

# Standard Operating Procedure

## SC23-05 USING ARTIFICIAL NEST BOXES TO MONITOR LITTLE PENGUINS (*EUDYPTULA MINOR*)

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 1.1

June 2023



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June 2023

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Chair, Animal Ethics Committee  
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# 1 Acknowledgements

This standard operating procedure was originally developed by Erin Clitheroe and Belinda Cannell, based on methods and techniques used by Dr Barbara Wienecke and Dr Belinda Cannell.

## 2 Purpose

Artificial nest boxes are a commonly used method for monitoring species that use cavities such as burrows or hollows for nesting and shelter. Little penguins (*Eudyptula minor*) on Penguin Island, Western Australia, have been monitored using artificial nesting structures since 1986 (Figure 1). Artificial nests allow researchers and the Department of Biodiversity, Conservation and Attractions to access nests and collect data without the risk of damaging natural burrows or nesting habitat. This standard operating procedure (SOP) provides advice on the use of nest boxes for monitoring little penguins in Western Australia.



Figure 1: Typical nest box used by little penguins on Penguin Island.

## 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 all fauna survey and monitoring activities involving the use of nest boxes for monitoring little penguins 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 use of nest boxes for monitoring little penguins should be familiar with the content of this document.

Projects involving wildlife may require a licence/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 in wildlife studies 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 Definitions

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

**PIT tag:** An internally placed Passive Implant Transponder (PIT) also known as a microchip. The tags are inserted subcutaneously into the penguin using a pre-loaded needle applicator. The tags are pre-programmed with a PIT tag number that can be read using an appropriate scanner.

**Nest box:** A man-made structure designed to meet the needs of cavity nesting species for shelter. They are often used as a means of observing and monitoring occupants.

## 5 Animal Welfare Considerations

To reduce the level of impact of nest monitoring on the welfare of penguins, personnel must consider, address and plan for the range of welfare impacts that may be encountered. Strategies to reduce impacts should be identified both prior to, and during, the monitoring season to ensure that they can be readily implemented during field work. All handlers and volunteers 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 nest box monitoring projects will require approval from the Department's Animal Ethics Committee.

Key animal welfare considerations that should be considered are listed below.

### 5.1 Injury and unexpected deaths

If adverse events including injury, unexpected deaths or euthanasia occur then it is essential to consider the possible causes and take action to prevent further incidents. 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.

### 5.2 Level of impact

Potential animal welfare impacts of nest box monitoring of penguins include:

- Trauma and distress during hand capture and processing

- Hyperthermia (clinical overheating)
- Complications of microchipping (e.g. pain, incorrect insertion, infection)
- Injury or death of chicks due to incorrect handling technique
- Abandonment of eggs or chicks due to inappropriate monitoring technique, frequency or duration.

If correct monitoring procedures are followed, the processing and microchipping of penguins should have minimal negative impacts on nesting penguins.

## 6 Ethical considerations

To reduce the level of impact of monitoring nest boxes on the welfare of animals, there are a number of ethical considerations that should be addressed. Department of Biodiversity, Conservation and Attractions projects involving nest boxes for monitoring will require approval from the Department's AEC, a nominated Animal Ethics Committee. Where appropriate the following ethical considerations must be adequately covered in any application being submitted for approval.

### 6.1 Monitoring frequency

It is possible for projects involving nest box monitoring to be running concurrently. For each project, nest boxes should be monitored fortnightly, however, monitoring on alternate weeks (resulting in weekly nest box checks) may be permitted. The highest frequency of nest box monitoring when multiple projects are undertaken should be no more than once a week (as per Wienecke 1993, Wienecke 2000). Communication between project leaders is essential to determine the appropriate timing of nest box checks. Investigators should also consider the impact that such frequent nest disturbance may have on the penguins, and consider whether potential overlap between studies could lead to data sharing and result in lower monitoring frequency.

### 6.2 Handling time and technique

To minimise stress or injury, penguins should only be handled for as long as required to identify them and to collect necessary measurements. This should not take longer than five minutes. Correct handling technique should be followed at all times and under supervision of experienced staff/ handler.

