# Standard Operating Procedure

## SC25-06 PERMANENT MARKING OF VERTEBRATES USING PASSIVE INTEGRATED TRANSPONDER (PIT) TAGS

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 1.5

June 2025

GOVERNMENT OF WESTERN AUSTRALIA

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**Revision History**

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*Previously titled Permanent Marking of Vertebrates using Microchips.

**Approvals: Version 1.5**

Approved by the DBCA Animal Ethics Committee: 

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Chairperson, Animal Ethics Committee
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# Contents

# 1 Acknowledgements

This standard operating procedure was originally developed by Christine Freegard and Vanessa Richter, with contributions from Peter Orell, Stephanie Hill, Neil Thomas, Kelly Rayner, and Holly Raudino.

# 2 Purpose

Passive Integrated Transponder (PIT) tags are a method of permanent individual identification that remains with the animal for its lifespan. Where sufficient to achieve the desired purpose, temporary marking methods should be utilised over permanent methods.

Many field studies of ecology, behaviour and conservation require individual recognition of the subjects that make up a population. PIT tags are a permanent identification method that can be used to identify a wide range of species for research purposes. There are some individual size limitations and species physiology that must be considered, however in most instances where a permanent unique identifier is required PIT tags are the preferred option.

PIT tags, commonly known as microchips, are very small in size and weight and should not alter the appearance or behaviour of the animals (Mellor et al., 2004). A standard PIT is approximately 11 mm in length, 2 mm in diameter and 100 mg in mass. However, there is a range of smaller chips now available including the mini-microchip measuring just 8.5 mm x 1.4 mm and the nano-microchip 7 mm x 1.25 mm. Noting that the smaller the chip the shorter the read range.

This Standard Operating Procedure (SOP) provides advice on the safe application of permanent marking of fauna using PIT tags (or microchips) which can come in different sizes and under different names.

# 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 PIT tags to permanently mark vertebrates undertaken across Western Australia by DBCA (hereafter department) personnel. It may also be used to guide fauna related activities undertaken by Natural Resource Management groups, consultants, researchers and any other individuals or organisations. All department personnel involved in fauna research and management should be familiar with the content of this document.

This SOP complements the *Australian code of practice for the care and use of animals for scientific purposes* (The Code). The Code provides the ethical framework and governing principles to guide decisions and actions of all those involved in the care and use of animals for scientific purposes 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

The method of individual identification should be humane, simple, and accurate. Tags applied to animals should be physiologically inert and not interfere with behaviour, growth, survival, or probability of recapture (Plummer and Ferner 2012).

To reduce the level of impact of PIT tagging 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 PIT tagging, and contingencies for managing welfare issues have been identified. All personnel involved in the project should be aware of the range of issues that 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 permanent marking of vertebrates using PIT tags will require approval from the department's AEC. The key animal welfare considerations that should be considered when permanently marking vertebrates using PIT tags are listed below and are highlighted throughout the document.

## 4.1 Injury and unexpected deaths

If adverse events including injury, unexpected deaths or 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 first aid and field euthanasia are described in the department SOPs for 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

PIT tagging is considered an invasive procedure because tags pass through living tissue. Potential animal welfare impacts when PIT tagging animals include:

- Distress (caused by discomfort, social isolation, separation of mother and young).
- Trauma (possible injury to the animal during restraint e.g., tearing of skin, strains, or fractures of limbs/bones).
- Pain and bleeding during insertion of PIT tag (this is usually brief).
- Infection at site of implant insertion.
- Incorrect insertion, too deep or wrong place, resulting in internal bleeding and/or injury to internal organs (e.g., into skull, spine, lungs).

If carried out correctly, PIT tagging should be a fast procedure causing limited pain, with no need for either local or general anaesthesia. 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 use of PIT tags, an animal may also experience other impacts from associated procedures. Investigators must be aware that the effects of a series of stressors, such as capture, handling, transportation, sedation, anaesthesia and marking can be cumulative.

# 5 Procedure Outline

## 5.1 Equipment

The following equipment is required when implanting PIT tags:

- Portable reader (scanner), preferably a scanner with an internal memory.
- Sterile, individually packaged PIT tags (e.g., Trovan® 'microtransponder' and 'nanotransponder').
- Applicator/implanter (MUST match the PIT tags being used or may not implant properly).

