

# Charles Darwin University Animal Ethics Committee

Standard Operating Procedure:  
DPAW SOP 09.2019 Permanent Marking of Vertebrates using  
Microchips

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# Standard Operating Procedure

## PERMANENT MARKING OF VERTEBRATES USING MICROCHIPS

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

Prepared for: Animal Ethics Committee

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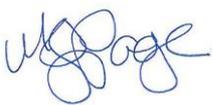
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## Contents

1 Purpose .....	7
2 Scope .....	7
3 Definitions .....	8
4 Procedure Outline .....	8
4.1 Equipment required .....	8
4.2 Animal handling.....	9
4.3 Inserting the microchip .....	9
4.4 Recording data .....	11
5 Level of Impact .....	11
6 Ethical Considerations.....	11
6.1 Animal handling.....	12
6.2 Pain and infections .....	12
6.3 Injury and unexpected deaths .....	12
7 Competencies and Approvals.....	12
8 Occupational Health and Safety.....	13
8.1 Animal bites, stings and scratches .....	13
8.2 Zoonoses .....	14
8.3 Allergies.....	14
8.4 Sharp Equipment.....	14
8.5 Chemicals .....	14
9 Further Reading.....	14
10 References.....	15
10.1 Personal Communication .....	15



# 1 Purpose

Microchipping is a method of permanent identification that remains with the animal for its lifespan.

In fauna monitoring activities, microchips are most commonly used to mark medium to large sized animals being monitored for research purposes and species in which other forms of marking are not practical (e.g. species that burrow and therefore easily lose ear tags). Furred pouch young can be micro-chipped if no other suitable method of marking is available. Microchipping is not suitable for small species with delicate skin such as some rodents, amphibians and invertebrates. Where sufficient to achieve the desired purpose, temporary marking methods should be utilised over permanent methods.

Advantages of using microchips in the identification of animals include their ability to be used on an unlimited number of individual animals and on many different species of mammals, reptiles and birds, providing the microchip to body ratio does not exceed 10%. They can be read through soft/hard tissue, water, glass, thin wood, plastic, handling bags and some metal (e.g. aluminium box traps), although this does vary depending on the type of scanner used. Their very small size and weight means that they do not alter the appearance or behaviour of the animals and they are quick to apply (Mellor *et al.*, 2004)

This standard operating procedure (SOP) provides advice on the safe administration of permanent marking of fauna through the use of passive implant transponders, commonly known as microchips.

# 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 microchips to permanently mark vertebrates, 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 the use of microchips 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.

**Microchip:** A small device about the size of a grain of rice, which is implanted subcutaneously or intra-muscularly into an animal for identification. They generate a low energy radio signal that transmits a unique number when a compatible scanner is passed over the top of it (Sharp *et al.*, 2007).

**Permanent marker:** A marker designed to stay with an animal for its lifespan (Sharp *et al.*, 2007). They tend to leave marks that are less visible but often involve tissue damage.

### 4 Procedure Outline

#### 4.1 Equipment required

The following equipment is required when implanting microchips:

- scanner (reader)
- individually packaged microchips (e.g. Trovan<sup>®</sup> Passive Implant Transponders)
- applicator/implanter
- topical antiseptic
- gauze swabs or tissues
- tissue glue

Trovan<sup>®</sup> and Allflex<sup>®</sup> microchips and scanners are most commonly used for Department survey and monitoring activities, but there are many other brands of microchips and associated implanting and scanning equipment. Take care to ensure that your scanning equipment can read the microchips being implanted. *Note: The Lid 560 ISO Pocket Read can read ALL ISO and conventional microchips used throughout Australia.* The International Standards Organisation (ISO) has developed the standards ISO 11784 and ISO 11785 to reduce incompatibility issues associated with microchips (WSAVA, 2008). Table 1 lists the microchips in use within Australia.

*Table 1 Microchip distributors and brands currently used in Western Australia*

Distributor	Brand	Compatible Scanner/Reader
TROVAN	Trovan	AREH5 Portable Reader
Destron-Fearing	Animal Electronic ID System (AEIDS)	Pocket Reader
	Lifechip	Pocket Reader EX
AVID	VMN	Power Tracker II
Allflex	Allflex FDX-B Passive Transponder	Allflex Compact Reader

## 4.2 Animal handling

- (a) Techniques for handling animals vary depending on the species of mammal, reptile or bird involved and the experience and skills of personnel. General advice on handling of animals is contained in the Department SOP for *Hand Restraint of Wildlife*. All handling of animals should be done by (or under the guidance of) experienced personnel.
- (b) Use handling bags appropriate for the species and length of containment as advised in the Department SOP for *Animal Handling and Restraint using Soft Containment*.
- (c) If an animal is injured during handling/microchipping, treat any superficial wounds with a topical antiseptic (e.g. Betadine). Refer to the Department SOP for *First Aid for Animals*.
- (d) 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 or not to euthanase or seek veterinary care.
- (e) Captured animals must be released at point of capture (unless the purpose of the trapping is translocation, specimen collection is required or 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.

