

## **Survival of Released Rehabilitated Northern Brush tailed Possums (*Trichosurus arnhemensis*)**

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### **Abstract**

In 2007 Wildcare Incorporated in Darwin (Wildcare) obtained a grant from Perpetual Trustees to study the post release survival of rehabilitated Northern Brush Tailed Possums (*Trichosurus arnhemensis*), in conjunction with the Northern Territory Department of Natural Resources, Environment the Arts and Sport (NRETAS). The study aimed to gain an understanding of factors relating to the survival of possums post release in order to improve management and rehabilitation of possums in care, to increase possum survival and to educate the wider community on possum behaviour.

The study involved radio-tracking 42 Northern Brush Tailed Possums (NBTP) released between October 2007 and May 2009 with tracking continuing until September 2009. Results indicate that snakes appeared to be the major predator. Some possums were unable to cope with relocation and release and died within 10 days. However, 70% of the possums released during the study survived for more than 10 days post release with one monitored for many months. Current rehabilitation practices appear adequate for the survival of most possums but some would benefit from closer assessment prior to release and increased predator awareness.

### **Introduction**

Dedicated wildlife carer's throughout Australia spend a great deal of time and effort caring for sick, injured or orphaned wildlife but the fate of released animals is often unknown. NBTP are common in the Northern Territory's urban areas and frequently come into care and are subsequently rehabilitated and released.

Research on Common Brush Tailed Possums suggests that possum survival after release is low. Wildlife carer's need a better understanding of the factors influencing the successful rehabilitation of wildlife and the results of this study will assist in determining if Wildcare's rehabilitation and release methods are adequate to ensure survival of released possums.

### **Objectives**

The objectives of this study were to gain an understanding of post release behaviour and survival of rehabilitated possums and to determine if existing pre-release management practices are adequate for possum survival.

Factors considered include:

- number and cause of mortalities
- time to mortality post release

- behaviour and movement of the possums
- the effects of collaring.

Factors affecting post-release survival of rehabilitated animals include

- suitability of release sites
- pre-release rehabilitation (predator awareness, ability to identify food),
- ability of the animal to handle stress,
- competition

### **Study area**

The study area was 15 km<sup>2</sup> of privately owned land 100 km south of Darwin.

The property consists of flat swampy areas in the south to undulating hills in the north with elevation ranges from 47m - 140m. There are several small wet season channels draining into Coomalie Creek which flows seasonally. Small bodies of permanent water are scattered throughout the property and vehicle access is limited during the Wet Season (Dec to Feb).

Vegetation is low open woodland and dry sclerophyll forest dominated by *Eucalyptus miniata*, *Eucalyptus tetradonta*, *Erythrophleum chlorostachys*, and *Lophostemon lactifluus*. The property is predominantly uncleared and firebreaks are maintained and it is used for limited grazing of cattle. The area is known to support populations of NBTP as well as other marsupial species. The site had been used intermittently as a release site for 3 years with approximately 50 possums released at the site by Wildcare during this time.

### **Methodology**

The methodology for this study was devised with the assistance of NRETAS staff.

Radio tracking is the ideal method for tracking vertebrate movement and has been used successfully to determine aspects such as survival, home range, utilisation of tree species, dispersal and spacing behaviour. For this study 42 possums were fitted with radio transmitting collars.

Trap surveys were undertaken at the release site for 2 nights prior to possum releases, using standard NRETAS trapping methods, to compare wild resident possum numbers but no possums were trapped. No spotlight surveys were undertaken.

Wildcare purchased 30 'ready for use' radio tracking collars with built in antennae from Sirtrack Transmitters.

The collars had the following specifications:

- signal range 2 – 3 km.
- weight 32g
- battery life 14 months
- small elastic insert
- movement (mortality) sensor to differentiate signals for living and dead possums.

The first 2 groups of possums were assessed as suitable for release by a veterinarian. The possums were microchipped, and blood and ear tissue samples collected to assist investigation should a mass mortality occur.

The possums declared fit for release had a collar fitted. The collars were designed with an elastic section designed to perish over time so as not to constrict possum growth.

