Charles Darwin University Animal Ethics Committee

Standard Operating Procedure:

DPAW 9.2 Cage traps for live capture of terrestrial vertebrates

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NOTE:

Page 3: Section 5.3 (b) Checking Traps (Nocturnal species):

Traps must be checked for captures AT NIGHT or WITHIN 2 HOURS OF SUNRISE.

Department of Parks and Wildlife

Standard Operating Procedure

Cage traps for live capture of terrestrial vertebrates

SOP No: 9.2

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Department of Parks and Wildlife's Animal Ethics Committee

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Approvals

Version 1.1

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Version 1.0

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Appendix I is courtesy of Christine Groom, Judy Dunlop, Juanita Renwick, Manda Page, Neil Thomas and Adrian Wayne.

This document has been reviewed by the Department of Parks and Wildlife's Animal Ethics Committee.

Table of Contents

1 Purpose

Cage trapping is a common method used for monitoring many species of small to medium sized mammals. This method allows for animals to be captured and usually transferred to a method of soft containment to make observations and take measurements before release. Cage traps are also capable of catching birds, reptiles and amphibians, however this not the primary technique used to monitor these species and they are usually captured as non-target species when monitoring mammals.

This standard operating procedure (SOP) provides advice on the use of cage traps for non-lethal trapping of terrestrial vertebrate fauna.

2 Scope

This SOP applies to all fauna survey and monitoring activities involving the use of cage traps undertaken across the State by the Department of Parks and Wildlife (DPaW). 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 DPaW personnel involved in monitoring using cage traps 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 Agriculture and Food, Western Australia.

Please note: Projects involving wildlife research require a licence to take (i.e. capture, collect, disturb, study) fauna for scientific purposes (Reg 17) under the provisions of the *Wildlife Conservation Act 1950*. Other licences may also be applicable and care should be taken to ensure that the appropriate licences and permits are adhered to when planning any project. All projects involving the use of cage traps for capture of terrestrial vertebrates also require approval from the DPaW Animal Ethics Committee.

3 Definitions

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

Cage trap: A trap for the live capture of animals constructed of wire mesh. Cage traps operate by the animal treading on a weight-sensitive trigger plate which causes the door to close and lock.

4 Approved Trap Types

Large cage
Galvanised wire mesh cage trap (45cm x 45cm x 90cm) with a treadle plate release mechanism (Figure 1). Large cages are used primarily for quokka (*Setonix brachyurus*) and tammar wallaby (*Macropus eugenii derbianus*).

Small cage
Galvanised wire mesh cage trap (20cm x 20cm x 56cm) with a treadle release mechanism (Figure 2), collapsible forms are available. Used for most medium-sized mammals such as chuditch (*Dasyurus geoffroii*), quenda (*Isoodon obesulus fusciventer*), brushtail possums (*Trichosurus vulpecula*) and woylies (*Bettongia penicillata ogilbyi*). Small cages also catch small dasyurids and rodents as well as varanids, large skinks and occasionally birds.

Most cage traps used in Western Australia are manufactured by Sheffield Wire Products (Sheffield Rd,

Welshpool, WA) and so are sometimes referred to as “Sheffields”. Cage traps manufactured by other businesses or with different trigger mechanisms may also be appropriate and their use is not excluded. Projects approved by the DPaW Animal Ethics Committee preferring to use alternative cage 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. Cage traps manufactured by other companies can be added to the approved trap types section of this SOP if they are shown to be as effective and have minimal level of impact on animals.

The solid nature of cage traps means that animals can injure themselves whilst inside the trap. To minimise these injuries soft trap options have been developed and are covered in SOP 9.5. These soft traps are preferred for species that are particularly prone to injury or capture myopathy and have been effectively used for a variety of species including rock-wallabies (*Petrogale lateralis*), tammar wallabies and mala (*Lagorchestes hirsutus*).