### 6.3 Eggs present in nest

It is acceptable to process birds that are incubating eggs, however care must be taken when removing the adult from the nest to avoid damaging the eggs in the process. Remove adult penguin quickly but gently and ensure the penguin is returned to box through the entryway.

### 6.4 Young in nest box

When chicks are present in the nest then an assessment of age is required before handling. This is to reduce the risk of accidental injury to chicks as a result of removing the adult. If chicks are less than five days old (see Appendix II for aging guide) then penguins should not be disturbed (unless necessary for specific demographic measures), and only the contents of



the nest recorded. If older than five days then the adult/s and chicks can be removed for processing but this must be done with care.

## 6.5 Temperature

Little penguins are susceptible to hyperthermia. Prior consideration of the air temperature is essential before undertaking monitoring activities. Monitoring should not be done if the temperature will exceed 30°C. When processing penguins, ensure that birds are sufficiently shaded; either naturally or by positioning your body in a way that shades the animal. If a penguin appears heat stressed (rapid panting), immediately return penguin to the box.

## 7 Equipment

The following equipment forms the base kit required for this activity:

1. Calipers (minimum length 100mm and minimum accuracy 0.01mm)
2. 2 x large weigh bags (20cm x 30cm)
3. 1 x small weigh bag (15cm x 20cm)
4. 2500g hanging scales
5. 500g hanging scales
6. Tool box or similar for transportation of equipment
7. PPE (gloves, glasses, long sleeve shirt and long pants, closed in shoes)
8. Data sheet (Appendix 1), pencils and erasers
9. PIT scanner
10. PIT tag applicators
11. Hand sanitiser
12. Basic first aid supplies (i.e. Band-Aids, wound cleansers)

## 8 Procedure outline

### 8.1 Timing and frequency of nest box checks

Nest boxes should be checked once a fortnight throughout the breeding season (April – December). As boxes are occupied by nesting penguins throughout the day there is no need to complete monitoring within a specific time. On days where temperatures are high (>30°C) monitoring should be either postponed to an alternate day when the weather may be cooler, or, completed before temperatures reach 30°C.

### 8.2 Preparation prior to fieldwork

- a) Nest box locations should be numbered and marked using a GPS.
- b) Any new nest boxes should be installed, and existing nest boxes inspected and maintained, before the breeding season commences.
- c) Obtain sufficient number of PIT tag applicators and scanner. Ensure scanner is in good working order with a full battery and PIT tags are in date and sealed.
- d) Collect remaining equipment and place everything in tool box.
- e) Check other equipment is in good working order. e.g. if using digital callipers, ensure batteries are charged and ensure scales are calibrated.

- f) Check sufficient number of data sheets and pencils.
- g) Ensure all equipment, and the hands of penguin handlers, are clean and sterilised before, between nest boxes and after monitoring (refer to the Department SOP for *Managing Disease Risk and Biosecurity in Wildlife Management*).

### 8.3 Checking nest boxes

- a) Proceed with nest box monitoring by checking nest boxes one by one. Ensure boxes are approached in silence, minimising noise of foot-tread. Lift nest box lid just enough to see into the box. If nest box is empty, secure the lid, record, and continue to the next box. If box contains penguins determine the appropriate equipment required (e.g. Two penguins need two bags), replace lid gently and prepare equipment for processing.
- b) Ensure all necessary equipment is easily accessible.

### 8.4 Removing penguins from nest box and transferring to soft containment

Have one person hold the lid up enough so that there is room to safely remove the penguin from the box without allowing the penguin to escape (if monitoring alone, remove lid to expose half the box). Depending on the site and type of the nestbox, and where the penguin is located within the nestbox, two different methods for penguin extraction can be used. The first method is to capture the penguin by placing both hands around the body and over the flippers to ensure restraint. Then lift penguin out of the box (Figure 2). The second method is to place a grip around the back of the neck, then support the penguin with the other hand placed under the belly. Once supported, the penguin can be removed from the box. See Department SOP *Hand Capture of Wildlife* for further advice. Once removed from the box the penguin can be transferred into soft containment (Figure 3) for restraint (See Department SOP *Animal Handling and Restraint using Soft Containment* for further advice). Once restrained, the lid should gently be replaced.