## 4.3 Inserting the microchip

Microchips are inserted subcutaneously under the skin (usually on the back of the neck or scapula area) of the animal, or intra-muscularly, and are quick to apply and cause only brief pain.

- (a) While the animal is in the holding bag or while it is being restrained it should be scanned to ensure that it does not already have a microchip.

*Note: As a microchip may migrate it is advisable to scan the whole animal.*

- (b) All transponder marking must be conducted using sterile equipment.
- (c) Turn the scanner on and scan the microchip to ensure it is functioning and that the number of the microchip matches the number shown on the packaging sticker. If the microchip number and sticker match, transfer the sticker onto the animal's record.
- (d) Remove the implant needle from its individual sterile packaging and insert the plastic base into the applicator. Secure it by screwing it into the base of the applicator.
- (e) Firmly restrain the animal (this is often easier with two people with one person holding head and the other the rump), exposing the implant site and leaving the rest of the body in the handling bag, taking particular care to ensure eyes are covered. Do not continue if the animal becomes distressed as a result of restraint. A squirmy animal while manoeuvring a sharp object can result in injury to both the animal and handler alike.

Recommended implant sites for animal groups are outlined in Table 2.

Table 2 Guide to implantation sites in different animal groups

Animal Group	Implantation Site
<b>Mammals</b>	Subcutaneously in the loose skin at the nape of the neck
<b>Birds</b>	Intramuscularly in the pectoral muscle
<b>Lizards</b>	Subcutaneously in the inguinal region (i.e. on the side of the body just in front of the hind leg) (K. Payne, pers. comm., 2009).
<b>Snakes</b>	Between the scales subcutaneously lateral and cranial to the cloaca (i.e. on the side of the snake just in front of the cloaca) (K. Payne, pers. comm., 2009)
<b>Freshwater turtles and tortoise</b>	Subcutaneously above the tail in a skin fold between the tail and the shell (G. Kuchling, pers. comm., 2015).
<b>Marine turtles</b>	As per the Department SOP for <i>Marking of Marine Turtles using Flipper and PIT Tags</i> . Generally in the left shoulder by measuring approximately 2-3 finger widths below the carapace in the right half of the centre section between the neck and flipper.

(f) Once the animal is securely restrained swab the implant site with dilute topical antiseptic (e.g. Betadine®/ethanol), part the fur/feathers/scales to expose the skin at the insertion site. The point of insertion should be 2cm behind where the transponder will be. If an antiseptic swab is not effective at clearing the injection site, hair may be carefully cut away. This may also aid in relocating the injection site should an animal move or flinch between the removal of the syringe and gluing of the site.

(g) Remove the plastic shield from the needle.

(h) Once ready to insert the microchip, tent any loose skin between three fingers, allowing space for entry of the needle and chip.

(i) Firmly insert the needle at the base of the tented skin, facing in a posterior direction on a slight angle trajectory. Pause to allow the animal to relax if it has tensed up, then continue, stopping when the notch in the needle reaches the point of entry into the skin.

*Note: New batches of microchips from Microchips Australia do not have the notch on the needle.*

The needle needs to be inserted into the subcutaneous space (except birds). If you have difficulty inserting the needle fully you may have the needle too deep and be trying to insert the needle into muscle or you have the needle in too shallow so it is still in the skin layer.

*Note: There may also be instances where it may be appropriate to insert the needle towards the animals head. Appropriate techniques may vary slightly between species highlighting the importance of training and experience to administer this procedure.*

(j) Rotate the needle 180°, so that the long edge is against the skin allowing the chip to drop out of the needle with greater ease.

(k) Depress the plunger on the applicator, feeling at the end of the needle (through the skin) for the microchip.

(l) Remove the needle gently holding the skin around the needle at the insertion point which helps prevent the microchip from tracking back out with the needle. For mammals and birds ensure there are no fur/feathers within the insertion wound as this can be a source of infection.

*Note: If the microchip tracks back out or if the end of the chip is visible at the insertion point it is important to reinsert it by carefully threading the exposed end back up the needle and using the needle to push it further under the skin. Sometimes fingers or forceps are sufficient for this task. (S. Vitali, pers. comm, 2008).*

(m) Replace the cover on the needle and dispose of into a sharps container.