  **OR** transponder with implanter (e.g., Trovan® 'Mini transponder in VetPlant Implanter').
- Sharps disposal container
- Topical antiseptic (e.g., Medi-Swab®, Betadine®, 70% ethanol).
- Gauze swabs or tissues.
- Tissue glue (e.g., 3M Vetbond®).

Trovan® and Micro Products Australia® PIT tags and portable readers are commonly used for department survey and monitoring activities, but there are many other brands of PIT tags and associated implanting and scanning equipment. Take care to ensure that your scanning equipment can read the PIT tags being implanted (Table 1).

Although the tags can be very small at <0.1 g, they vary in size. Therefore, during the planning stage, personnel must consider the animal size, providing the PIT tag to body ratio (e.g., for mammals, the head body (HB) length) does not exceed 10%.

PIT tags use Radio Frequency Identification (RFID) technology, that can be read through soft and hard tissue, water, glass, thin wood, plastic, handling bags and some metal (e.g., aluminium box traps). This does vary, depending on the type of portable reader used (pocket readers ~50mm; more expensive ones up to 200mm), the size of the PIT tag (8mm < 11-13mm), and how close to the animal the reader is placed.

*Note: The LID 560 ISO Pocket Reader from Microchips Australia, can read ALL ISO and conventional PIT tags used throughout Australia (including the TROVAN Unique ID100 [FDXA] PIT tags often used in zoos and wildlife research around Australia).*

*Table 1 PIT tags distributors and brands currently used in Western Australia*

| Distributor | PIT System | Compatible Portable Reader |
|---|---|---|
| **Microchips Australia (Zoos; wildlife research)** | TROVAN Unique ID100 (FDXA) | LID 560 Pocket Reader; AREH5 Portable Reader |
| **Micro Products Australia** | European Mini Microchips | LID575 ISO reader |
| **Destron-Fearing (Pets; livestock)** | Animal Electronic ID System (AEIDS) Lifechip | Pocket Reader Pocket Reader EX |
| **OzMicrochips (pets)** | ISO FDXB Microchips + Mini Microchips | Real Trace V8RT100 Handheld Reader |
| **Allflex (No longer making PIT tags, only livestock tags)** | Allflex FDX-B Passive Transponder (no longer available, but will have a historical presence for some years) | Allflex Compact Reader |
| **Microchips Australia (Pets; wildlife research)** | TROVAN ISO (FDXB) | Multi reader LID 560 (All ISO FDXB **+ FDXA**) OR LID 540 (ISO FDXB **only**) |
| **Global-Ident** | Global-Ident XS MiniChips or Standard MicroChips (ISO) | GI Global-scan reader GS110 (reads all ISO) |

## 5.2 Animal handling

**ANIMAL WELFARE**: To minimise stress individuals should only be handled for as long as required to mark them and to collect any necessary measurements (usually no more than five minutes). 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. Improper restraint, especially when dealing with a stressed and frightened animal can lead to major physiological disturbances (i.e. hyperthermia, stress, shock capture myopathy). It is preferable that handling be done during the cooler periods of the day (dawn/dusk).

(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 PIT tagging, 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 *Euthanasia of Animals Under Field Conditions* to make the decision on whether 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 AEC. Animals should be released at a time when they are normally active.

## 5.3 Inserting the PIT tag

In most terrestrial mammals, PIT tags are inserted subcutaneously under the skin in the area between the scapula (shoulder blades), where the skin is usually loosest. However, some species such as quenda have thicker skin with muscle fibres within the dermis and may require some patience or massaging to get the animal to relax the contracted skin to insert the needle. In this case the PIT tag can be placed more laterally if there is looser skin available. In birds (and some reptiles) the PIT tag may be inserted intra-muscularly (e.g., in birds, they are usually placed into the breast muscle; Table 2).

**ANIMAL WELFARE**: Implantation of a PIT tag is an invasive identification procedure and must only be performed, or closely supervised, by an experienced, endorsed and competent personnel.

(a) While the animal is in the handling bag or while it is being restrained, it should be thoroughly scanned to ensure that it does not already have a PIT tag.

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

(b) All PIT tagging must be conducted using sterile equipment.

(c) Prior to insertion, scan the PIT tag to ensure it is functioning and that the number of the PIT tag matches the number shown on the packaging sticker.