Figure 2: Restraining and removing penguin from nest box using two handed method



Figure 3: Transferring penguin to soft containment bag.

## 8.5 Scanning and weighing

Once the penguin is restrained in the weigh bag and the bag is secure then the bird can be scanned and weighed. With the bag and bird on the ground, run the scanner initially over the dorsal side of the body, focussing primarily on the nape area. However, if no PIT tag has been identified, it is necessary to check the whole body, in case the PIT tag has migrated internally (Figure 4). The scanner will indicate if a PIT tag has been located or not and identification can be recorded on the datasheet. Weigh the penguin using the hanging scale, ensuring the bird is still secured in the bag (Figure 5). Remember to deduct the weight of the bag from the final weight. Record animal weight on the datasheet. Weight is generally a fair indication of health. Scales should be calibrated at least every two months to ensure continued accuracy, by weighing an object of known weight.



Figure 4: Scanning penguin in bag using PIT tag reader.



Figure 5: Weighing penguin in bag using hanging scales.

## 8.6 Insertion of PIT tag and collection of morphometric data

If the penguin has no existing PIT tag identification then proceed with insertion of PIT tag and the collection of bill morphometric data.

### 8.6.1 Collecting bill and other data

While keeping the penguin in the bag, restrain firmly between legs and expose the bill only (Figure 6).

Measurements that must be taken using callipers include:

- a. Bill length – length of exposed section of the penguin bill (Figure 7a). Begin where the bill stops and feathers start on the top of the bill, measure to the point where the upper and lower bill meet.
- b. Bill depth – Depth of the upper and lower bill whilst closed at the forward end of the nares (Figure 7b).



Figure 6: Restraining, exposing and measuring bill length (top) and depth (bottom).

