Standard Operating Procedure

SC22-26 NEST BOXES FOR MONTIORING ARBOREAL MAMMALS

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 1.2

February 2023

GOVERNMENT OF WESTERN AUSTRALIA

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Revision History Log

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1.1	16/05/2017	Minor revision	G. Yeatman and M. Page	M. Page	August 2017
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Approved by the DBCA Animal Ethics Committee: Martin Dziminski Digitally signed by Martin Dziminski Date: 2023.02.08 17:03:55 +08'00'

Dr Martin Dziminski
Chair, Animal Ethics Committee
Department of Biodiversity, Conservation and Attractions

Contents

1 Acknowledgements

This standard operating procedure was originally developed by Christine Freegard and Vanessa Richter, with contributions from Peter Orell and Peter Mawson.

2 Purpose

Some small mammals that use tree hollows and that are not readily caught in cage traps or Elliott traps can be monitored by using nest boxes (Figure 1). These species include, but are not limited to, red-tailed phascogale (*Phascogale calura*), south-western brush tailed phascogale (*P. tapoatafa wambenger*), 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.

Figure 1 Nest box attached to jarrah tree. Photo: Christine Freegard/DBCA

3 Scope

This SOP has been written specifically for scientific and education purposes, and endorsed 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 the monitoring of arboreal mammals using nest boxes undertaken across Western Australia by DBCA (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 nest boxes should be familiar with the content of this document.

Projects involving wildlife may require a licence and an authorisation under 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 *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 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 (http://www.nhmrc.gov.au).

4 Animal Welfare Considerations

To reduce the level of impact of nest box monitoring 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, and to ensure that contingencies for managing welfare issues have been identified. Ensure that all handlers and volunteers involved in the project are aware of the range of issues that they may encounter, the options that are available for reducing impact and improving animal welfare, and the process for managing adverse events.

Department projects involving nest boxes for monitoring of arboreal mammals will require approval from the department's Animal Ethics Committee.

The key animal welfare considerations that should be considered when nest box monitoring 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 Animal Ethics Committee, adverse events must be reported in writing to the AEC Executive Officer as soon as possible after the event by completing an *Adverse Events* form. Guidance on field euthanasia procedures is described in the department SOP for *Euthanasia of Animals Under Field Conditions.* Where disease may be suspected, refer to the department SOP for *Managing Disease Risk and Biosecurity in Wildlife Management* for further guidance.

4.2 Level of impact

Potential animal welfare impacts of nest box monitoring include:

- Trauma (e.g. accidental injuries inflicted during hand capture)
- Hypothermia or 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 useability 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.

5 Procedure Outline

5.1 Nest box construction and installation

(a) Nest boxes for arboreal mammals should preferably be constructed of rough sawn Jarrah or other Australian native hardwoods for longevity but may also be constructed of softwoods.

ANIMAL WELFARE: Avoid using treated timber, toxic paints, chipboard or smelly glues. Ensure there are no sharp edges or protruding nails.

(b) Design and dimensions will vary depending on the requirements of the target species. Personnel should research the most appropriate nest box design for the target species. Factors to consider include the size, depth and shape of the box, size and position of the entrance hole (e.g. low positioned holes could be blocked by nesting material), and position of the nest box in the environment.

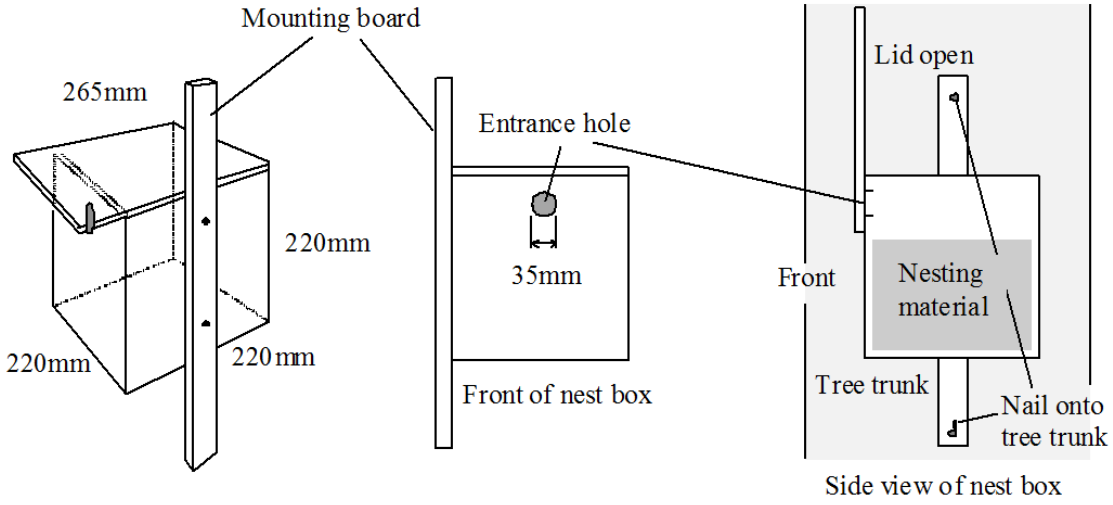

Figure 2 Example of nest box design and specifications

(c) Nest boxes should be well ventilated and have good drainage (a small gap under the roof or a few small holes in the floor is sufficient).

