

Guide to Writing Standard Operating Procedures (SOPs)

A Standard Operating Procedure (SOP) is a set of step by step instructions for carrying out a specific technique. They can be used for any technique, but this guide focuses on their use in documenting monitoring techniques, specifically for species and ecological communities.

SOPs are used in **Monitoring Protocols** (MoPs) to stipulate how the monitoring will be undertaken, and provide quality assurance that the data collected will be consistent and therefore comparable. They should be clear and concise but with enough detail so that users with a basic understanding but limited experience can reproduce the procedure.

For more information, see also:

[SOP – Frequently Asked Questions](#)

[SOP – Writing Tips](#)

[SOP – Template](#)

[SOP No 1.1 Preparation, review, approval and amendment of standard operating procedures\)](#)

The advantages of having a SOP is that they:

1. provide personnel with numbered step by step instructions on a specific procedure (or procedure used to carry out a method) with minimum variability;
2. ensure that the procedures are performed consistently and in compliance with government regulations;
3. protect the health and safety of personnel by enabling jobs to be carried out in the safest possible way. They ensure that all of the safety, health, environmental and operational information is available to perform specific procedures with minimal impact;
4. facilitate training in procedures, for both new personnel and for those that need re-training (ie. after extended absence from a position. Having step by step instructions aids trainers to ensure that nothing is missed;
5. serve as a historical record for use when modifications are made to that procedure and when the SOP is revised
6. promote quality through consistent collection of the data, even if there are changes in the people undertaking the monitoring; and
7. encourage improvements and work evaluation by ensuring that the procedures are completed, and can be used in incident investigations to improve operations and safety practices

It is not possible, nor practical to provide all the appropriate headings that could be used in a [template](#). The following guide has been developed for SOPs used to monitor species and ecological communities. This template can be found at [link](#).

This guide is designed to help personnel write SOPs using the [SOP for Nest Boxes for Monitoring Arboreal Mammals](#) as an example. These example appear in red text in the text boxes.

1 SOP Title

This is a description of the SOP. The title should be concise, but descriptive enough to indicate what technique the SOP provides instructions for.

Nest boxes for monitoring arboreal mammals

2 SOP No

A SOP will be allocated a SOP number after it has been reviewed and approved. The numbering system involves placing SOPs in categories (e.g. Fauna Observation, Fauna Capture, Remote Observation etc.) with a sequential number applied in each category. The first digit in a SOP number therefore refers to the category and the second digit refers to the specific SOP.

SOP No: 9.4 (Category 9 = Fauna Capture etc etc)

3 Prepared by

Identifies the personnel who prepared the SOP. The first author listed will be the author to which correspondence/enquiries will be directed unless otherwise indicated.

Name, Role/Position, Organisation/Branch, Address

4 Prepared for

Lists the organization or project for which the SOP has been prepared.

Department of Environment and Conservation's Animal Ethics Committee

5 Version

The version number is allocated when the SOP is approved. Version numbers increase incrementally by hundredths (e.g. version 1.1, version 1.2, ...etc) for minor changes. Major revisions should be designated with the next whole number (e.g. version 2.0, 3.0, 4.0 ...).

Version 1.0 (October, 2008)

6 Revision history log

This table records the version number, revision date, author and a brief summary of the changes that have been made to the SOP. The revision history log must be completed whenever an alteration to the version number is made (including approval for the first time).

Revision History Log

Version #	Revision Date	Author	Changes
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Revision History Log

Version #	Revision Date	Author	Changes

7 Approved by

Identity of the personnel approving the SOP for distribution and use.

<p>_____ Date: _____</p> <p>Dr Peter Mawson Principal Zoologist, DEC Species and Communities Branch Chair, DEC Animal Ethics Committee</p>
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8 Acknowledgements

Lists any other personnel (e.g. reviewers) or documents which aided in the preparation of the SOP.