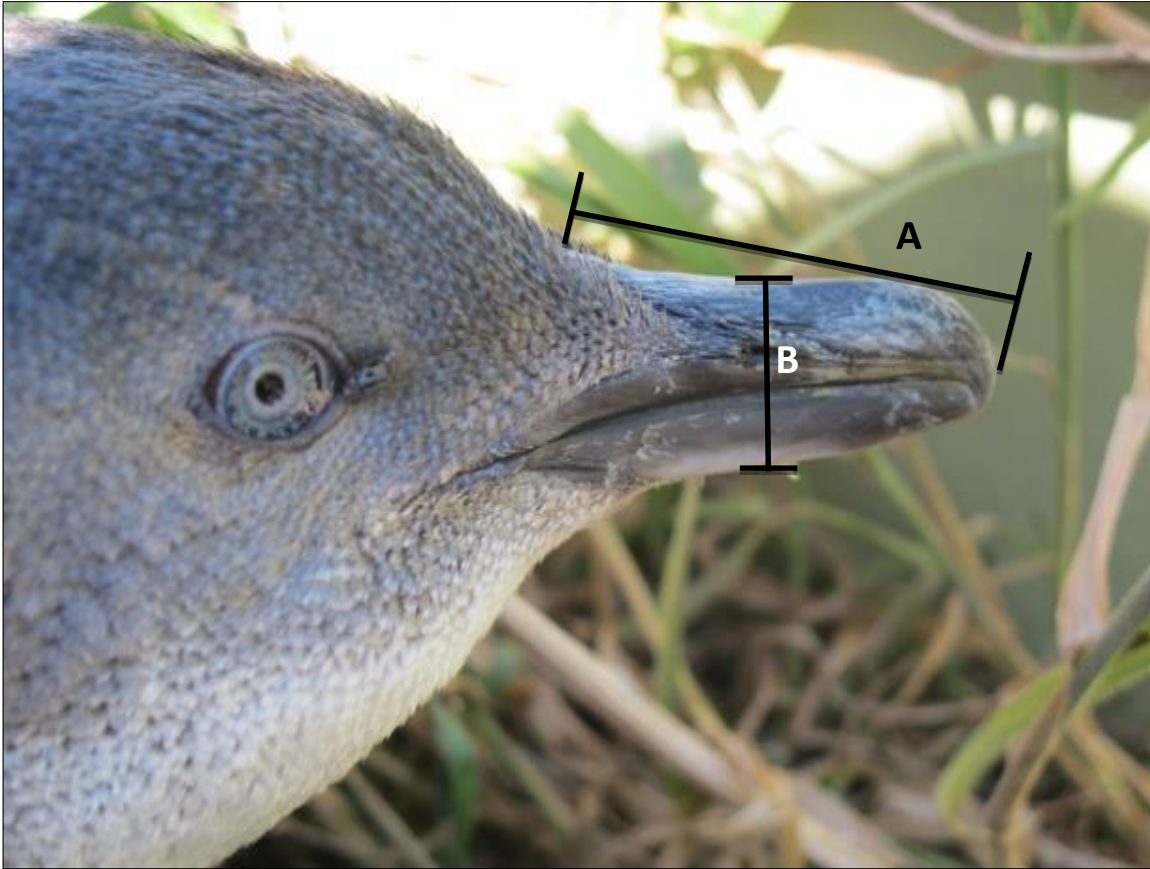


Figure 7: The bill measurements to be taken using calipers; A) bill length, B) bill depth.

### 8.6.2 Insertion of PIT tag

To insert the PIT tag, follow procedures outlined in Department SOP *Permanent Marking of Vertebrates Using Passive Integrated Transponders*. As per the SOP, anyone implanting PIT tags is required by the Department Animal Ethics Committee (AEC) to be endorsed as competent by a qualified registered veterinarian. The best location for PIT tag insertion in penguins is subcutaneously in the loose skin at the nape of the neck (Figure 8), ensuring the animal is secured in a way that allows the animal handler to confidently and safely insert the PIT tag. If possible, have a second person hold the penguin securely.





Figure 8: Inserting PIT tag.

## 8.7 Returning penguins to nest box

Methods for returning penguins to nest boxes will vary depending on the age of the penguins being handled. Adult penguins and chicks more than five weeks old (see Appendix

If for guide on aging penguin chicks) must be returned through the entryway after the lid has been secured. Adult penguins should never be returned through the top of the box. Chicks less than five weeks old can be returned to the nest bowl (depression that indicates nest) through the top of the box and then the lid secured. If adult/s and chicks are both present in the nest, then chicks should be returned to the nest first through the top of the box and then the lid secured. The adult can afterwards be returned to the nest through the entry way (Figure 9). It is important to direct the adult penguin's head inside the box entry. Otherwise, penguins are likely to escape into nearby bushes leaving eggs or chicks unattended and open to predation.



Figure 6: Returning adult penguin to nest through box entryway.

### 8.7.1 Eggs, chicks and multiple penguins in one box

Care must be taken when eggs or chicks are present and if there are multiple adult penguins in one box. To avoid damaging eggs or chicks then birds should be processed in the following way:

- a) Incubating adult penguins may be processed. Incubating adults should be removed quickly but gently so the eggs are not damaged.
- b) If there are two adults in one box, remove the first adult and process accordingly. After processing of the first adult is complete, remove the second adult then return the first adult to the box. Process the second adult and return to the box.
- c) If there is more than one chick in a box remove and process one at a time. Return

the first chick to the nest before moving onto the next. Ensure that the chick to be processed is distinguishable from any chick(s) already processed.

- d) If there are both adult/s and chicks in the nest then the adult/s should be removed first and processed. The adults should remain out of the box (contained in a separate calico bag out of the sun) while the chick/s are being processed. After returning the chicks to the nest, the adults can then be returned through the box entryway.

## 9 Competencies

Department personnel, and other external parties covered by the Department’s Animal Ethics Committee, undertaking monitoring projects involving use of nest boxes for monitoring little penguins 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 basic animal welfare legislative obligations.