Detailed records of each possum processed for release included:

- body condition
- weight
- sex
- demeanour
- dental check
- microchip number
- collar number



Collared Northern Brushtail Tail Possums

After health checks and collaring the possums were returned to their rehabilitation cage and observed for a minimum of 1 week prior to release.



Typical release cage

After the first 2 releases with no mass mortality (23 possums in total), it was decided to abandon collection of skin and blood samples due to the significant stress to the possums with little potential benefit. The veterinarian examination was also abandoned as experienced carers were able to assess possum weight, health, skin and teeth in the pre-release cages. This meant possums did not have to travel to the surgery which greatly reduced the stress when fitting the collars.

The possums were all hard released in the late afternoon and no further support provided. Each possum was transported inside their nest log to the release site where the log was attached to a suitable tree. A release site was considered suitable if trees with natural hollows were present along with local native tree species eaten by possums such as wattle (*Acacia auriculiformis*) and ironwood (*Erythrophleum chlorostachys*).

Release procedure included

- turning on and checking the transmitter is operational and signals are being received
- locating a tree with an accessible, horizontal, shaded limb and taping the log to the limb.
- recording the location of the tree on the GPS receiver.



Release log in tree

On the first release there was a problem with collars slipping off the possums as the buckle mechanism did not allow collars to be fitted as tightly as required. These collars were found on the ground not far from the release site and were re-activated and reused. The collars were returned to the manufacturer for modification with a screw locking mechanism.

A total of 42 possums were released in 5 separate groups between October 2007 and May 2009. Possums were monitored using a Yagi antenna with Yaesu or Icom VHF hand held receivers to track each collar. Tracking involved checking for each individual frequency from a hilltop and estimating the location of each collar or noting the lack of signal. Tracking was carried out by vehicle, on foot and by air. Each possum was tracked daily for 10 days after release, then weekly or fortnightly till the signal was no longer locatable. Possums were randomly tracked to the tree depending on ease of

access and time constraints. Possums moving outside the property boundaries were recorded as out of range.

The following field tracking data was recorded:

- GPS position
- Type of tree/den possum is located in
- Tree diameter at breast height (DBH)
- Height of the first accessible hollow.

Specific data recorded on each possum included:

- time each possum remained in its release log
- distance the possum moved between tracked locations
- duration the possum stayed in the area
- signal type (weakening, lost or mortality activated) and possible cause.

### **Possums in the study**

All the possums included in the study were sourced from local Wildcare carers. All were originally from the greater Darwin urban and rural areas.

Adult possums enter care as a result of vehicle accidents, injury from feral animal attacks, illness or occasionally relocation from urban dwellings. Wildcare does not translocate possums directly. All displaced possums undergo a 2 week rehabilitation period to enable monitoring of health, fitness and demeanour and allow familiarisation with native food plants and a nest log.

Wildcare carers successfully rear juvenile possums from 35g furless joeys up to 400g sub-adults. Young possums of similar size are frequently buddied which benefits the young possum's socialisation and recovery and increases the capacity of carers. Young possums generally buddy well and often share a log even when additional logs are available. Buddied possums were released in the shared log.

The majority of possums received pre-release rehabilitation according to the minimum standards of the Wildcare Code of Practice for Possums:

- A minimum of 2 weeks in a large cage at least 2.4 x 2.4 x 2 m high.
- Provision of suitable branches for climbing as high as possible and swinging ropes to improve balance
- Provision of a 2 suitable nest logs
- Provision of fresh native vegetation at least 3 times a week similar to what they will find in their release area and ensuring this is being eaten
- Provision of stimuli such as placing the food around the cage on hooks etc

A possum was deemed ready for release when in good health, according to weight and body condition, there was evidence of good climbing ability and evidence that local native plants were being consumed.

The following details were documented for each possum (where possible):

- date, age and weight when came in into care
- reason for care

- time in care
- health issues
- housing (cage size, diet,)
- buddy status
- carer's name

## Results

During the 2 years of the study, 42 possums were tracked with 735 observations recorded. Tracking ceased during the Wet season due to the inaccessibility of parts of the property. We were able to track one possum after the wet season for 18 months in total.

