be kept for DNA analysis, refer to the Department SOP for *Tissue Sample Collection and Storage for Mammals*.

- (i) Place the ear between the jaws of the applicator, positioning the male part of the tag with the piercing column (see Figure 2) on the back side of the ear at the location of the freshly punched hole.
- (j) Squeeze the applicator to apply the tag and release the tag. This should be performed swiftly before the animal has a chance to pull away.
- (k) Inspect the ear to look for any tearing or bleeding caused by the procedure and also to check that the tag is correctly applied. Treat any wounds or reapply the tag if required.

6 Level of Impact

Potential animal welfare impacts when ear tagging animals include:

- Distress caused by handling (discomfort, social isolation, separation of mother and young).
- Trauma (possible injury to animal during restraint. e.g. scratching or biting itself).
- Pain during insertion of the ear tag(s), which is usually brief.
- Infection at site of tag insertion.

It should be noted that whilst these impacts are specifically associated with the procedure of ear tagging, 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 ear tagging on the welfare of animals there are a number of ethical considerations that should be addressed throughout projects involving these procedures. Department projects involving ear tagging 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. 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 be done during the cooler periods of the day (dawn/dusk).

7.2 Suitability of tags

Care must be taken to use tags that are of an appropriate material, size and colour. Brightly coloured or reflective ear tags may make the animal more obvious to predators, and may cause animals to be treated differently by other members of the same species. The physical presence of the tag(s) may also affect the animal's behaviour (e.g. the animal may persistently try and rid itself of the tag). The ear tags must also be appropriate for the animal's size, future growth, body shape and habits (Sharp *et al.*, 2007).

7.3 Future growth of animal

Ear tags are only fitted to animals whose ears have reached adult size. Fitting tags loosely to allow for extra growth is not recommended because of the risk of the tag getting snagged being ripped out. If tags are fitted snugly to ears that are still growing the ear will be distorted and could potentially affect the hearing of the animal.

If marking juveniles is necessary, alternative methods of marking should be used such as ear notching.

7.4 Pain and infections

Equipment should be kept sharp and clean to minimise tearing, bruising, infection and transfer of disease. Appropriate anaesthetic, anti-septic and measures of pain control must be used when/if required.

7.5 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.

8 Competencies and Approvals

Ear tagging is considered an invasive procedure because it involves piercing and/or removal of tissue. Department projects proposing to use ear tagging must provide justification in their *Application for Approval to Undertake Research Involving Vertebrate Animals* why other less invasive marking methods (e.g. temporary markers such as dye or fur clipping) are unsuitable for the projects objectives/requirements.

Department personnel, and other external parties covered by the Department's Animal Ethics Committee, undertaking projects that involve ear tagging of animals require approval from the committee and will need to satisfy the competency requirements detailed in Table 2. This is to ensure that personnel involved have the necessary knowledge and experience to minimise the potential impacts of ear tagging on the welfare of 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 1 provides advice for basic monitoring only.

Table 2 Competency requirements for Animal Handlers of projects involving ear tagging to semi-permanently mark animals

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)	Provide licence number
Formal training (Note: Suitable levels of skills/experience can substitute for formal training requirements)	Department Fauna Management Course or equivalent training	Provide course year
Animal handling and processing skills/experience	Experience in handling terrestrial mammal fauna	Personnel must be confident at hand capture and handling of species likely to be encountered when using ear tags, and should be familiar with how to operate ear tagging equipment. This experience is to be obtained under supervision of more experienced personnel. A minimum of 5 supervised applications is required for each species and technique. Estimated total time in field: Min 2 years involved in similar projects.
Blood, DNA and surgical skills/experience	If using an ear punch for the process of applying a tag: Experience in ear clipping for DNA sampling of non-bird and non- bat fauna	Personnel must be familiar with how to operate ear notching and punching equipment. This experience is to be obtained under supervision of more experienced personnel. A minimum of 5 supervised applications is required for each species and technique. Estimated total time in field: Min 2 years involved in similar projects

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 and scratches

Handling animals can result in injuries to handlers from the animals inflicting bites and 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.

Personnel should also have up-to-date tetanus vaccinations.

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.

10 Further Reading

The following SOPs have been mentioned in this advice and it is recommended that they are consulted when proposing to undertake ear tagging of animals.

- Department SOP *Tissue Sample Collection and Storage for Mammals*
- Department SOP *Animal Handling and Restraint using Soft Containment*
- Department SOP *Hand Restraint of Wildlife*
- Department SOP *Permanent Marking of Vertebrates using Microchips*
- Department SOP *Permanent Marking of Mammals using Ear Notching*
- Department SOP *First Aid for Animals*
- Department SOP *Managing Disease Risk in Wildlife Management*
- Department SOP *Humane Killing of Animals under Field Conditions*

11 References

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