It should be noted that sampling design details such as intensity and scope of the project 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 artificial nesting boxes to monitor Little Penguins

Competency category	Competency requirement	Competency assessment
<b>Knowledge</b>	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 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 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.
<b>Formal training</b> <i>Note: Suitable levels of skill/experience can substitute for formal training requirements</i>	Department Fauna Management Course or equivalent training or experience	Provide course year
<b>General Skills/experience</b>	Relevant knowledge of species biology and ecology	Personnel should be confident in assessing penguin behaviour and breeding status and be able to correctly determine the age of penguin chicks within 2 days. Familiarity with biology and ecology is essential and can be gained by sufficient field experience. Estimated minimum year assisting with penguin monitoring or similar project.
<b>Animal handling and processing skills/experience</b>	Experience handling terrestrial fauna	Personnel should be confident at assessing, capturing and handling of penguins. This can be gained through experience in the field under more experienced personnel. Estimated minimum 2 years assisting with penguin monitoring or similar project.
	Experience inserting PIT tags	Personnel should be competent in inserting PIT tags and will have undergone necessary training and endorsement provided by a veterinary surgeon. Experience should be gained through estimated minimum 2 years assisting with penguin monitoring or similar project.

## 10 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)

## 11 Occupational Health and Safety

It is recommended that a job safety analysis is undertaken prior to monitoring. This safety analysis should include the following considerations.

Always carry a first aid kit on your person and be aware of your own safety and the safety of others as well as the animals when handling.

### 11.1 Animal bites, stings and scratches

Penguins are powerful birds and can deliver a painful bite as well as inflict scratches, often drawing blood. Open wounds are easily infected through contact with penguin faeces. Insects, spiders and other invertebrates present on the penguin and in surrounding vegetation can inflict irritating stings or bites. All injuries should be appropriately treated as soon as possible to prevent infection and promote healing. Protective clothing including long pants, sleeves as well as leather gloves should be worn by handlers when undertaking monitoring. Correct handling technique will also minimise injuries.

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

### 11.2 Zoonoses

There are a number of infections caused by parasites, bacteria, or viruses that can be contracted through handling penguins and through contact with their nests (e.g. *Salmonella*). Precautions should be taken to minimise the risk of transmitting zoonoses to personnel or wildlife populations. Staff should familiarise themselves with the Department SOP for *Managing Disease Risk and Biosecurity in Wildlife Management*.

### 11.3 Needle stick injury and sharps disposal

There is a real risk of needle stick injuries to personnel. Care must be taken when working with PIT tag applicators. 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.

## 12 Further Reading

The following SOPs have been mentioned in this advice and it is recommended that they are consulted before undertaking nest box monitoring:

- Department SOP *Animal Handling and Restraint using Soft Containment*
- Department SOP *Hand capture of wildlife*
- Department SOP *Permanent Marking of Vertebrates Using PITs*
- Department SOP *Euthanasia of animals under field conditions*
- Department SOP *Managing Disease Risk and Biosecurity in Wildlife Management*

## 13 References

- NHMRC (2004). *Australian code of practice for the care and use of animals for scientific purposes* (7<sup>th</sup> ed.). Canberra: National Health and Medical Research Council.
- Stahel, C., & Gales, R. (1987). *Little penguin: Fairy penguins in Australia*: New South Wales University Press. Kensington, Australia.
- Wienecke, B.C (1989) The breeding patterns of little penguins on Penguin Island, Western Australia, in relation to dietary and oceanographic factors. Honours Thesis, Murdoch University, Western Australia
- Wienecke, B.C. 1993 The size and breeding patterns of little penguins *Eudyptula minor* in Australia: A comparative study, PhD Thesis, Murdoch University, Western Australia
- Wienecke, B.C., Bradley, J.S. & Wooller, R.D. (2000) Annual and seasonal variation in the growth rates of young little penguins *Eudyptula minor* in Western Australia. *Emu* (100): 139-147

