

Standard Operating Procedure

ALUMINIUM BOX TRAPS FOR CAPTURE OF TERRESTRIAL VERTEBRATES

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*.

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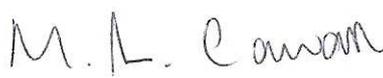
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1 Purpose

Aluminium box traps (i.e. Elliott traps by Elliott Scientific Company, Upwey, Victoria) are used for the capture of a variety of small to medium sized animals. They operate using a treadle-plate mechanism, which is set off when an animal steps on an elevated trigger plate, and springs the door closed. They are usually placed on the ground but can also be secured in trees to catch semi-arboreal and arboreal mammals.

This Standard Operating Procedure (SOP) provides advice on the use of aluminium box traps for non-lethal trapping of terrestrial vertebrate fauna.

2 Scope

This SOP has been written specifically for scientific and education purposes, and endorsed by the Department's Animal Ethics Committee. However, this SOP may also be appropriate for other situations.

This SOP applies to all fauna survey and monitoring activities involving the use of aluminium box traps (Elliott traps or similar box-type traps), undertaken across the State by Department of Biodiversity, Conservation and Attractions (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 monitoring using aluminium box traps should be familiar with the content of this document.

Projects involving wildlife may require a licence under the provisions of the *Wildlife Conservation Act 1950* and/or 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 provisions of 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 provides governing principles to guide decisions and actions of personnel involved in the care and use of animals, and contains an introduction to the ethical use of animals in wildlife studies. A copy of The Code may be viewed by visiting the National Health and Medical Research Council website (<http://www.nhmrc.gov.au>).

3 Animal Welfare Considerations

To reduce the level of impact of aluminium box trapping on the welfare of animals, staff 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 trap set up and trap checking and contingencies for managing welfare issues have been identified. 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 projects involving box trapping will require approval from the Department's Animal Ethics Committee.

Key animal welfare considerations that should be considered when box trapping are listed below and highlighted throughout the document.

3.1 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 *Humane Killing of Animals under Field Conditions*. Where disease may be suspected, refer to the Department SOP for *Managing Disease Risk in Wildlife Management* for further guidance.

3.2 Level of Impact

Potential animal welfare impacts on wildlife during box trapping include:

- Stress, injury and/or self-harm as a result of an extended period in confinement.
- Stress and/or survival disadvantage as a result of inappropriate handling and release technique, timing and location.
- Stress as a result of harsh environmental conditions within the trap (i.e. temperature).
- Stress or mortality as result of attack from other species (e.g. ants).
- Trauma (e.g. tail injury from door mechanism).
- Starvation (e.g. dependent young of captured lactating female).
- Distress (caused by discomfort, social isolation, separation of mother and young, exposure to predators etc.).

If the box traps are properly monitored and preventative actions are utilised then the impact should be small and only short-term. Field planning must involve risk mitigation of the above potential impacts to the fullest extent possible.

4 Approved Trap Types

Most box-style traps used in Western Australia were manufactured by Elliott Scientific (Upwey, Victoria) and are usually referred to as "Elliotts." Box style traps manufactured by other businesses or with different trigger mechanisms may also be appropriate and their use is not excluded. Care should be taken to select brands that are of high quality and operate correctly. Projects approved by the Department's Animal Ethics Committee preferring to use alternative box-style traps to those mentioned here may do so if they describe in detail the differences in design and are able to report on the survivorship rates and the welfare impacts. The following is a list of commonly approved trap types:

Large Box Trap: Aluminium folding box trap (15cm x 15.5cm x 46cm) with a treadle release mechanism. This trap is designed for small to medium sized mammals such as phascogales, quenda and chuditch. However, these traps are not as robust as cage traps and they are easily damaged by larger animals. While not widely used in fauna trapping, they are useful in situations where large numbers of traps are being deployed in rough terrain.

Medium Box Trap: Aluminium folding box trap (9cm x 10cm x 33cm) with a treadle release mechanism. These traps are designed for small mammals (up to 250g) and some reptiles. This is the most versatile and therefore most widely used form of box trap.

Small Box Trap: Aluminium folding box trap (8cm x 9cm x 23cm) with a treadle release mechanism. This trap is designed for small mammals (up to 30g) but has limited application.

Optional modification to traps:

A locking mechanism has been developed to improve capture efficiency of box traps for dexterous arboreal and scansorial mammals such as phascogales (Johnson, 1996). The mechanism comprises a shaped-metal tab centrally fixed to the top of the door. Details of how to make and fit the locking mechanism may be found in Johnson (1996).