This standard operating procedure was written utilising information contained in the 2007 Fauna Management Course Manual and the 1997 Western Shield Operational Fauna Monitoring Protocols. The authors would like to acknowledge the contributions of the following reviewers in improving the content of this standard operating procedure: Peter Orell and Peter Mawson. This document has been reviewed by the Department of Environment and Conservation Animal Ethics Committee.

9 Table of contents

A table of contents is needed for quick reference and to locate information. The template has been designed to make this easy to create and update, provided that consistent formatting is used within the template.

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10 Purpose

This is an introductory section to provide background information on the procedure. It explains why the SOP has been written and what the SOP is to be used for.

Some small mammals that use tree hollows and that are not readily caught in cage traps or Elliott traps can be monitored by erecting nest boxes. These species include brush-tailed phascogale (*Phascogale*

tapoatafa), yellow-footed antechinus (*Antechinus flavipes*) and western pygmy possum (*Cercartetus concinnus*).

This standard operating procedure (SOP) provides advice on the use of nest boxes for monitoring arboreal mammals.

11 Scope

This section identifies the agencies and jurisdictions to which the SOP will apply. It specifies which situations the SOP will and will not apply to, and identifies those personnel who should be familiar with its content.

This SOP applies to all fauna survey and monitoring activities involving the use of nest boxes for arboreal mammals undertaken across the State by the Department of Environment and Conservation (DEC). It may also be used to guide fauna monitoring activities undertaken by NRM groups, consultants, researchers and any other individuals or organisations. All DEC personnel involved in monitoring using nest boxes should be familiar with the content of this document.

This SOP complements the *Australian code of practice for the care and use of animals for scientific purposes* (The Code). The Code contains an introduction to the ethical use of animals in wildlife studies and should be referred to for 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/>). In Western Australia any person using animals for scientific purposes must be covered by a licence issued under the provisions of the Animal Welfare ACT 2002, which is administered by the Department of Local Government and Regional Development.

12 Definitions

This section should contain a list of any terms contained in the SOP that may be unfamiliar to, or misinterpreted by the reader. These must be in alphabetical order. References should be provided wherever possible.

Animal handler: A person listed on an application to the DEC Animal Ethics Committee who will be responsible for handling animals during the project.

Arboreal: An arboreal animal is one which spends large amounts of time inhabiting or frequenting trees.

Nest box: A man-made structure designed to meet the needs of hollow-dependent species for nesting and shelter. They can be made so that occupants can be observed and monitored.

13 Approved methods

Briefly describe the methods that are approved and covered by the SOP. This section can be deleted if the SOP only covers one technique.

14 Procedure outline

In this section each specific task required to perform the procedure should be identified, listed and labeled. The easiest way to write this section is to perform the task, writing down each step as it is performed, in the same way that a recipe would be written for making a cake.

The procedure outline should describe when and how all aspects of the procedure are done, including troubleshooting tips. It can contain diagrams, photos, charts or tables. Users tend to have difficulty with long SOPs, so if the procedure is more than 10 steps long, break major tasks undertaken into subheadings. Other SOPs may be referred to if required.

When writing the SOP, you should consider:

1. what is needed before starting the task, the materials needed and how they are used;
2. health and safety considerations, and specify them at the appropriate steps;
3. whether there may be two methods which must be done at the same time. This needs to be clearly stated so that there is no confusion;
4. providing personnel with alternative steps if there is a possibility that a step may not work (ie. under specific circumstances);
5. the time that the task may or should take, or how long it should be performed for this should be clearly stated; and
6. using drawings or graphics, as well labeled drawings are sometimes better than text – a picture tells a thousand words!

14.1 Nest box construction and installation

(a) Nest boxes for arboreal mammals are constructed preferably of rough Jarrah or other Australian native hardwoods for longevity but may also be constructed of softwoods (but not softwoods treated with toxic preserving chemicals such as copper or arsenic). The external dimensions are 220mm x 220mm x 220mm (the back may be 270mm to provide a sloping roof). The entrance hole diameter should be 35mm. The lid should be hinged from the front with enough overhang so that when the lid is opened the overhang blocks the entrance hole. (See Figure 1).