## Appendix I: Field Data Sheet

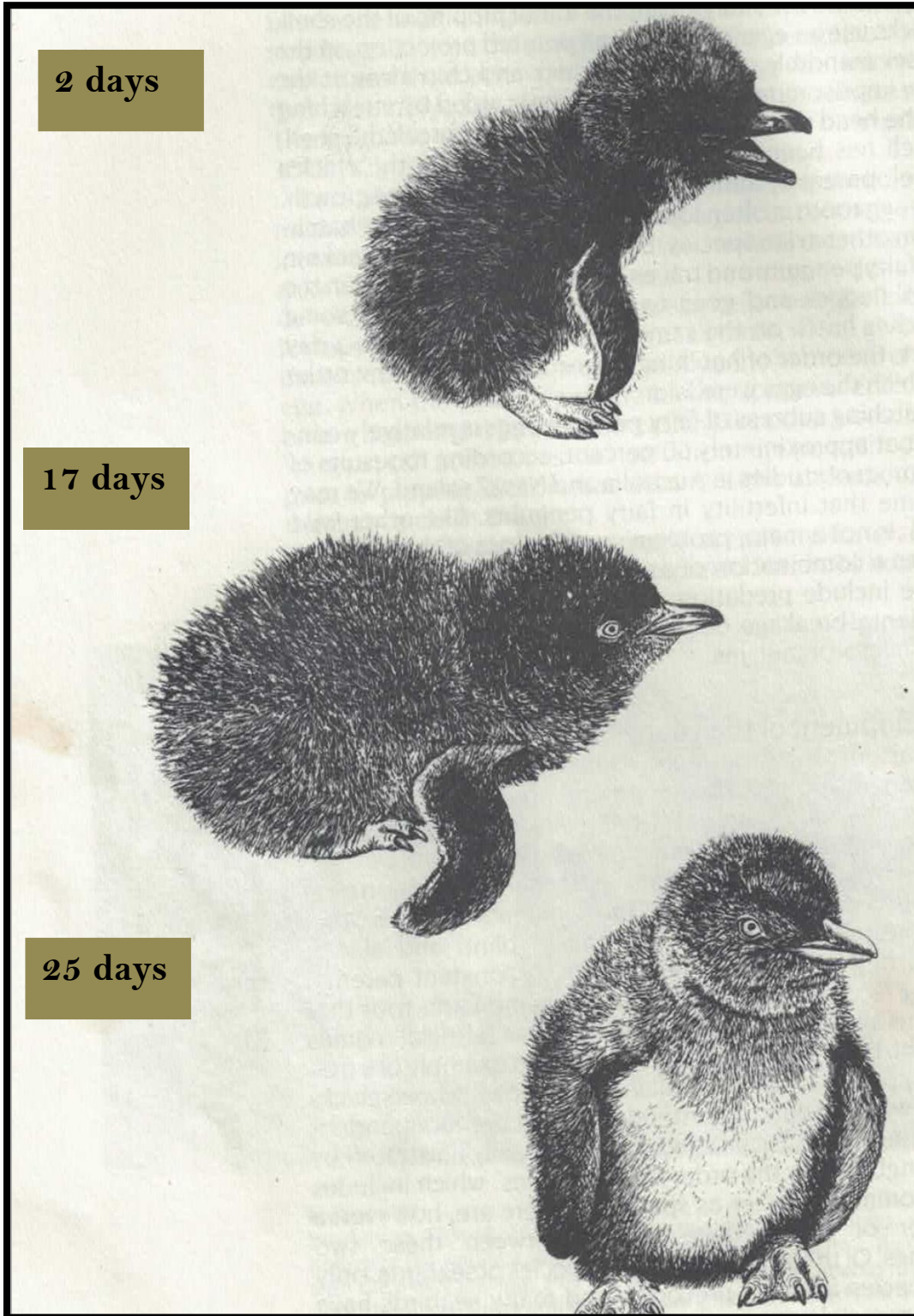
**Penguin Nest Box Monitoring data sheet**