Modifications including the placement of box traps inside PVC tubing, secured with pin arrangements, have also been used successfully to manage trap disturbance by non-target species (Page *et. al.* 2012).

Modifications to traps should have no greater impact on the welfare of the target species.



Figure 1: Elliott trap sheltered in a spinifex bush. Photo: Mark Cowan/DBCA

5 Procedure Outline

5.1 Setting and positioning traps

(a) The location and configuration of trap placement (i.e. transect or grid), as well as the number of traps, will be determined by the purpose of the study and should be planned before commencing the survey. Consider the target species' likely use of habitat and home range, and welfare implications of trap placement when designing trap configuration and layout. Vegetation and habitat mapping may assist in survey design.

(b) Trap locations must be marked so that no traps are missed when checking or removing them (e.g. with flagging tape which is labelled and using a numbering system so

that traps can be uniquely identified). A GPS reading for each trap point should be taken to aid relocation of the trap as well as for later data analysis and any future re-trapping at the site. Permanent monitoring sites should also be marked using a permanent marker (e.g. numbered dropper post). The location information for permanent monitoring transects and their trap points should be recorded on datasheets and in a database.

(c) If setting traps along roads or vehicle tracks, the traps must be set so that they minimise the impact on the animals. Traps should be placed away from the roadside (generally a distance of 5m or greater on publicly accessible roads and tracks), they should not be readily visible from the road to avoid public curiosity and possible theft and to reduce the disturbance of trapped animals by passing vehicles.

(c) Trap placement:

ANIMAL WELFARE: Trap placement can greatly affect animal welfare. Consider the climate of the area you are trapping in and the species biology (e.g. thermoregulation characteristics) when choosing a trap position. Traps need to be placed in suitable locations that provide complete shelter from the sun and protection from rain to reduce exposure of trapped animals.

Good cover is critically important for aluminium box traps to provide insulation and protection for animals in traps. Shade is critical in warm to hot weather. Box traps must never be exposed to full sunlight as animals can easily die of heat stress inside the traps. Give consideration to shade movement when placing traps, particularly early morning sun exposure. Where exposure may be an issue, consider setting traps within or under dense vegetation/thickets and on the southern side of vegetation.

In colder weather box traps should have an insulating material such as a fleece (something that will provide insulation but won't absorb or shed moisture readily) or leaf litter/grass placed inside them to provide protection for captured animals. When using insulating material you need to ensure that it won't impact on the welfare of the animal, that it will provide good insulation and that the selected insulating material does not impede the treadle or door of the trap.

Additionally, a thick plastic bag or plastic wrap can be secured around two thirds of the trap to provide protection from wind and rain, whilst still permitting adequate ventilation. Hessian of an appropriate size can also be placed on the outside of the traps in dry weather to reduce temperature extremes within the trap.

Do not place traps on or in the vicinity of ant nests.

(d) Traps must be set in level positions using natural cover wherever possible. Debris can be cleared from under the trap to ensure stability.

(e) If securing the trap to a tree, check that the branch is solid and that it can support the trap and any possible trapped animal. Brackets can be secured and nailed into the tree to support the trap and prevent it from falling; however traps should be secured in an appropriate method that ensures that the trap is able to function properly.

(f) Faulty equipment reduces the opportunity to trap animals, and can result in poor data, cause animal deaths and reduce the value of the trapping effort. Before the trap is left, it is important to re-check that the mechanism is working properly, the trap cover is

effective and secure, and that the trap is positioned to take advantage of shade in the morning.

(g) All traps must be accounted for after each trapping session.

5.2 Baiting traps

When choosing the type of bait for your traps always consider the target species and possible non-target captures. Bait is intended to lure an animal into the trap and for some species, provides a small amount of food while the animal is trapped.

The standard bait generally used for box traps is a mixture of peanut paste, rolled oats and sometimes sardines which is also known as “universal bait” (*Note: sardines may increase the attraction of ants and you may want to consider excluding them from the bait if ants are an issue*). Medium box traps require a quantity about the size of a 10-cent coin. Refer to Appendix II for more information.

Other bait types or ingredients may be used if they have been identified as appropriate and approved for use for a particular project or species.

Care must be taken when baiting traps to ensure that the bait does not impede the trigger mechanism. To avoid bait rolling underneath the treadle plate and rendering the trap inoperative, it is recommended that bait balls are slightly squashed so that they cannot roll.