Note: Different entrance hole diameters have been trialled and the size influences which species will utilise the nest box. Diameter size of 35mm was used by Rhind (1998) for her PhD study of the ecology of brush-tailed phascogales in the jarrah forest of southwestern Australia.

(b) Nest boxes should be filled two thirds with nesting material consisting of dry shredded Jarrah bark or similar.

(c) Nest boxes should be fastened to tree trunks 3-5m above ground level, positioned to provide shelter from the sun and rain. They need to be accessible by ladder and trees should be selected with this in mind. Fasten the nest box side on to the tree for ease of opening and inspection (Figure 1).

(d) Nest box locations (eg transect vs grid and number of traps) will be determined by the purpose of the study.

Example:

Nest boxes spaced at 200-300m intervals along vehicle tracks have been monitored as part of Western Shield. At least 10 nest boxes are used at each site. Location of nest box transects include Julimar, Mundaring, Serpentine,

Huntley, Dwellingup, Kingston and Perup/Yendicup. These transects monitor presence/absence and provide an index of occupation/activity.

- (e) Nest boxes must be numbered.
- (f) Optional: A small strip of hair tube wafer or double sided tape may be attached to the entrance of the nest box for collection of guard hairs that may be used to identify species using the nest box.

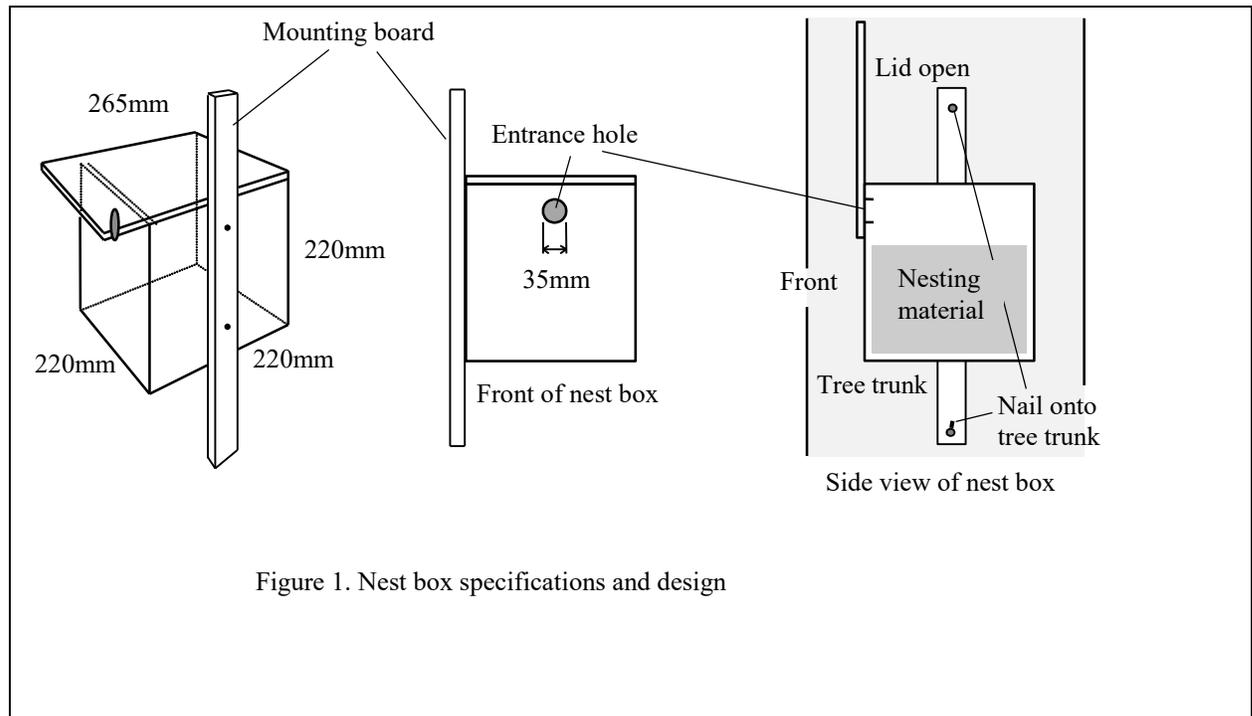


Figure 1. Nest box specifications and design

14.2 Checking nest boxes and data collection

- (a) Nest boxes can be left for long periods of time without checking, however, they should be monitored twice a year in January/February and in June.
- (b) Spare nest boxes should be kept on hand to replace any damaged ones.
- (c) The nest box entrance must be blocked during the inspection and for a short time after inspection to reduce the chance of escape and possible predation if nocturnal animals are disturbed during the day.
- (d) Animals that are in the box at the time of checking will be captured by hand (see SOP AEC3.12 for further advice on hand capture), removed from the box, identification confirmed and other observations and measurements taken. The animals are to be returned to the nest box.
- (e) Minimum data requirements are: date; location; nest box no.; signs of animal presence (scats, fur, etc, collect for identification) and probable species, or, if present, species of animal, number and sex of individuals if possible.
- (f) Data should be recorded on the Western Shield Nest Box Data Sheet and data entered into Fauna File.

Potential animal welfare impacts of nest boxes include:

- Trauma (e.g. accidental injuries inflicted during hand capture)
- Hypothermia (e.g. due to poor positioning of nest box)
- Hyperthermia (e.g. due to poor positioning of nest box)
- Dehydration (e.g. due to poor positioning of nest box)
- Distress (e.g. caused by hand capture)
- Predation (e.g. due to increased vulnerability of nocturnal animals being released during the day)

Positioning of the nest box can greatly affect their usability and impact the comfort of occupants.

