Learning from nest boxes – monitoring and storing data

	A	B	
1	Nest box label	Type of box	D ins
2	ARI001	BTP/SG	1/0
3	ARI002	BTP/SG	1/0
4	ARI001	BTP/SG	1/0
5	ARI002	BTP/SG	1/0

Nest boxes (artificial shelter, refuge, nest and den sites) can be of benefit to native wildlife, but we can learn more about these benefits if we monitor their use, and analyse the data collected.

This fact sheet is for those who are considering installing or have installed nest boxes, and/or are responsible for their monitoring and maintenance. It provides an overview of what to monitor and record to help assess nest box effectiveness as a conservation tool. This guide should be considered by those planning to apply for funding under the Department of Environment, Land, Water and Planning (DELWP) Community & Volunteer Action grants.

The effectiveness of nest boxes

A number of studies have contributed to our knowledge of nest box design, use by wildlife and contribution to conservation outcomes, but there remains a great deal to learn. The use of nest boxes by wildlife should be carefully interpreted, for example, the presence of a species in nest boxes does not necessarily equate to an increase in their population size.

There are many nest boxes installed across Victoria with more than 10,000 identified in a DELWP 2018 stocktake - a great potential source of data.

Why are you installing nest boxes?

When using nest boxes, it is important to clarify your objective. What species (single or multiple) are you trying to target and why?

For example:

- Provide additional habitat for hollow-dependent fauna such as small arboreal mammals, birds or bats in areas where hollows are absent or in short supply
- Support the persistence or reintroduction of a species
- Targeted research to determine the presence of a species or to track changes in populations

Also think about how to determine whether your nest boxes are achieving these objectives. This will help in deciding how many boxes to install and where to place them.

Why monitor and store nest box data?

The effectiveness of nest boxes cannot be known unless their use is monitored. Collecting data on nest box use gives the potential to determine whether they are achieving their purpose, and to explore the factors that may influence their success. Ideally, large nest box programs should be designed in a way to enable your objective to be assessed. Habitat and fauna surveys may be needed to complement nest box data. While the capacity to do this may be limited, collecting meaningful data can contribute to increasing knowledge about nest box use and effectiveness. This in turn leads to better design, placement and impact of boxes for the benefit of wildlife.

By collecting good quality nest box data we can determine:

- Whether the target species is using the box over time, including for breeding
- Occupancy rates, frequency of use, proportion of use by different species, pattern and timing of use
- Whether boxes are only supporting common species or are also used by species of conservation concern
- Use of the nest boxes by pests (e.g. feral bees, Common Myna)
- Suitability of designs, and maintenance needs and cost

All the above help to inform how effective nest boxes are at contributing to the conservation of a species.

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What to record about individual nest boxes

Many factors could influence the use of nest boxes. Recording the following aspects is recommended as a minimum:

- **Target fauna** – what species are you trying to provide habitat for or study?
- **Nest box characteristics** – nest box identification (unique identifier), type of box (what animal is it designed for?), material that the box is made from, size of entrance, colour of box, any modifications made to boxes (e.g. to prevent pests).

Nest box location – site name, geographic location coordinates (need to be precise, e.g. recorded using a GPS) and datum (e.g. GDA 94, WGS 84), name of park, forest, property, name of locality. A map can be useful to find boxes later.

Using a GPS for recording precise location coordinates will ensure accuracy and help find nest boxes later (Photo: Phoebe Macak)

- **Nest box installation details** – the date each box was installed, type of tree (or other structure) on which the box was installed (species level if possible), direction that the box faces (i.e. north, north-east etc.), direction that box entrance faces, height above ground, and how the box is attached.

What to record about nest box use

Before checking boxes, become familiar with how to identify the species you may find, and what their nests look like. It will help minimise disturbance to animals if you can make an identification quickly. Aim to check all the boxes on the same day to avoid recording the same animal multiple times (individuals may use several boxes).

Always record:

- The date of nest box check
- The name and location of the nest box (to confirm details and avoid mix-ups)
- Who checked the box.

- **Monitoring regime** – try to be consistent with how often and the time of year that boxes are checked. Seasonal differences should be considered, for example, breeding activity in spring may increase nest box use.
  - Regular checking will increase the amount of data collected and help identify whether boxes are achieving their specific objective, but must be balanced with an increased risk of disturbing animals.
  - Opportunistic observations can be useful too and should also be recorded.
- **What is in the box** – record what was found in the box, including if it was empty or whether there were signs of use:
  - Species (how many individuals). Also include notes on any pests
  - Nests (identify if possible, describe shape and materials) or droppings
  - Consider taking a photo of box contents for confirmation of identification (these can be passed on for expert opinion). Minimise the use of a flash as much as possible. Ensure the photo can be linked to the individual box.

This photo of nest box contents shows a typical Brush-tailed Phascogale nest: this can be identified and recorded as a sign of use by this species (Photo: Jess Lawton)

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- **Condition of box and maintenance details** – boxes can deteriorate over time, or parts can become damaged. How often they need fixing or replacing, and the associated cost, needs to be considered when planning a nest box program. Record:
  - The condition of the box and whether repairs are needed
  - When and what repairs are undertaken

  This can also provide information on the durability and suitability of materials.