Figure 1 Large cage trap. Photo by P Orell/DEC

Figure 1 Small cage trap. Photo by C. Freegard/DPaW

5 Procedure Outline

5.1 Baiting traps

(a) Small cages: The standard bait used in small cages is a mixture of peanut paste, rolled oats and sardines which is also known as “universal bait” (appendix I). Small cages require a quantity about half to a third of the size of a golf ball. An alternative bait known as “smelly bait” has been developed to increase captures of species such as chuditch where woylie numbers are high. Use of “smelly bait” also increases captures of reptiles, particularly varanids and skinks.

Large cages: A variety of bait is used in large cages depending on the target species. Bait options include apples, lucerne chaff, grain or processed pellets. If using grain it should be treated so that it cannot germinate.

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

(c) Care must be taken when baiting traps to ensure that the bait is placed clear of the treadle plate and does not impede the closing mechanism. To avoid bait rolling underneath the treadle plate and rendering the trap inoperative, it is recommended that universal bait balls are slightly squashed so that they cannot roll under the treadle.

5.2 Setting 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.

Example:

Transects of 50 small cage traps spaced at 200m intervals (total 10km) along vehicle tracks have been used as the standard method for monitoring target species under the Western Shield program. This provides information on presence/absence of species, relative abundance and population trends.

(b) If setting traps along roads or vehicle tracks, the traps must be set so that they are not readily visible from the road to avoid public curiosity and possible theft of traps. Traps should be placed a minimum of 5m from the road edge except where the density of the vegetation makes this impracticable.

(c) The traps must be placed in a position that is sheltered from the sun and rain, with particular attention paid to the position the trap; the orientation of the sun and the period of the day when the captured animal will be in the trap.

(d) Avoid placing traps on, or near, ant nests.

(e) Trap locations must be marked with flagging tape and labelled or numbered. A GPS reading for each trap is also recommended and is required for long-term monitoring sites (e.g. Western Shield transects). Permanent monitoring trap sites should also be marked using a numbered dropper post. The location information for permanent monitoring transects and their trap points should be recorded on datasheets and a database.

(f) Traps must be set in level positions using natural cover wherever possible. Debris can be cleared from under the trap to ensure stability and check to make sure that no obstructions (vegetation or debris) will stop the effective dropping and locking of the trap door. To ensure that the trap door closes properly, a short straight stick (that won't reduce trap stability), no longer than the width of the cage, can be placed under the front lip of the trap to lift the bottom lip of the trap mouth off the ground by approximately 5mm.

(g) Cage traps must be covered with heavy weight hessian (or similar material with the same protective qualities) to provide captured animals with security and shelter from the elements. Do not place the trap inside the hessian bag but place the hessian over the top of the trap and wrap around to cover exposed sides. The hessian needs to be secured to ensure that it cannot be easily removed by an animal (e.g. brushtail possum) and wind cannot blow the hessian off the trap. Options include using a convenient rock or log, nestling the trap into a bush, tucking the edges of the bag under the trap (ensuring the stability of the trap is not impeded) or piling sand on the edges of hessian. Ensure that the trap release mechanism is not impeded by the hessian or method used to secure it.

(h) 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 the trap is positioned to take advantage of shade in the morning.

(i) It is recommended that traps are set for a minimum of three consecutive nights (preferably more, but consideration should be given to the impact on individuals that may be trapped every night, especially if they have dependent young).

(j) All traps must be accounted for before and after each trapping session.

5.3 Checking traps

(a) All traps must be accounted for during each day's trapping. Traps must be counted upon setting and counted when checking them each trapping session Personnel undertaking the trapping must keep tallies of traps to ensure that all are checked. There is no excuse for leaving unchecked traps set in the field. It is responsibility of the lead personnel at the survey location on each trapping day to ensure that all traps are accounted for and that the impact on animal welfare is minimised.

(b) If the focus of trapping is nocturnal species, then traps must be checked for captures at night or within three hours of sunrise or otherwise approved. 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. If weather conditions are hot then trap checking must be completed earlier.

(c) Traps must either be closed on checking and re-opened late afternoon, or, if they need to remain open (i.e. targeting diurnal animals), must be re-checked in the late afternoon at a minimum. Traps remaining open during the day must be in a shaded position, and consideration should be given to more frequent checking throughout the day, particularly in hot weather or if there is a risk of birds or diurnal mammal capture.