(d) If required, 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, ensuring sterile conditions are maintained

**ANIMAL WELFARE**: Asepsis (cleanliness) of all surgical techniques is essential to minimise the potential for infection (refer to the department SOP for *Managing Disease Risk and Biosecurity in Wildlife Management*), and skin should be disinfected prior to inserting a sterile applicator into the animal. 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 was administered successfully.

(e) Restrain the animal (if required, a second person may assist with one person holding the 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. A squirmy animal while manoeuvring a sharp object can result in injury to both the animal and handler alike.

(f) Once complete, transfer the sticker from the packaging onto the data sheet.

*Table 2 Guide to implantation sites in different animal groups*

| Animal Group | Implantation Site |
|---|---|
| **Terrestrial Mammals** | Subcutaneously in the loose skin between the scapulae (shoulder blades) left or centre. |
| **Marine Mammals** | Subcutaneously in the rump, into the clipped area, parallel to the spine and close to the tail to minimize the effect of gravitation (Goldsworthy et al., 2019). |
| **Birds** | >5.5 kg adult weight and/or long-legged: subcutaneously at the base of the neck<br><5.5 kg adult weight: intramuscularly in the left pectoral muscle (Whitfield et al., 2015; WSAVA, 2022). By convention, tags are generally inserted in the left side.<br>Small passerine birds (<25 g), attachment to leg bands (Schroeder et al.,2011) or subcutaneous implantation between scapulae (Nicolaus et al., 2008; Oswald et al., 2018). |
| **Lizards** | 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). By convention, tags are generally inserted in the left side.<br>>12.5 cm snout to vent length - subcutaneously in the left inguinal region.<br><12.5 cm snout to vent length – intracoelomic (WSAVA, 2022). |
| **Snakes** | 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). By convention, tags are generally inserted in the left side. |
| **Amphibians** | Subcutaneously posterior lymph space between the hind legs (Ireland et al., 2003; WSAVA, 2022). By convention, tags are generally inserted in the left side. |
| **Freshwater turtles and tortoise** | Subcutaneously above the tail in a skin fold between the tail and the shell (G. Kuchling, pers. comm., 2015) or in skin fold in front of L hindlimb. By convention, tags are generally inserted in the left side. |
| **Marine turtles** | Intramuscularly in the left shoulder muscle, by measuring 2-3 finger widths below the carapace in the right half of the center section between the neck and flipper (Foley et al., 2021; SOP *Marking of marine turtles using flipper and passive implant transponder (PIT) tags*). |

(g) Once the animal is securely restrained, part the fur/feathers/scales to expose the skin at the insertion site and then swab the implant site with topical antiseptic (e.g., Medi-Swab®, Betadine® or ethanol). The point of insertion should be 2 cm 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.

(h) Remove the plastic shield from the needle.

(i) Once ready to insert the PIT tag, tent any loose skin between three fingers, allowing space for entry of the needle.

(j) Firmly insert the needle at the base of the tented skin, on a trajectory that is horizontal to the animal's body to ensure it does not enter critical organs if the animal moves and the needle goes further than intended. It is usually when the needle initially breaks the

skin that the animal is most likely to move or jump, and when there is most risk. It is essential that the handling technique ensures that the hand holding the needle, and the animal, move together if this occurs (i.e., hand holding the needle should have some contact with the animal to feel for the movement and react accordingly) to prevent the needle going somewhere it should not. Pause to allow the animal to relax if it has tensed up, then continue, stopping when at least 15mm of the needle has been inserted.

*Note: Many newer PITs now utilise a much shorter needle and the total length of the needle can be safely inserted, if required.*

(k) 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 have the needle too shallow, so it is still within the skin layer.

*Note: The needle can be inserted towards the head or away from it.* ***The choice of direction depends on the species, behaviour of the animal, comfort of the operator and if they have assistance restraining the animal or not****. Some people have concerns that pointing the needle towards the head risks accidentally driving it into the skull or base of the spine. However, if the animal is being held appropriately (with head down) and the angle is correct, there should be little risk. If the operator is restraining the animal and inserting the needle on their own, then the hand with the needle should be over the back, rather than the head, as the head is most likely to move and be thrown up or back which risks jolting the needle and changing its trajectory during insertion. If a separate person is restraining the animal there is less risk of interference with the needle hand and direction is less important. Appropriate techniques may vary slightly between species highlighting the importance of training and experience to administer this procedure.*

(l) Fully depress the plunger on the applicator, feeling at the end of the needle (through the skin) for the PIT tag.

