DERM Animal Ethics Committee

Standard Operating Procedure

Use of Pitfall Traps

1. Preamble

As the Department responsible for nature conservation in Queensland, the Department of Environment and Resource Management is involved in identifying and assessing the living parts of the state's natural resources — plants, animals and ecosystems. Research, survey and monitoring programs provide a means of collecting important information in relation to the condition and trends of our wildlife and ecosystems and how best to protect these precious resources.

A pitfall trap is a glass, metal or plastic container sunk into the ground so that the mouth is level with the soil surface. Ground dwelling animals fall into the trap and are unable to escape. Pitfall trapping is a sampling technique which is widely used in wildlife surveys to study seasonal occurrence, to examine spatial distribution patterns, to compare relative abundance in different micro-habitats, to study daily activity rhythms, and in community surveys.

The pitfall trap is a relative method of estimating animal numbers and species, thus it cannot be used to estimate absolute population sizes or overall species richness of an area. It produces an "index" by which several areas can be compared. It is a "passive" form of sampling which relies on the animal rather than the observer making the action that leads to capture and enumeration.

There are three basic approaches to using pitfall traps:

1. For survey work, traps that catch the animal randomly - animals foraging on the ground 'accidentally' fall into the trap.

2. Traps that are used in conjunction with barriers - a 'drift fence' barrier can be used to direct foraging animals towards the trap; traps set up on known runs, to collect specific animals; or adaptations such as a lid or cover that encourages behavioural responses in certain animals to take refuge and therefore fall in.

3. Baits used to attract certain species or animal groups.

2. Objective and purpose of proposed procedure

The purpose of this procedure is to provide information to the AEC and activity leaders in considering the use of pitfall traps in surveys and research of wildlife populations.

Two specific issues have been identified in relation to the application of Pitfall Traps:

a. The impact of pitfall traps on non-target vertebrates.

b. Whether wet traps are acceptable, including those set to trap invertebrates.

3. Detailed Description of Procedure

3.1 Dry Pitfall Traps

3.1.1 Description

The pitfall trap is an adaptation by the ecologist of a common hunting technique: the use of a pit in the ground into which an animal falls and cannot escape. The ecologist's pitfall trap consists basically of a glass, plastic or metal container, sunk into the soil so that the mouth is level with the soil surface. Many ground dwelling animals fall into the trap and are unable to escape.

Dry pitfall traps used to collect reptiles or frogs are described by Harold Cogger as generally consisting "of jars, tins or drums which are buried in the ground with their lips flush with the ground's surface. The openings are covered by a slightly raised lid or stone, or other object to keep out predators and prevent trapped animals from being overheated during the day or drowned during rain.

To be effective they should be placed along known 'runs', where they are most likely to be encountered by the animals to be trapped." (Cogger, H. "The Reptiles and Amphibians of Australia" 1986 page 24). In addition to being positioned along known 'runs', traps are often used in conjunction with drift fences for enhanced effectiveness.

3.1.1 Justification for Use

In certain isolated locations, dry pitfall traps are the only practical method of catching small, ground dwelling vertebrates and invertebrates. An example of this would be trapping for ground dwelling spiders in a remote part of a forest.

The advantages of using these traps include the following:

- they are simple, cheap and cost effective;
- have no moving parts;
- do not kill the animals (except inadvertently);
- collect large numbers of animals;
- are safe for the operator;
- are often the only practical alternative.

The disadvantages include the following, that:

- they require deactivating;
- they are fairly non-selective;
- they do not prevent trapped animals from killing each other;
- catch size is influenced by population sizes, activity levels, weather, size and nature of trap.

3.1.3 Management of Dry Pitfall traps

Dry pitfall traps must be managed to minimise the impact on trapped animals by taking into account issues such as:

- time animals will spend in the trap
- the possibility of trapping animals which may prey upon or parasitise other trapped animals
- environmental effects such as dehydration and hyperthermia in hot weather, hypothermia or drowning
- deprivation of food and water
- deactivation of traps when no longer required
- appropriate size of trap - diameter, depth
- construction of trap - conformation of the walls, lids, covers or grids
- possible non-target species - bearing in mind that small vertebrates may in fact be smaller than large invertebrates

- traps should not be set in areas where there is a possibility of them filling with water such as low lying areas or wetlands