Baits should be replaced when their effectiveness as a lure is reduced (e.g. when the odour of the bait is reduced or gone) or if the bait may impact on an animal’s health if consumed (e.g. rancid). Baits should be replaced rather than additional baits placed in the trap – more bait in the trap may increase the probability of the treadle being impeded.

5.3 Checking traps

ANIMAL WELFARE: In determining the duration and frequency of trapping you should consider the purpose of your study and the potential welfare impacts from recapturing animals on multiple occasions (e.g. limitations on feeding, welfare of dependent young). Consider the duration and frequency that will allow the aim of the activity to be achieved with the minimal impact on animals. Some animals become “trap happy” (entering traps on multiple consecutive nights) and this can impact their wellbeing by disrupting behaviours such as normal feeding, foraging, breeding and defending territories.

Avoid trapping in breeding seasons where lactating females may be separated from dependent young or when there is an increased likelihood of injury or separation of dependent young. However, many species breed throughout the year making it impossible to completely avoid trapping animals at sensitive times. If captured, lactating animals should be released as soon as possible. If the same lactating female is caught on successive nights, consideration should be given to moving or closing the trap.

Avoid or stop trapping in extreme weather conditions. Close traps if there excessive rain or heavy rain is forecast. Plan ahead and monitor long-range and daily weather forecasts.

For programs such as *Western Shield* monitoring it is recommended that traps are set for a minimum of four consecutive nights.

(a) All traps must be accounted for when setting and checking traps. This is the responsibility of the person in charge at the survey location on the day. There is no excuse for leaving traps unchecked.

ANIMAL WELFARE: The timing and frequency of trap checking and clearing is determined by considering the behaviour and biology of the target species (and potential by-catch species) in association with the environmental conditions at the site. The timing and frequency of trap checks should be reviewed and adapted when and if conditions change or adverse events occur. Traps may need to be checked more frequently throughout the day and/or night if prolonged trap confinement or environmental conditions are likely to increase the impact on animal welfare and affect survivorship.

(b) Where only nocturnal species are being targeted, traps must be checked early in the morning during the period when temperatures will have minimal effect on the trapped animals (no later than 3 hours after sunrise but as early as possible in high temperature conditions) and should remain closed until the following evening. If checking of traps cannot be completed within this timeframe, trap numbers must be reduced or the number of personnel increased before any further trapping occurs.

(c) Traps that remain open during the day must be situated in a position that is shaded throughout the day. If reptiles are likely to be trapped, traps should be checked immediately after periods of peak activity (e.g. late morning). If there is a risk of bird or diurnal mammal capture, checking must occur more frequently throughout the day. If traps need to remain open, the Animal Ethics application must provide compelling information to show that leaving traps open during the day will not impact animal welfare of target or non-target animals.

(d) An appropriate handling bag must be carried when approaching a trap to ensure efficient removal of the animal from the trap (see the Department SOP for *Animal Handling and Restraint using Soft Containment*).

(e) Bait within each trap should be checked daily and replaced when necessary. Traps without bait reduce the validity of trapping results.

(f) The presence of ants in the trapping area can lead to detrimental impacts on captured animals. A small amount of surface insecticide (e.g. permethrin-based products such as Coopex) can be applied around and below traps to discourage ants. Always read the MSDS of chemicals before use. If ants become highly attracted to the trapping area, remove and relocate the traps to a more suitable position. One way to reduce risk of ant infestation is to remove bait each morning when clearing traps and replace when resetting in the afternoon.

ANIMAL WELFARE: If moderate to high numbers of ants are identified at a trap site, or if small numbers of ants cause welfare issues, then the trap must be closed or moved to another location.

(g) Trapping data should be recorded on an appropriate trapping datasheet and database.

5.4 Removing animals from traps

All animal handling must be done by (or under the guidance of) trained and competent personnel. Techniques for removing animals from traps vary depending on the species involved and the experience and skills of the animal handler. These notes are provided as a general guide only.

ANIMAL WELFARE: To ensure minimal stress to the animals, animals should only be handled for as long as required to identify them and to collect any necessary measurements (usually no more than five minutes). Animals must be released (or reach alternate end point) as soon as possible.

ANIMAL WELFARE: Ejection of pouch young is common in species of the Potoroidae and Peramelidae families. Personnel that may encounter species of these families whilst trapping must be familiar with the Department SOP for *Care of Evicted Pouch Young*. Records need to be kept on orphans, their care and fate for annual reporting requirements for the Department's Animal Ethics Committee approved projects.