**Date:** \_\_\_\_\_ **weather:** \_\_\_\_\_ **page:** \_\_\_\_\_

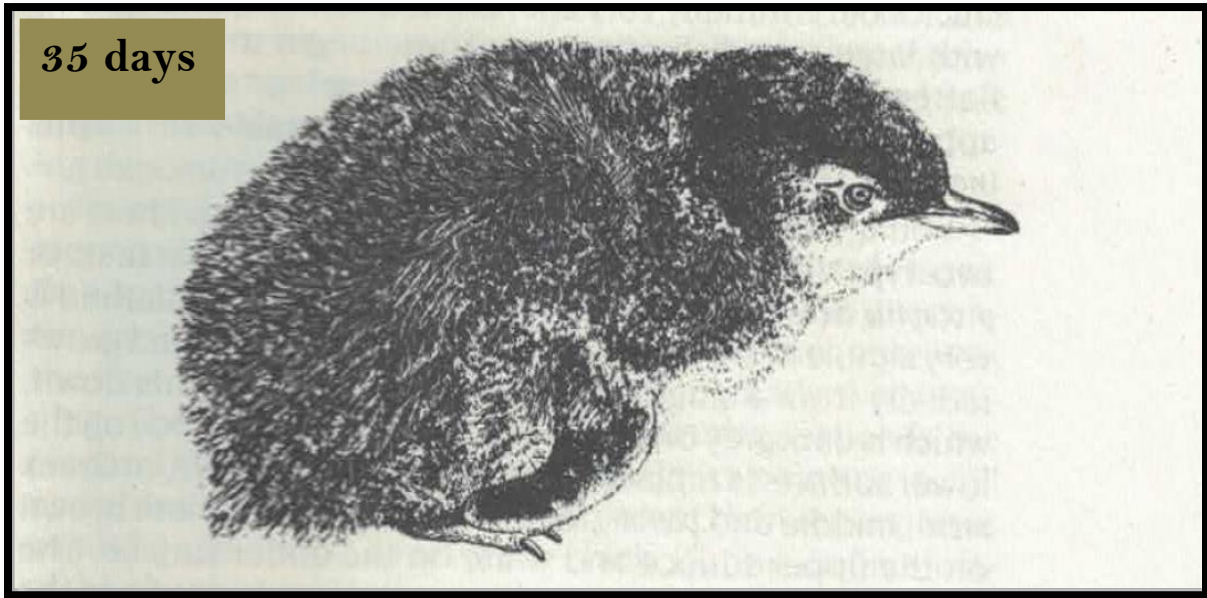
Box #	ID	Weight	Bill Data		Eggs	chick 1		chick 2		Comments
			BL	BD		mass	age	mass	age	

[moult descriptor – pre-moult/ late pre-moult/ 1/4 moult/ 1/2 moult/ 3/4 moult/ post moult] [Eggs - pipping/ abandoned] [Bill Data - BL bill length/exposed bill, BD = Bill depth]

## Appendix II: Guide to ageing penguin chicks







Use the following key to assist in aging little penguin chicks. This can be used for ageing the chick on the first encounter. After this, they can be aged by adding the day since last seen (modified from Stahel and Gales, 1987).

<b>1</b>	<b>Ability to support head</b>	(a) <b>No</b>	<b>1 day</b>
		(b) Yes	Go to 2.
<b>2.</b>	<b>Eyes</b>	(a) Not fully open	<b>2 – 7 days</b>
		(b) Fully open	Go to 3.
<b>3.</b>	<b>Coverage by mesoptyle down</b>	(a) Incomplete	<b>8 – 14 days</b>
		(b) Complete	Go to 4.
<b>4.</b>	<b>Feet</b>	(a) Dark grey	<b>15 – 21 days</b>
		(b) Top white, bottom black	Go to 5.
<b>5.</b>	<b>Egg tooth</b>	(a) Present	<b>22 – 28 days</b>
		(b) Absent (scar only)	Go to 6.
<b>6.</b>	<b>Mesoptyle down</b>	(a) General	<b>29 – 56 days</b>
		(b) Absent or restricted to head and neck	<b>57 + days</b>