The negative impacts of nest boxes on the welfare of animals are low and are potentially an overall positive impact in areas where natural hollows are scarce due to clearing or logging.

15 Level of Impact

The next two sections are for projects involving fauna only. The level of impact will determine the level of scrutiny the projects using the procedure will receive from the Animal Ethics Committee. You need to ask yourself if the procedure will have a potentially high, medium or low impact on animals and whether the procedure can be managed to reduce the level of impact.

16 Ethical Considerations

This section covers the issues that the Animal Ethics Committee will be reviewing, to ensure that the project proponents have adequately assessed them and put in place management strategies to minimise the impact on the animal.

To reduce the level of impact of nest boxes on the welfare of animals there are a number of ethical considerations that should be addressed throughout projects involving these procedures. DEC projects involving nest boxes for monitoring will require approval from the DEC Animal Ethics Committee where appropriate the following ethical considerations must be adequately covered in any Application for Approval to Undertake Research Involving Vertebrate Animals.

16.1 Handling time

To ensure minimal stress to the animals they should only be handled for as long as required to identify them and to collect any necessary measurements (usually no more than five minutes). If animals are in poor condition when handling it may be advisable to offer sugar water prior to release.

16.2 Young in nest box

If young are encountered in the nest box disturbance should be kept to a minimum.

16.3 Prescribed fuel reduction burning

Animals in nest boxes may be at risk from fire, particularly hot autumn fires. If a prescribed burn is scheduled for areas with nest box sites, all nest boxes must be checked 6 months before burning. Animal occupants should be removed and the entrance holes blocked. If nest boxes are occupied by female individuals with dependent young, these should be left and re-checked in one to two months time. Hollow users generally have a selection of other hollows which they use and will not be adversely affected by being barred from the nest boxes.

Rake away all dry fuel within 2 m of the supporting tree trunk prior to the burn commencing.

Nest boxes should be reopened after the burning is complete.

17 Competencies and Approvals

In this section, details of all permits, licenses and experience which personnel must have prior to the procedure being carried out should be provided. This ensures personnel are trained and experienced in the procedure and identifies where training is required.

DEC personnel, and other external parties covered by the DEC Animal Ethics Committee, undertaking nest box monitoring projects require approval from 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 nest boxes 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 the 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 1: Competency requirements for Animal Handlers of projects using nest boxes to monitor arboreal mammals.