(d) An appropriate handling bag must be carried when approaching a trap to ensure efficient removal of the animal from the trap (see SOP 10.1).

(e) Take care when approaching the trap and minimise noise during your approach (reduce noise from walking, vehicles, minimal talking, etc.). A second handling bag may be used to quickly cover the front of the trap (the exposed front of the trap) which will aid in calming agitated trapped animals, particularly woylies.

(f) The bait must be checked daily in every trap and replaced where necessary. Traps without bait reduce the validity of trapping results.

(g) The presence of ants in the trapping area can lead to detrimental impacts on captured animals. Surface insecticide (e.g. permethrin based products like Coopex ®) can be applied around traps to discourage ants. Surface insecticides should never be used inside traps and should not be used routinely as they can be harmful to trapped animals, particularly frogs and reptiles. Powder and spray forms are available however extreme care must be taken to ensure that no free standing liquid droplets remain when using the spray form as absorption and/or ingestion can be lethal to frogs and reptiles. Always read the MSDS of chemicals before use. If ants become highly attracted to the trapping area remove the traps and relocate them to a more suitable position.

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

5.4 Picking up traps

(a) All traps must be counted out upon setting traps and counted in when picking up. Personnel undertaking the trapping must keep tallies of traps to ensure that all are collected and that there are no traps left behind. 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. There is no excuse for leaving traps set in the field. Responsibility of animal welfare rests with the lead personnel at the survey location during fauna trapping events.

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

5.5 Removing animals from traps

(a) 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.

(b) Animals must be removed from the trap as efficiently as possible.

(c) Traps must remain covered as much as possible during removal of the animal to minimise stress.

Small cages: Animals should be encouraged to enter an appropriate handling bag for the species (see SOP 10.1) by placing the bag over the end of the trap and manipulating the door to the open position. Lifting small cages with an animal inside should be avoided. Gentle encouragement via blowing on the animal, using light and dark or positioning of the animal handler's body toward the rear of the trap can help.

Large cages: Lift the front of the trap and position the trap so the door is facing skywards, open the door. Place a bag over the animal. For medium-sized macropods such as tammar wallabies, grasp the base of the tail to lift the animal out of the trap and then placing or gently swinging them into the opening of an appropriate handling bag (see SOP 10.1). It may be helpful to take a firm grip of the hind feet as you lift the animal from the trap to restrain the animal and avoid injuries. This should not be attempted unless experienced in the technique or being supervised by an experienced person. Avoid the risk of eye injury by keeping the animal, especially hind legs, below eye-level (handler and assistant if present).

(d) Particular care should be taken for those species that may eject pouch young (see SOP 14.1 Care of evicted pouch young for further information).

(e) Venomous or dangerous animals such as snakes should be released with consideration given to the best possible escape route for both animal and personnel. The door can be propped open to allow the animal to leave when the animal is ready.

(f) Captured animals must be released at point of capture (unless the purpose of the trapping is translocation, specimen collection is required or other approved reason). Animals must be released, or reach an alternate endpoint approved by the DPaW Animal Ethics Committee, within 24 hours of capture. Further, animals must be released at a time that is appropriate to their normal activity and caution taken to reduce exposure to risks such as predation i.e. nocturnal animals should be released early morning or kept until late afternoon before release at the point of capture.

6 Trap Care and Maintenance

(a) Traps must be maintained in good working order.

(b) Traps must be cleaned and disinfected after each trapping session. In some instances, particularly traps that have held reptiles or brushtail possums, the trap will require faecal material to be removed within a trapping period. Particular attention should be paid to the release mechanism to ensure it is kept free of bait and scats. Instructions on cleaning and disinfection of traps are available in SOP 16.2 Managing disease risk in wildlife management.

(c) Hessian bags used as trap coverings should also be cleaned and disinfected after each trapping session following the instructions contained in Chapman *et al.* (2008).

(d) Do not carry the traps by any of the moving parts and do not put any excessive weight into traps that will be carried.