(a) Use handling bags appropriate for the species and length of containment as advised in Department SOP for *Animal Handling and Restraint using Soft Containment*.

ANIMAL WELFARE: All handling bags and equipment should be kept clean to minimise risk of disease, contamination etc. Refer to the Department SOP for *Managing Disease Risk in Wildlife Management* for further guidance.

(b) Remove animals from the trap as efficiently as possible.

(c) First, check what kind of animal is in the trap. The first clue will be the weight of the trap when picked up. Gently push in one end of the trap so that you can just see inside but can quickly close the trap if the animal attempts to escape.

(d) If the animal is venomous, take particular care. If no measurements are required, it may be easiest to choose a location where it is possible to place the trap on the ground in a vertical position, pull the pin in the side of the trap allowing the trap to unfold and to release the animal, and quickly move away from the trap.

(e) To remove small animals from the trap into a bag, gently turn the trap upside down, wrap the opening of the bag firmly around the end of the trap, depress the door until it clicks open (or manually hold it open) and then gently slide the animal into the bag. Turning the trap upside down helps to avoid the animal getting caught under the treadle or door. It also helps prevent the door closing on the animal as it exits the trap. Care must be taken to ensure that the occupant of the trap is not crushed when the door is opened to extract the animal.

If the animal is large such that there is little room to open the door (e.g. quenda) then place the entire trap in an appropriate bag and pull the pin on the side of the trap. Ensure that the animal is at the bottom of the bag and extract the trap before securing the top of the bag.

(f) Once you are sure the animal is in the bottom of the bag, grasp the top of the bag and tie the opening closed.

(g) Captured animals must be released at point of capture (unless the purpose of the trapping is translocation, specimen collection is required or otherwise approved). Animals

should be released as soon as possible and at an appropriate time of day or night. Animals must be released, or reach an alternate endpoint approved by the Department's Animal Ethics Committee, within 24 hours of capture. Animals should be released into good shelter and caution taken to reduce exposure to risks such as predation.

5.5 Picking up traps

(a) All traps must be accounted for when picking up traps. Personnel undertaking the trapping should keep tallies of traps to ensure that all have been collected and that there are no traps remaining in the field. If traps are not being collected immediately after checking (i.e. traps are not being checked and picked up simultaneously), the traps must be closed on checking and remain closed until they are picked up. This is the responsibility of the person in charge at the survey location on the day. There is no excuse for leaving traps set in the field.

(b) Ensure residual bait is removed from traps and flagging tape is removed from the area.

6 Trap hygiene and maintenance

(a) Traps must be maintained in good working order

(b) Traps must be cleaned and disinfected after each trapping session. The trap release mechanism must be kept clean of bait and scats. Clean traps to reduce the risk of spread of disease to trapped animals and animal handlers. Advice on cleaning and disinfection is available in the Department SOP for *Managing Disease Risk in Wildlife Management*.

The most efficient way to clean box traps involves removing the pin and unfolding the trap to expose the interior, which can then be scrubbed clean with disinfectant and a stiff brush prior to the trap being reassembled. Traps should be rinsed clean with water after disinfection as the small of chemicals may impact on capture rates.

Take care not to lose the pins. Pins should be reinserted from the trap door end only to avoid them accidentally being caught on vegetation and pulled out when lifting traps.

(c) Any damaged traps requiring attention should be flagged and labelled in the field when a problem is identified so that it can be attended to and removed from use until repaired.

7 Competencies and Approvals

Department personnel, and other external parties covered by the Department's Animal Ethics Committee, undertaking monitoring projects involving box traps 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 aluminium box trapping 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 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 Elliot traps to capture fauna

Competency category	Competency requirement	Competency assessment
Wildlife licences	Licence to take fauna for scientific purposes (Reg 17) OR Licence to take fauna for educational or public purposes (Reg 15)	Provide licence number
Formal training <i>Note: Suitable levels of skills/experience can substitute for formal training requirements</i>	Department Fauna Management Course or equivalent training	Provide course year
General skills/experience	Relevant knowledge of species biology and ecology	Personnel should be able to correctly identify the likely species to be captured in Elliott traps for the site/s being studied. This knowledge may be gained from sufficient field experience and/or consultation of field guides and other literature. Estimated total time in field: Min 1 year involved in similar projects.
Fauna survey and capture skills/experience	Experience in setting and use of live traps	Personnel should be confident at identifying the best locations to set traps and how to set traps so that the mechanism works and animal welfare is considered at all times. This knowledge may be gained from sufficient field experience and/or consultation of literature. Estimated total time in field: Min 1 year involved in similar projects.
	Training and experience in trap hygiene, disease transmission	Personnel should be familiar with hygiene procedures. This knowledge may be gained from sufficient field experience and/or consultation of literature. Estimated total time in field: Min 1 year involved in similar projects with similar species and /or techniques.