Competency Category	Competency Requirement	Competency Assessment
Wildlife licences	1.1 Licence to take fauna for scientific purposes (Reg 17) OR 1.2 Licence to take fauna for educational or public purposes (Reg 15)	Provide SC licence number Provide TF licence number
Formal qualifications and course certificates (Note: Suitable levels of skills/experience can substitute for formal training requirements)	3.5 TAFE qualifications in fauna management and handling OR 3.7 CALM Mammal Conservation Course (1992-1995) OR 3.8 CALM/DEC Fauna Management Course (1997-)	Provide course year, TAFE facility Provide course year Provide course year
General skills/experience	5.1 Relevant knowledge of species biology and ecology	Personnel should be able to correctly identify the likely species to be encountered when checking nest boxes. Familiarity with biology and ecology of target species will assist in project design and positioning nest boxes. This knowledge may be gained by sufficient field experience and/or consultation of literature. Estimated total time in field: Minimum 1 year involved in similar projects.

<p>Animal handling and processing skills/experience</p>	<p>7.1 Experience in handling terrestrial mammal fauna</p>	<p>Personnel should be confident at hand capture and handling of species likely to be encountered when checking nest boxes. This experience is best obtained under supervision of more experienced personnel.</p> <p>Estimated total time in field: Minimum 2-5 years involved in similar projects.</p>
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18 Health and Safety Considerations

This section outlines all the hazards and risks (e.g. chemical, physical, biological, radiation) specific to the procedure along with treatments and solutions on how to avoid or minimise these risks (e.g. personal protective equipment etc). Refer to any MSDS sheets which are available for any chemicals used.

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 monitoring using nest boxes at your site. This safety analysis should include the following considerations.

18.1 Animal bites, stings and scratches

It is important to remember that occupants of the nest box may not welcome being disturbed and may inflict bites, stings or scratches. Bees, spiders and other invertebrates may be disturbed by checking nest boxes and can inflict irritating stings or bites. Arboreal mammals can also inflict minor injuries during hand capture. All injuries should be appropriately treated as soon as possible to ameliorate possible allergic reaction, prevent infection and promote healing.

If DEC personnel or volunteers are injured an "Incident and Near Hit Notification" form must be completed and forwarded to DEC's Risk Management Section.

18.2 Zoonoses

There are a number of diseases carried by animals that can be transmitted to humans (ie zoonoses such as Toxoplasmosis, Leptospirosis, Salmonella etc). 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 Chapman *et al.*, (2008).

18.3 Use of a ladder

Take care when positioning the ladder to check nest boxes to ensure that it is stable and in a suitable position for easy access to the nest box. Avoid use in wet weather when the ladder may be slippery.

19 Further reading

List any other SOPs referenced in the document or related to the procedure. Other recommended reading may also be suggested in this section.

The following SOPs have been mentioned in the advice regarding use of nest boxes. It is recommended that the following SOPs are also considered when proposing to undertake monitoring using nest boxes.

SOP 9.6 Hand capture of wildlife (In preparation as at February 2009)

Additional information on the use of nest boxes for monitoring fauna may be found in Beyer and Goldingay (2006) who reviewed published literature and assessed the research and management value of using nest boxes for arboreal marsupials.

20 References

Any material taken from other peoples work must be acknowledged in this section as well as cited within the SOP using the standard referencing format.

Beyer, G.L., and Goldingay, R.L. (2006). The value of nest boxes in the research and management of Australian hollow-using arboreal marsupials. *Wildlife Research* **33**, 161–174.

Chapman, T., Sims, C. and Mawson, P. (2008). *Minimising Disease Risk in Wildlife Management. Standard Operating procedures for fauna translocation, monitoring and euthanasia in the field.* 2nd edition. Department of Environment and Conservation, Perth. Available electronically at: http://calmweb.calm.wa.gov.au/bigpic/aec/PDF/disease_risk_management.pdf. Last accessed 3/9/2008.