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

7 Level of Impact

Potential animal welfare impacts of cage trapping include:

- Capture myopathy (particularly for macropods)
- Trauma (e.g. head or nose injuries from hitting walls of the trap)
- Hypothermia
- Hyperthermia
- Dehydration
- Starvation
- Distress (caused by confinement, discomfort, social isolation, separation of mother and young, exposure to predators, ants, etc.)
- Predation

If the cage traps are properly monitored and preventative actions are utilised then the impact is small and only short-term.

8 Ethical Considerations

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

8.1 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). They must be released (or reach alternate end point) within 24 hours of capture.

Most studies using cage traps are interested in nocturnal species. If trapping is targeting nocturnal species then traps should be opened at dusk (to avoid stray animals being captured during the day) and checked at dawn to avoid heat stress and possible death of animals. If trapping is targeted at daytime active species, traps should be checked at a minimum of twice a day and more frequently in

extreme weather conditions.

8.2 Frequency of trapping

To reduce the impact of trapping on animals, consideration should be given to minimising the frequency of trapping required to achieve the goal of the activity. Some animals become “trap happy” where they are trapped every time a trap is opened and this can greatly impact their wellbeing by disrupting their feeding, foraging and defending territory activities. Other animals become “trap shy” making it harder for them to be monitored.

8.3 Trap placement

Trap placement can greatly affect animal welfare. Traps need to be placed in suitable locations to reduce exposure (e.g. light, heat/cold, rain/water) of trapped animals. For example, considerations need to be given to the movement of shade, prevailing winds and drainage in wet conditions. Thick trap covers that provide protection from the elements and reduce the sense of exposure by the animals are required. If the traps are likely to capture species that are prone to panic or stress (e.g. woylies), trap placement should also allow animal handlers to approach the traps without the knowledge of the potential captives (e.g. allow ‘blind’ approach, reduced noise from walking on leaf litter, vehicles, minimal talking). Traps should also not be located in the vicinity of high ant activity.

8.4 Capture myopathy

Capture myopathy is a condition associated with the capture and handling of many species of mammals and birds that results in degeneration of skeletal and/or cardiac muscle (Shepherd *et al*. 1988). The condition can result in sudden death but death may also occur weeks after capture as a result of complications including abnormalities to posture and gait and increased susceptibility to predation (Abbot *et al.* 2005). Signs and symptoms include a drooping head and neck, laboured breathing, tremors, lethargy and lack of coordination or paralysis.

Prevention of the condition through efforts to minimise stress to animals is better than treatment options. Records of animals suspected to be suffering from capture myopathy need to be provided to the Animal Ethics Committee for annual reporting requirements.

8.5 Unexpected deaths

If unexpected deaths or euthanasia occur then it is essential to consider the possible causes and take action to prevent further deaths. For projects approved by the DEC Animal Ethics Committee, unexpected deaths or euthanasia must be reported in writing to the Animal Ethics Committee Executive Officer on return to the office (as per 2.2.28 of The Code).

8.6 Hygiene

The movement of dirty hessian bags and traps from one working site to another may pose a disease risk for animal populations. To avoid possible transfer of pathogens use one batch of hessian bags and traps for each site or connected group of sites, or wash/soak hessian bags in bleach solution and dry in the sun before using at another site (see SOP 16.2 Managing disease risk in wildlife management).

8.7 Breeding season

Avoid trapping in breeding seasons where lactating females may be separated from dependent young (e.g. chuditch between May and August in the southwest when young are in the den) or when there is an increased likelihood of injury or separation of dependent young (e.g. brushtail possums during pouch emergence). 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.

8.8 Pouch young

Ejection of pouch young is common in some members of the Macropodidae, Potoroidae (e.g. woylies)

and Peramelidae families. Persons that may encounter members of these families whilst trapping must be familiar with SOP 14.1 Care of evicted pouch young. Records need to be kept on orphans, their care and fate for annual reporting requirements of Animal Ethics Committee approved projects.

8.9 Weather

Avoid trapping in extreme weather conditions (hot, cold or wet and/or strong winds) by planning ahead and monitoring long-range and daily weather forecasts.