(m) Remove the needle gently holding the skin around the needle at the insertion point which helps prevent the PIT tag from tracking back out with the needle.

*Note: If the PIT tag tracks back out or if the end 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 or sterile forceps to push it further under the skin* (S. Vitali, pers. comm, 2008). *Do not touch the end of the exposed tag with anything other than the needle or sterile instruments. If the needle has touched anything else, it will no longer be sterile and risks infection, so starting again with a fresh needle and PIT tag may be necessary.*

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

(o) To provide insurance against the loss of the PIT through the wound, a drop of tissue glue (e.g., Vetbond®) can be used to seal it. Ensure the wound from the syringe is clear of dirt and hair before it is glued.

*Note: it is* ***not suitable to use commonly available 'super glues'*** *as they are not designed for use on biological tissue, hence are not sterile and can generate significant heat which may burn tissues.*

(p) Run the portable reader over the insertion site to check that the PIT tag has been correctly applied and still reads. Use the sticker provided with the PIT tag on your data

sheet to record the number.

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

## 5.4 Recording data

Data should be recorded on an appropriate datasheet and database (Appendix 1). PIT tags are accompanied by several copies of the unique ID number (usually 15 digits). To ensure accuracy of recording PIT tag numbers the sticker should be removed (may need to be trimmed to size) and stuck onto the data sheets rather than written down. Email Threatened (CR, EN, VU) and Priority (P1-4) fauna records to fauna.data@dbca.wa.gov.au. It is recommended you invest in a scanner with a memory, and regularly download the scanner memory and save this with your trap data sheets for cross checking numbers particularly for recaptures.

# 6 Competencies

A person who is competent has the knowledge, skills, and experiences that allow them to capture and handle animals successfully, and appropriately manage adverse events as required. Department personnel, and other external parties covered by the department's AEC, undertaking fauna-related activities require approval from the committee and will need to satisfy the competency requirements (Table 3). Other groups, organisations or individuals using this SOP to guide their fauna monitoring activities are encouraged to also meet these competency requirements as well as their animal welfare legislative obligations.

It should be noted that sampling design details such as intensity and scope of the study being undertaken will determine the level of competency required and Table 3 provides advice for standard monitoring only.

*Table 3 Competency requirements for Animal Handlers of projects involving the permanent marking of vertebrates using PIT tags*

| 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, or experience).<br>In applications, provide details on the course provider, course name and year. |
| | Understanding species biology and ecology | Personnel should be able to correctly identify the likely species to be encountered at the site(s) being studied and understand the species' biology and ecology. This knowledge may be gained through sufficient field experience and consultation of field guides and other literature. |

| | | |
|---|---|---|
| **Animal handling and tagging skills/experience required** | Experience handling vertebrate fauna | Personnel should be experienced at hand restraint of species being PIT tagged. This experience is best obtained under supervision of more experienced personnel.<br>In applications, provide details on the longevity, frequency & recency of experience. |
| | Experience in inserting PIT tags | Personnel should be familiar with the animal welfare principles of permanent marking using PIT tags. Personnel should be familiar with how to operate PIT tagging equipment. This experience is best obtained under supervision of more experienced personnel. |
| | Experience managing disease risk and biosecurity in wildlife management | Personnel should be familiar with hygiene procedures. This knowledge may be gained through sufficient field experience and consultation of literature. |

In conjunction with possessing the required understanding and knowledge of the permanent marking technique and animal welfare requirements, a guide to the experience and skill requirements for an animal handler to be considered competent to permanently mark vertebrates using PIT tags is as follows: (noting that some personnel with experience may still require initial supervision in unfamiliar locations or with species that they have not encountered previously):

- Recency of time in field: within the past 5 years.
- Minimum 20 PIT tags implanted (in live animals) across multiples species under supervision of an AEC endorsed staff member or veterinarian. *Note: this number may vary at the discretion of an endorsed trainer.*

# 7 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)*.

- 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.

Personnel should consult the department's Wildlife Licensing Section for further guidance Contact the department's Wildlife Licensing Section for more information. It is your responsibility to ensure you comply with the requirements of all applicable legislation.