  Ants and pests, such as Common Mynas and feral bees, may need to be controlled if they occupy the nest box.

The lid and bottom of this possum nest box need to be replaced, and other maintenance may be required, for it to be returned to a condition suitable for use (Photo: Fern Hames)

- **How boxes are checked** – record if boxes were checked internally (e.g. using a camera on a pole, or by physically lifting the lid and looking inside), or externally (e.g. from the ground, or by survey cameras aimed at the entrance).

This box will be checked by someone climbing a ladder and physically lifting the lid to look inside (Photo: Jess Lawton)

Including a 'notes' section can be useful to record extra observations that might be important (e.g. a recent fire).

Consistency of recording is essential – if there are multiple people involved, make sure everyone is trained to fill out data sheets correctly and accurately.

Safety

Installing and checking nest boxes is a potentially hazardous activity involving working at height and lifting heavy items. Assess your capacity to safely undertake these tasks. A qualified arborist may be needed. Dangerous animals can occupy nest boxes including bees, wasps, spiders, snakes and biting native animals. Avoid working alone, wear protective clothing, carry first aid and maintain communication.

This feral bee-infested nest box (above) was removed by experienced beekeepers (below); the bees were later transferred to a hive (Photos: Friends of Glenfern Valley Bushlands)

Ethics and permits

Wildlife should be able to live free of unnecessary interference by humans, particularly if there is a risk to wildlife safety or health, or a risk of pain or suffering.

A permit is required if animals are to be handled.

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Data sheets and storing nest box data

Designing data sheets (hard-copy or electronic) that are clear and simple to fill out in the field, and follow a logical flow of observations as they are collected, will help ensure all relevant information is included.

Data collection forms should also be designed for easy entry into an electronic database (e.g. MS Excel spreadsheet) for storage. Matching the information flow between field data sheets and the spreadsheet will help make data entry easier, minimising errors and the chance of information being missed.

Set out information in your database in a way that it can easily be extracted and summarised, and that multiple dates of individual box checks can be linked.

In this example of nest box observations in MS Excel, categories are arranged as column headings across the top, with rows for data entry for each individual box on each survey date. Note the use of abbreviations, and that some nest box characteristics, such as the type of box and tree installed on, are always included – useful for cross checking.

	A	B	C	D	E	F	G	H
1	Nest box label	Type of box	Date installed	Tree	Date checked	Name	Species	Number of individuals
2	ARI001	BTP/SG	1/01/2017	E. microcarpa	5/06/2017	PVM	empty	n/a
3	ARI002	BTP/SG	1/01/2017	E. microcarpa	5/06/2017	PVM	SG	2
4	ARI001	BTP/SG	1/01/2018	E. microcarpa	5/12/2017	PVM	CRP	1
5	ARI002	BTP/SG	1/01/2018	E. microcarpa	5/12/2017	PVM	empty	n/a

Characteristics for individual nest boxes (or metadata) can be stored in a separate sheet. Setting out the spreadsheet in the same format will enable observations of individual nest boxes to be linked to their characteristics.

Example of nest box metadata, including location and tree installation details.

	A	B	C	D	E	F	G	H	I
1	Nest box label	Date installed	GDA Zone	Easting	Northing	Type of box	Tree	Height (m)	Tree side
2	ARI001	1/01/2017	55	329263	5819929	BTP/SG	E. microcarpa	4	SE
3	ARI002	1/01/2017	55	329331	5819903	BTP/SG	E. microcarpa	3.5	SE

Submitting nest box data

Submitting species records to public databases such as the Victorian Biodiversity Atlas is encouraged, as these datasets contribute to conservation decision making.

More information can be found on the DELWP website:

https://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

Further information

The following sources may help with planning a nest box program, and identification of animals.

Goldingay, R.L., Rueegger, N.N., Grimson, M.J., Taylor, B.D. (2015) Specific nest box designs can improve habitat restoration for cavity-dependent arboreal mammals. *Restoration Ecology* 23: 482–490

DELWP (2018) Nest box guide: general use. Fact sheet. Department of Land, Water and Planning, East Melbourne
https://www.ari.vic.gov.au/__data/assets/pdf_file/0024/328191/Nest-box-fact-sheet-general-guide.pdf

Menkhorst, P.W. and Knight, F. (2011) A field guide to the mammals of Australia. 3rd edition. Oxford University Press, South Melbourne

Menkhorst, P., Rogers, R., Clarke, R., Davies, J., Marsack, P. and Franklin, K. (2017) The Australian bird guide. CSIRO Publishing, Clayton South

BirdLife Australia's bird finder:
http://www.birdsinbackyards.net/finder

NatureKit:
https://www.environment.vic.gov.au/biodiversity/naturekit

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Header image: bat box (Photo: Annette Muir), nest box with owlet nightjar (Photo: Peter Menkhorst), example of nest box data, Brush-tailed Phascogale in a nest box (Photo: Jess Lawton)

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