(n) Place a drop of tissue glue on the wound to seal it (this is essential with reptiles and in general is a good insurance against the loss of the microchip through the wound). Ensure the wound from the syringe is clear of dirt and hair before it is glued.

(o) Run the scanner over the insertion site to check that the transponder has been correctly applied.

(p) Resecure the animal in the handling bag and allow it to recover before releasing.

## 4.4 Recording data

Data should be recorded on an appropriate datasheet and database. Microchips are accompanied by several copies of the microchip number (usually 15 digits). To ensure accuracy of recording microchip numbers these should be cut off and stuck onto the data sheets rather than written down.

## 5 Level of Impact

Potential animal welfare impacts when microchipping animals include:

- Distress (caused by handling, discomfort, social isolation, separation of mother and young)
- Trauma (possible injury to the animal during restraint eg. Scratching itself, biting itself)
- Pain during insertion of microchip (this is usually brief)
- Infection at site of implant insertion
- Incorrect insertion (too deep, into skulls etc.)

If carried out correctly microchipping should be a fast procedure causing limited pain, with no need for either local or general anaesthesia.

It should be noted that whilst these impacts are specifically associated with the procedure of microchipping, an animal may also experience other impacts from associated procedures such as trapping and capture.

## 6 Ethical Considerations

To reduce the level of impact of microchipping on the welfare of animals there are a number of ethical considerations that should be addressed. Department projects involving

microchipping of vertebrates will require approval from the Department's Animal Ethics Committee.

It should be noted that whilst these ethical considerations are specifically associated with the procedure of microchipping, other ethical considerations need to be taken into account during procedures carried out prior, such as trapping and capture.

## 6.1 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).

## 6.2 Pain and infections

Although hygiene is difficult in the field, cleanliness of all surgical techniques is essential to minimise the potential for infection (refer to the Department SOP for *Managing Disease Risk in Wildlife Management*). Appropriate anti-septic and measures of pain minimisation must be used when/if required (refer to the Department SOP for *First Aid for Animals*).

Where the opportunity arises, personnel should check injection sites on animals in the days following the procedure. In addition to identifying the animal upon re-trap, inspect the injection site for signs of infection to verify the procedure is being administered successfully.

## 6.3 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 Competencies and Approvals

Department personnel, and other external parties covered by the Department's Animal Ethics Committee, undertaking monitoring projects involving permanent marking of animals by microchipping require approval from the committee and will need to satisfy the competency requirements detailed in Table 3. This is to ensure that personnel involved have the necessary knowledge and experience to minimise the potential impacts of microchipping 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 3 provides advice for basic monitoring only.

*Table 3 Competency requirements for Animal Handlers of projects involving permanent marking of vertebrates by microchipping*

Competency category	Competency requirement	Competency assessment
Wildlife licences	Licence to take fauna for scientific purposes (Reg 17)	Provide licence 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
Animal handling and processing skills/experience	Experience in handling target (or similar species) AND Experience and training in inserting PIT tags.	Personnel should be confident at hand restraint of species likely to be encountered when microchipping.  The Department's Animal Ethics Committee require that anyone proposing to implant microchips are trained and supervised by a highly experienced staff member or qualified registered veterinarian.  A minimum of 5 supervised applications of microchips for each species is recommended.  Estimated total time in field: Min 2-5 years involved in similar projects.

## 8 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.

### 8.1 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](http://intranet/csd/People_Services/rm/Pages/ReportingHazards,Near-MissesandIncidents.aspxZoonoses).

## 8.2 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*

## 8.3 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.

## 8.4 Sharp Equipment

There is a real risk of needle stick injuries to personnel. Needles are designed to be sharp and pierce skin easily. Care must be taken when working around sharp objects. All injuries (even superficial ones) should be appropriately treated as soon as possible to prevent infection and promote healing.

Adequate restraint needs to be used when working with an animal to avoid any sudden movements.

All needles are to be disposed of in a sharps container.

## 8.5 Chemicals

Only tissue glue is to be used when permanently marking animals with microchips. Super glue is **NOT RECOMMENDED**. Super glue is ethyl cyanoacrylate which can cause histotoxicity and inflammation as it rapidly breaks down into the by-products of cyanoacetate and formaldehyde (Mobley *et al.*, 2002). Tissue glue is butyl cyanoacrylate which degrades at a slower rate than ethyl cyanoacrylate and releases less toxic by-products into the tissue of the animal (Mobley *et al.*, 2002).

# 9 Further Reading

The following SOPs have been mentioned in this advice and is recommended that they are also consulted when proposing to use microchips.

- 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*

## 10 References

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### 10.1 Personal Communication

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- Karen Payne (Veterinarian, Perth Zoo), 14 February 2009
- Simone Vitali (Senior Veterinarian, Perth Zoo), 3 October 2008