# 8 Occupational Health and Safety

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

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

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

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

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

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

# 9 Further Reading

The following SOPs have been mentioned in this advice and it is recommended that they are consulted when proposing permanently mark mammals using ear notching:

- 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

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# 11 Glossary of Terms

**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.

**Passive Integrated Transponder (PIT):** also known as microchip or passive RFID tag. 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 portable reader 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.

# Appendix 1: Western Shield Trapping Data Sheet

**TRAPPING DATA SHEET** Transect/Grid/etc NAME:_____ DATE:_____/_____/_____ ☐ *Animal welfare was considered at all times*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Site | | Date ___/_____/_____ | Trap type | Small cage | Elliott trap | Pitfall trap | Bait |
| Area | | Transect / Grid / Other: | # Traps set for this date/event | | | | |

| Personnel | Animal handling (initials) | Data recording (initials) |
|---|---|---|
| | | |

Session Dates

| Start time | End Time | Weather (rain/wind) | Day 1 (Date) | Last day (Date) |
|---|---|---|---|---|
| ___:____ | ___:____ | | | |

| Trap No. | Trap type | Recently burnt Y/N | Species/ Trap status (OB/ON/CB/CN/ SHUT) | Total wt / Bag wt | Animal wt (g) | Implant No or Ear Tags (record both if both present) L Ear | R Ear | N/R/RT* | Sex | Age | Head L / TL | Pes S/L OR SVL | Pouch/ Repro Status | PY/CR | Fate/Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | _____ | | | | | | | | | | | |
| | | | | _____ | | | | | | | | | | | |
| | | | | _____ | | | | | | | | | | | |
| | | | | _____ | | | | | | | | | | | |
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| | | | | _____ | | | | | | | | | | | |
| | | | | _____ | | | | | | | | | | | |

# Appendix 2: Codes for trapping data sheet

## Trap status

| Trap status label | Trap status Code | Notes |
|---|---|---|
| **Closed with bait** | CB | Trap is closed, but still has bait and no animal |
| **Closed with capture** | CC | All animal captures, including captures in pitfalls |
| **Closed with no bait** | CN | Trap is shut, bait has been removed, no animal |
| **Open with bait** | OB | Open traps with bait |
| **Open with no bait** | ON | Use this code for any open trap with no bait, this includes pitfalls with no captures |
| **Trap deliberately shut** | SHUT | Deliberately closed traps (for safety) and permanent points on transect that were not set |

## Capture Code

| Capture label | Capture code |
|---|---|
| **escaped before id checked or marked** | E |
| **new capture** | N |
| **not tagged** | NT |
| **recapture, previous trapping session** | R |
| **recapture, all new tags** | RN |
| **recapture, no prior record of tags** | RP |
| **recapture, same trapping session** | RT |

## Age/sex

| Age | Age code |
|---|---|
| Adult | A |
| Infant | I |
| Juvenile | J |
| Subadult | S |

| Sex | Sex code |
|---|---|
| Female | F |
| Male | M |

## Pouch Young

| Pouch Young | Description | Code |
|---|---|---|
| **embryonic, attached** | jellybean stage, attached to teat | EMBRYONC |
| **fully furred** | fully developed pelage | FUR_FULL |
| **fur covering, short** | complete but light covering of fur | FUR_SHRT |
| **hairless, ears attached** | limbs developed, no hair, ears folded onto head | HLS_EARA |
| **hairless, ears free** | limbs more developed, no hear, external ear free | HLS_EARF |
| **hair emerged, eyes open** | hair visible, protruding from skin | HR_EMERG |
| **hair not yet emerged, closed eyes** | dark skin colouration from growing hair | HR_NEMER |

## Reproductive activity

| Reproductive condition | Description | Code |
|---|---|---|
| abdominal testes | testes not visible | ABD_TEST |
| Active pouch (stained, Moist) | pouch empty but ready for young | ACTV_PCH |