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

(e) Nest boxes should be securely fastened to tree trunks 3-5 m above ground level, positioned to provide shelter from the sun and rain (see Figure 3). 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.

ANIMAL WELFARE: Nest boxes can be strongly influenced by ambient temperatures and solar radiation and can reach temperatures several degrees higher than natural tree hollows. Thermal properties of the nest boxes must be considered during the design and installation phase of the project to enhance the suitability of the nest box to the target species. Nest boxes will likely be of limited value if they consistently reach temperatures exceeding species' upper critical temperatures (Rowland *et al*. 2017).

ANIMAL WELFARE: Animals in nest boxes may be at risk from fire. Rake away all dry fuel within 2 m of the supporting tree trunk when installing / checking nest boxes and prior to any prescribed burn commencing to reduce the chance of the nest box being burnt.

(f) Nest box survey design (e.g. transect vs. grid and number of traps) will be determined by the purpose of the study.

(g) Nest boxes must be numbered.

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 3 Nest box installed in a jarrah tree. Photo: Christine Freegard/DBCA

5.2 Checking nest boxes and data collection

(a) Nest boxes can be left for long periods of time without checking; however, they should ideally be monitored twice a year.

(b) 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.

(c) If required, animals that are in the box at the time of checking may be captured by hand (see department SOPs *Hand Capture of Wildlife* and *Hand Restraint of Wildlife* for further advice), removed from the box, identification confirmed, and other observations and measurements taken. The animals must then be returned to the nest box.

ANIMAL WELFARE: 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).

ANIMAL WELFARE: If young are encountered in the nest box, disturbance should be kept to a minimum. It is better to forego measurements on young animals than risk injury or having the mother abandon them.

(d) Minimum data requirements are: date, location, nest box number, 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.

(e) Data should be recorded on a Data Sheet and entered into a database.

5.3 Nest box condition and maintenance

Nest boxes can deteriorate over time, or parts can become damaged. Frequency of maintenance or replacement, and associated costs, need to be considered when planning a nest box monitoring project. An end-of-project plan that outlines what will happen to nest boxes once the monitoring project ceases should also be identified in the project's planning stages.

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 Animal Ethics Committee, undertaking projects involving the use of nest box monitoring require approval from the Committee and will need to satisfy the competency requirements detailed in Table 1. This is to ensure that personnel involved have the necessary knowledge and experience to minimise the potential impacts of nest box monitoring 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 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 1 provides advice for standard monitoring only.

Table 1 Competency requirements for Animal Handlers of projects using nest boxes to monitor arboreal mammals.

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). 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 in nest boxes for the site(s) being studied, and have an understanding of the species' biology and ecology. This knowledge may be gained through sufficient field experience and

Competency category	Competency requirement	Competency assessment
		consultation of field guides and other literature.
	Understanding environmental conditions	Personnel should be aware of the environmental and seasonal conditions that may be expected on the project, and understand location-specific animal welfare considerations. In applications, provide details of time spent undertaking similar work in similar locations.
Fauna survey and capture skills/experience required	Experience installing and checking nest boxes	Personnel should be familiar with the animal welfare principles of nest box monitoring (e.g. box design principles, appropriate locations for nest box installation, frequency of nest box checking). In applications, provide details on the longevity, frequency & recency of experience.
Animal handling and processing skills/experience required	Experience handling arboreal mammals	Personnel should be experienced at hand retrieval from nest boxes and restraint of the range of species likely to be captured. This experience is best obtained under supervision of more experienced and competent personnel. In applications, provide details on experience relating to the expected species or species groups.
	Experience managing disease risk in wildlife management	Personnel should be familiar with hygiene procedures. This knowledge may be gained through sufficient field experience and consultation of literature.

7 Approvals

A licence or authorisation may be required under the *Biodiversity Conservation Act 2016* (examples below). 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.

- 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.

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 to undertake monitoring using nest boxes.

- Department SOP *Hand Capture of Wildlife*
- Department SOP *Hand Restraint of Wildlife*
- Department SOP *First Aid for Animals*
- Department SOP *Euthanasia of Animals Under Field Conditions*
- Department SOP *Managing Disease Risk and Biosecurity in Wildlife Management*

For further advice refer also to:

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(3): 161-174.

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.

10 References

Rowland, J. A., Briscoe, N. J., & Handasyde, K. A. (2017). Comparing the thermal suitability of nest-boxes and tree-hollows for the conservation-management of arboreal marsupials. *Biological Conservation*, 209, 341-348.

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.

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. It can be made so that occupants can be observed and monitored.