Competency category	Competency requirement	Competency assessment
Animal handling and processing skills/experience	Experience in handling terrestrial fauna	Personnel should be confident at handling and restraint of the range of species likely to be captured. This knowledge may be gained from sufficient field experience and/or consultation of literature. Estimated total time in field: Min 1 years involved in similar projects with similar species and /or techniques.

8 Occupational Health and Safety

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 any monitoring which involves hand capture. This safety analysis should include the following considerations.

8.1 Animal bites, stings and scratches

Care should be taken when handling animals to avoid bites, stings or scratches. All inflicted injuries (even superficial ones) should be appropriately treated as soon as possible to ameliorate possible allergic reaction, prevent infection and promote healing.

To improve safety, field personnel should be aware of the treatment for snakebite and carry appropriate pressure bandages. Personnel should also have up-to-date tetanus vaccinations. Department personnel must not capture bats unless fully vaccinated against Australian Bat Lyssavirus.

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.

8.2 Zoonoses

There are a number of diseases carried by animals, including ticks, that can be transmitted to humans (i.e. zoonoses such as Toxoplasmosis, Leptospirosis, Salmonella). 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 the Department SOP for *Managing Disease Risk in Wildlife Management*

8.3 Allergies

People with or that develop severe allergies associated with animals or animal materials should consult with their medical practitioner on appropriate precautions and actions for the handling of wildlife.

9 Further Reading

The following SOPs have been mentioned in this advice and it is recommended that they are consulted when proposing to capture wildlife with aluminium box traps:

- Department SOP *Animal Handling and Restraint using Soft Containment*
- Department SOP *Hand Restraint of Wildlife*
- Department SOP *Humane Killing of Animals under Field Conditions*
- Department SOP *Managing Disease Risk in Wildlife Management*

For further advice refer also to:

Environmental Protection Authority and Department of Environment and Conservation (2010). *Technical Guide - Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (Eds. B.M. Hyder, J. Dell and M.A Cowan). Perth, Western Australia.

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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.

Arboreal: An arboreal animal inhabits or spends large amounts of time in trees.

Scansorial: A scansorial animal is adapted to or specialised for climbing.

Appendix I: Universal Bait Recipe

Equipment

- Mixing bowl or bucket
- Mixing spoon (optional: can just use your hands)
- Container with lid to store bait
- Disposable gloves

Ingredients

- 500g Quick cooking oats
- 2 kg (5-6 375g tubs) Smooth peanut butter
- *Optional:* Between 110g (1 tin) and 636g (6-8 tins) Sardines (preferably in oil, or springwater)
- *Optional:* Cooking oil, preferably peanut oil

Note: Avoid using ingredients that contain additives, preservatives or artificial colours and flavours.

Serves: makes enough bait for approximately 100 cage traps for 4 trap nights.

Methodology

1. Ensure staff mixing bait are not allergic to peanuts.
2. Place oats (and sardines if using) into clean mixing bowl or bucket and mix so that the sardines are well distributed though the oats.
3. Mix in peanut butter until the oats and sardines are well distributed and the mixture is not too dry or too sticky. Form a ball that is sticky and cohesive. Keep in mind that the mixture will become drier over time as the oats absorb the oil from the peanut butter.
4. Store bait in a sealed container.
5. Clean bait mixing equipment.
6. Add extra peanut butter if mixture becomes too dry. Water or cooking oil can be used if extra peanut butter is not available.

Optional: Bait can be pre-rolled.

Roll bait into balls ready for placing in traps (approx. 20c coin size for cage traps and 10c coin size for box traps). The bait balls can be counted to match the number of traps being set. This will ensure that you have enough bait for all traps being set and will also act as an additional check to ensure all traps have been set and baited.

Animal Welfare

To reduce the risk of impact of the use of universal bait on wildlife ensure that bait is stored for no longer than the specified period of 5 days fresh, or 3 months frozen, to avoid the risk of the components spoiling and being unsuitable for consumption. Where possible do not leave bait in open sun. Any old bait should be disposed of after trapping and not frozen for later reuse. Do not use bait or bait containers which contain mould.

Potential animal welfare impacts of mixing universal bait include:

- Food poisoning
- Changing behaviour by providing a food source

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