| | | |
|---|---|---|
| elongated teat, not lactating | teat elongated but not lactating | ELO_TEAT |
| inactive or dormant | no signs of reproductive activity | INACTIVE |
| lactating, dets of YAH separate rec | lactating, with young at heel present, details of young at heel recorded as a separate record | LAC_INDV |
| lactating, offspring absent | lactating with offspring absent | LAC_NOO |
| Lactating with offspring present | lactating with offspring present | LAC_OSP |
| uncertain if PY or YAH, dets sep rec | uncertain whether offspring is pouch young or young at heel (fully furred), offspring details recorded as a separate record | LAC_UNC |
| lactating | female with lactating teats - any mammal | LACTATNG |
| repro status not recorded | reproductive status was not recorded | NOT_REC |
| oestrus | oestrus, female reproductively active or receptive | OESTRUS |
| parous, not active (stained, dry) | marsupial female of breeding age, no pouch activity | PAR_NOAC |
| scrotal testes | testes visible in scrotal sac | SCR_TEST |
| suckling, dets of PY separate rec | suckling, with pouch young, details of PY recorded as a separate record | SUC_INDV |
| suckling PY attchd, lact teat, YAH absnt | suckling young attached, spare lactating teat, young at heel absent | SUC_LACA |
| suckling PY attchd, lact teat, YAH prsnt | suckling and lactating with pouch young and young at heel present | SUC_LACP |
| suckling, lact, YAH prsnt, YAH sep rec | suckling and lactating with pouch young and young at heel present, details of young at heel recorded as a separate record | SUC_LACY |
| suckling PY attached | young attached to mother's teat(s) | SUCKLING |
| suckling, lact, YAH absnt, PY sep rec | suckling and lactating with pouch young present and young at heel absent, details of pouch young recorded as a separate record | SUCP_LAC |
| undefined pouch activity | cannot determine pouch activity or activity does not fit any standard codes | UNDEFIND |
| undeveloped | female not yet reproductively mature | UNDEVLPD |
| developd pouch, no signs of use virginal | developed pouch but no signs of use - virgin mammal | VIRGINAL |

## ID method (insert in comments)

| Identification method | DESCRIPTION | ID CODE |
|---|---|---|
| **capture marked** | For temporary marks or non-unique marks - Marked to identify recaptures for this session only | CPMARKED |
| **individual id marked** | Use the animals body to provide the id by physically marking it (i.e., ear notch, digit removal, scale clip) | IDMARKED |
| **microchip implant, tags added** | Animal already has a microchip at capture, external tags have been added in this event | IMPL_TAG |
| **microchip implant** | No previous unique mark, implanted with microchip in this event | IMPLANT |
| **none** | No identification is taking place | NONE |
| **tagged, microchip implanted** | Animal already has an external tag at capture a microchip was implanted in this event | TAG_IMPL |
| **tagged (metal/plastic)** | Physically affix metal/plastic tag | TAGGED |

## All fate codes to be listed in comments section of data sheet

## Fate released*

| Fate | DESCRIPTION | Data sheet code |
|---|---|---|
| **released** | **released** | **RELEASED** |
| **minor casualty, released** | minor casualty, released | REL_CSLT |

## Fate — Unexpected death*

| Fate | DESCRIPTION | Data sheet code |
|---|---|---|
| **died during handling procedures** | died during handling procedures | DIED_HND |
| **deceased in trap** | deceased in trap | DIED_TRP |
| **euthanised, welfare, sharp blow to head** | euthanised for welfare reasons by sharp blow to back of head | EUW_BLOW |

## Fate — implants radio tags*

| Fate | DESCRIPTION | Data sheet code |
|---|---|---|
| **i-device surgically implanted, released** | i-device surgically implanted, released | REL_IDVS |
| **radio tag removed, released** | radio tag removed, released | REL_RTXR |

## Fate — Pouch Young*

| Fate | DESCRIPTION | Data sheet code |
|---|---|---|
| **mother + PY left in bag, failed** | mother + PY left in bag, failed | MPY_BAGF |
| **mother + PY left in bag, successful** | mother + PY left in bag, successful | MPY_BAGS |
| **PY taped in pouch, released, failed** | PY taped in pouch and released, failed | PCH_TAPF |
| **PY taped in pouch, released, successful** | PY taped in pouch and released, successful | PCH_TAPS |
| **PY taped + bagged, failed** | PY taped + bagged, failed | TP_BAG_F |
| **PY taped + bagged, successful** | PY taped + bagged, successful | TP_BAG_S |

## Fate — translocations*

| Fate | DESCRIPTION | Data sheet code |
|---|---|---|
| **translocated** | translocated | TLOC_STD |
| **translocated, after held in captivity** | translocated, after held in captivity | TLOC_CAP |
| **translocated, fitted with radio tag** | translocated, fitted with radio tag | TLOC_RTX |