### A Ranger's Handbook

# **Terrestrial Fauna Surveys** Managing Feral Pigs for Biodiversity Conservation in Cape York





This series of handbooks helps you choose suitable methods for the control of feral pigs and the monitoring of their impacts on biodiversity in your region. The techniques it describes have been used on Cape York Peninsula, Australia, but the ideas can be applied in similar environments in other regions.

To choose what will work best in your area, it is important to understand the techniques that are available and their limitations. These handbooks provide a brief overview of the available options.

There are multiple techniques for both control and monitoring. Often the best approach for successful control is a combination of techniques (as opposed to just one). Knowing what impacts you want to monitor will drive your decision for a monitoring technique.

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### Handbooks in this series:



## **Terrestrial Fauna Surveys**



#### Background

Feral pig impacts on terrestrial fauna are poorly understood in Australia. They have the potential to impact terrestrial fauna through four main pathways:

- 1. Predation and competition for food
- 2. Removal of cover and structure
- 3. Disease transmission
- 4. Spreading weeds which changes the structure and function of habitat.

A detailed assessment of impacts is provided in the federal government's threat abatement plan for feral pigs:

http://www.environment.gov.au/biodiversity/threatened/publications/tap/feral-pig-2017

#### Purpose

Appropriately designed, systematic fauna surveys provide an objective assessment of feral pig impacts on vertebrate fauna. This type of monitoring requires expert assistance and should only be considered if there is a clear need to understand the impacts of pigs (or other impacts).

#### Prerequisites

- Team of workers to assist with surveying and safety requirements
- High level taxonomic and field identification skills
- Access to trapping equipment and knowledge of trap use and systematic survey methods
- Skills and experience in experimental design to ensure adequate replication is achieved
- Skills and experience in high level data management and analysis
- Access to powerful computers and software for conducting analysis and for stratifying survey effort
- Or, the ability to contract staff with the above skills.



### Limitations

Terrestrial fauna surveys require expert assistance which means forming a partnership with a research institution. This can be very expensive and requires building strong relationships with research institutions (CSIRO, universities) and their networks. Rangers provide valuable contributions to the monitoring and surveys, but systematic surveys and experimental design will generally require collaborating with a research partner.

#### Method

Measuring the impact of feral pigs on biodiversity requires researchers to account for natural variation in the landscape and over time. This includes:

- Accurately identifying wetland typologies. Systematic surveys require an understanding of the natural variance in species composition and abundance in similar habiatat types
- Identifying natural fluctuations in the sites due to annual variation of weather (animals respond to dry and wet years)
- Accounting for differences in detectability between sites (i.e. sites that are impacted by feral pigs often have little vegetation, making it easier to detect frogs and reptiles when compared to intact sites with lots of plant cover)
- Accounting for the movement of animals when considering sampling and analysis (i.e. water birds move in and out of wetlands sporadically and sampling methods need to account for this).

It is important to note that some of these methods are designed for a Cape York landscape and may need modification or alternative approaches for other areas.

### Planning

Conducting fauna surveys is a logistical challenge. Each site requires the same effort and the same trapping and observation methods. This requires substantial planning to ensure that traps can be checked before it gets too hot and that all the required survey methods can be applied. With three researchers, no more than 10 sites should be completed in one survey period using the suggested methods.

### Site Selection

Site selection is one of the most important parts of systematic fauna surveys. The best site selection involves:

- Determining the different wetland typologies (wetlands with similar size, depth, vegetation, landscape position)
- For each typology, selecting replicates that most closely represent the similar characteristics
- Conducting surveys at the selected sites and using analysis of species composition and abundance to determine how similar the sites are
- Excluding feral pigs from half of the sites as a means of assessing the impact of removing this threatening process. This will let you see the impact that pigs are having on the wetlands at your site.

# **Trap Types**









Pitfall traps capture animals that walk along the drift net and fall into the bucket. This includes animals like this sand goanna, as well as insects, mammals and reptiles.





The bottom of the drift net is buried beneath soil to stop animals passing through it. Drift nets are kept taut with wire pegs. As an animal walks along the drift net it will fall into the pitfall trap.

# **Equipment Required**

For each site the following equipment is required:

- 20 Elliott traps
- 2 cage traps

- 3 buckets
- 12 funnel traps
- 3 lengths of drift line (flexible but strong mesh) plus metal pegs to tightly secure the drift line
- 2 motion sensor cameras plus bait holders. See the NT government's manual for the best way to utilise motion sensor cameras
  - o http://www.nespnorthern.edu.au/wpcontent/uploads/2015/10/5.2.4\_a\_guide\_to\_use\_of\_remote\_cameras\_for\_wildlife\_surveys\_f inal\_web.pdf
- Standard bait (peanut butter, oats, honey and vanilla essence)
- Dog food biscuits
- Sound Meter bioacoustics station (set to record 10 minutes of sound at dawn, midday, dusk, and 10.00 pm at night)
- Jimmy bar, crowbar, posthole shovel, mallets, 30-40 metal pegs, roof sarking for sheltering cage traps and funnel trap, small pieces of sarking to place in the bottom of pitfall buckets for protecting animals from the elements.

General equipment required:

- Good binoculars
- Field guides (books and mobile applications)
- Flagging tape
- Note pads and pencils.



a wide range of habitats.

# Installation

For each site and each treatment (pigs-allowed and pigs-excluded), the same survey methods are applied. The diagram below shows the fauna survey layout. Each site has 20 Elliott traps (grey dashes) that are placed about 5 metres apart. Three drift lines (brown lines) are placed to sample the transition of vegetation types from close to the water's edge to up near the woodland verge. Each of these includes a 10 m drift line that guides reptiles, mammals, and amphibians into a 40 cm deep bucket in the middle and funnel traps (green rectangles) on either side. Cage traps (red squares) are also used. Time-lapse cameras may also be used but are not shown.



### **Observation and Active Searching Methods**

To estimate relative numbers of amphibians (frogs and the introduced cane toad) and reptiles, three techniques were applied at each lagoon:

- 1. The drift line trapping method listed above
- 2. Timed (1 minute) visual searches at night time within a  $1 \text{ m}^2$  area.
  - 10 samples in the wet zone, 5 samples in the mid zone and 5 samples in the dry zone
- 3. 10-minute spotlight searches, twice (different nights), using head torches to detect animal 'eye shine'.

For birds, two methods can be used:

- 1. Eight repeated samples over a 5-day period at different times of the day where every bird heard or seen within a 1 ha area or on the wetland is recorded
- 2. A Song Meter bioacoustics station in each treatment to record 10 minutes of sound at dawn, midday and dusk.
  - <u>https://www.wildlifeacoustics.com/</u>

For mammals, the methods described above were used (Elliott and cage traps) and motion sensor cameras left on site for three months between surveys.

#### **Data Management and Outputs**

Collecting, managing, and utilising the data from this type of survey requires a significant level of expertise and generally requires a research partner. In the Biodiversity Fund project, a data management system was set up on Biocollect to store the data permanently and to allow access for analysis.



Passing on data to the relevant bodies is essential in completing these projects successfully. See the 'Data Management' handbook for more information.

#### **Useful Resources:**

- Commonwealth of Australia. (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (Sus scrofa) (2017).
- https://www.ala.org.au/biocollect
- Gillespie, G.R., Brennan, K., Gentles, T., Hill, B., Low Choy, J., Mahney, T., et al. (2015) A guide for the use of remote cameras for wildlife survey in northern Australia.
  Darwin, Australia: Charles Darwin University.

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