9 Competencies and Approvals

DPaW personnel, and other external parties covered by the DPaW Animal Ethics Committee, undertaking cage trapping require approval from the committee and will need to satisfy the minimum 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 cage traps on the welfare of the animals. Other groups, organisations or individuals using this SOP to guide their fauna monitoring activities should also meet these minimum competency requirements as well as their 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: Minimum competency requirements for Animals Handlers of projects using cage traps to capture fauna.

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 (DPaW personnel only) or SF 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/DPaW Fauna Management Course (1997-)	Provide course year, TAFE facility Provide course year Provide course year

Competency Category	Competency Requirement	Competency Assessment
General skills/experience	5.1 Relevant knowledge of species biology and ecology	Personnel should be able to correctly identify the likely species to be captured in cage traps for the site/s being studied. This knowledge may be gained through sufficient field experience and/or consultation of field guides and other literature. Estimated total time in field: Minimum 1 year involved in similar projects.
Fauna survey and capture skills/experience	6.1 Experience in setting and use of live traps - cage, Elliott, pit, Bromilow, Thomas AND	Personnel should be confident 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 through sufficient field experience and/or consultation of literature. Estimated total time in field: Minimum 1 year involved in similar projects.
	6.3 Training and experience in trap hygiene, disease transmission	Personnel should be familiar with hygiene procedures. This knowledge may be gained through sufficient field experience and/or consultation of literature. Estimated total time in field: Minimum 1 year involved in similar projects.
Animal handling and processing skills/experience	7.1 Experience in handling terrestrial mammal fauna AND	Personnel should be confident handling and restraining the range of species likely to be captured. This knowledge may be gained through sufficient field experience and/or consultation of literature. Estimated total time in field: Minimum 1 year involved in similar projects.
	7.2 Experience in handling terrestrial herpetofauna	Personnel should be confident handling and restraining the range of species likely to be captured. Personnel should be familiar with reptile identification methods such as scale counts. This knowledge may be gained through sufficient field experience and/or consultation of literature. Estimated total time in field: Minimum 1 year involved in similar projects.

10 Occupational Health and Safety

First aid kits should always be carried in vehicles. You must be aware of your own safety and the safety of others as well as the animals during handling.

It is recommended that a job safety analysis is undertaken prior to undertaking monitoring using cage traps at your site. This safety analysis should include the following considerations.

10.1 Animal bites and scratches

Removing animals from cage traps can result in injuries to handlers from the animals inflicting bites and scratches. All injuries should be appropriately treated as soon as possible to prevent infection and

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

10.2 Zoonoses

There are a number of diseases carried by animals that can be transmitted to humans (i.e. zoonoses such as Toxoplasmosis, Leptospirosis, Salmonella). Advice on minimising disease risk is contained in SOP 16.2 Managing disease risk in wildlife management.

10.3 Allergies

Some personnel may develop allergies when they come in contact with animal materials such as hair and dander. Personnel known to develop allergies should wear gloves when handling animals and long sleeved pants/shirt.

Personnel/volunteers with severe allergies associated with animals, with immune deficiency diseases or on immunosuppressant therapy should not engage in the handling of wildlife.

Personnel with a known or suspected peanut allergy will need to take appropriate precautions when in contact with universal bait and traps.

11 Further Reading

The following SOPs have been mentioned in the advice regarding use of cage traps. It is recommended that the following SOPs and further reading are also considered when proposing to undertake cage trapping.

SOP 9.5 Soft cage trapping for the capture of macropods

SOP 10.1 Animal handling/restraint using soft containment

SOP 14.1 Care of evicted pouch young

SOP 15.1 Humane killing of animals under field conditions in wildlife management

SOP 16.2 Managing disease risk in wildlife management

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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APPENDIX I Mixing Universal Bait

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 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 50c coin size for cage traps and 20c coin size for Elliott 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 rendering 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.

Potential animal welfare impacts of mixing universal bait include:
- Food poisoning
- Changing behaviour by providing a food source

References

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