The following modifications are recommended to enhance the operation of dry pitfall traps:

- pitfall traps may be fitted with rain guards to prevent flooding and polystyrene "floats"
- shade covers reduce midday pit temperatures (but may reduce trap success)
- traps may have "exclusion barriers" such as a selective grid or "roof" to exclude unwanted fauna (predators, non-target species)
- leaf litter added to the trap from the site provides shelter and moisture which prolongs survival of trapped animals. A saturated sponge provides high moisture levels for trapped amphibians
- PVC tubing can be used to provide shelter inside the trap
- insecticides may be used where ants are prevalent and cause a problem by attacking trapped animals. For example, by applying Rid Roll on around the rim of the trap. However, as the effects of insecticides on most reptiles and amphibians are not known, insecticides should be used with caution.

3.2 Wet Pitfall Traps

3.2.1 Description

A wet pitfall trap is defined as a dry pitfall trap containing a solution designed to trap, kill and preserve an animal or animals. Aqueous solutions used in these traps include; formalin (10% formaldehyde), alcohol, methylated spirits, trisodium phosphate and picric acid.

3.2.2 Justification for Use

Wet pitfall traps are routinely used to trap invertebrates, and are acceptable for this purpose. They are currently unacceptable for vertebrates as the preservative solutions used do not kill humanely. Furthermore, traps used for invertebrates can pose a significant risk to small non-target vertebrates, such as lizards, frogs and even small mammals.

3.2.3 Management of Wet Pitfall Traps

The AEC considers that the designs of wet pitfall traps and the solutions in current use are unacceptable for vertebrates because they cause an inhumane death. When used for the capture of invertebrates these traps must be managed so as to prevent the inadvertent capture of vertebrates.

4. Animal treatment/withdrawal and euthanasia decision

In the event that animals are either injured during trapping or are considered to be unfit for release due to health, stress or unknown causes they will immediately be assessed by an experienced field officer. The following actions would be taken based on the assessments of this officer.

The animals should be:

- Humanely euthanased if the injury or health concern is considered untreatable and is likely to significantly compromise the animal's survival prospects on release. An appropriate euthanasia technique would be adopted for different sized animals based on the NHMRC guidelines.
- Treated on site by an appropriately experienced person, with knowledge and skills in the treatment of such injuries. This should only occur where there are sufficient resources and experience to treat the animal on site and the injury/health concern is considered minor and unlikely to significantly compromise the animal's survival prospects on release. Once properly treated the animals should be closely monitored prior to release,
- Transported for assessment and treatment by an experienced veterinarian.

5. Routine Animal Monitoring and Management

Animals will be handled so as to cause minimal stress and under normal circumstances released as soon as identification is completed. Trapped animals will be released after identification early each morning. Any signs of stressed animal particularly associated with wet and cold conditions will be immediately dealt with as a priority (refer to Section 4 in relation to Animal Treatment/Withdrawl and Euthanasia decisions). Small mammals will be kept in a warm dry calico bag with cotton wool and held in field workers jacket for a short period of time or until the animal recovers. This method is very successful in assisting small mammals to recover from cold wet conditions. In the event of extreme wet and cold conditions traps will be shut down to prevent animals entering. If trapping is to be conducted during cold dry conditions some form of insulation either leaf material or other naturally available organic material shall be placed inside traps to ensure animals caught do not experience any associated stress. Details of specific protocols for different survey techniques and species groups are provided in the Standard Operating procedure for Wildlife Surveys.

6. Qualifications, Competencies and Training

The procedures detailed above must be undertaken either by or under the direct supervision of a person with significant previous experience in this technique and in the handling and care of the species likely to be captured during the activity. Details of some specific qualifications, training and authorities for different survey techniques/procedures are provided in the Standard Operating procedure for Wildlife Surveys.

7. Sources and References Used

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8. Authorities consulted in relation to the development of this procedure

This standard operating procedure has been substantially drawn from an equivalent guideline prepared by the Animal Research Review Panel (ARRP) and the Animal Welfare Unit of the NSW Department of Primary Industries Animal Welfare Branch. That guideline was developed from contributions made by the following authorities:

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- Mr Walter Boles,
- Dr Burt Sheridan,
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- Dr Leslie Reddacliff,
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- Dr Alan York.

The document has been reviewed and accepted by the DERM Animal Ethics Committee.