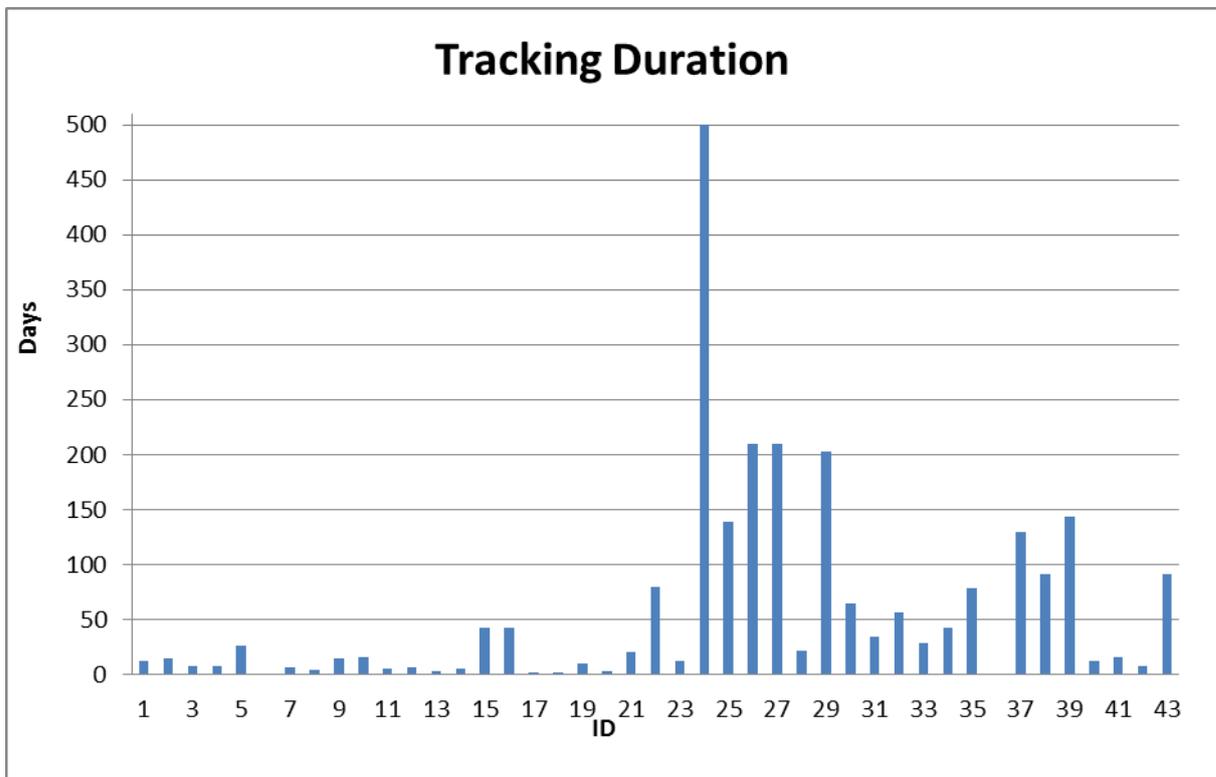


Fig 1. Duration of tracking of released possums

Possum behaviour was variable;

- Most stayed in the release area overnight and were still in the area for several days.
- Some remained in the release logs for days or weeks, whilst others moved on immediately.
- Some were found sheltering exposed in trees after the 1st night then soon found hollows.
- Most found different hollows every night with occasional repeat use of hollows.
- Buddied possums rarely stayed together after release.

The choice of tree and location varied greatly. Some possums used old open trees and low hollows for the first few nights then moved to taller, larger trees with hollow

entrances over 8m high. Others were found in exposed hollows or small trees weeks after release after previously using larger trees.

A number of collars slipped off after time and were found inside tree hollows. Two trees were cut down to check the collars and live possums were found in the tree (one was nearly sawed in half!). The collars recovered from these trees were clean. Thereafter it was assumed that clean undamaged collars recovered on the ground or from inside a tree were dropped collars.

The loss of radio tracking signal included transmitter or collar failure, predation (without activating the mortality switch) and migration out of range (weakening signal). Most possums moved out of the immediate release area after a few days or weeks and then gradually moved out of tracking range over a period ranging from a fortnight to several months. The possums tended to move along the gullies between the hills.

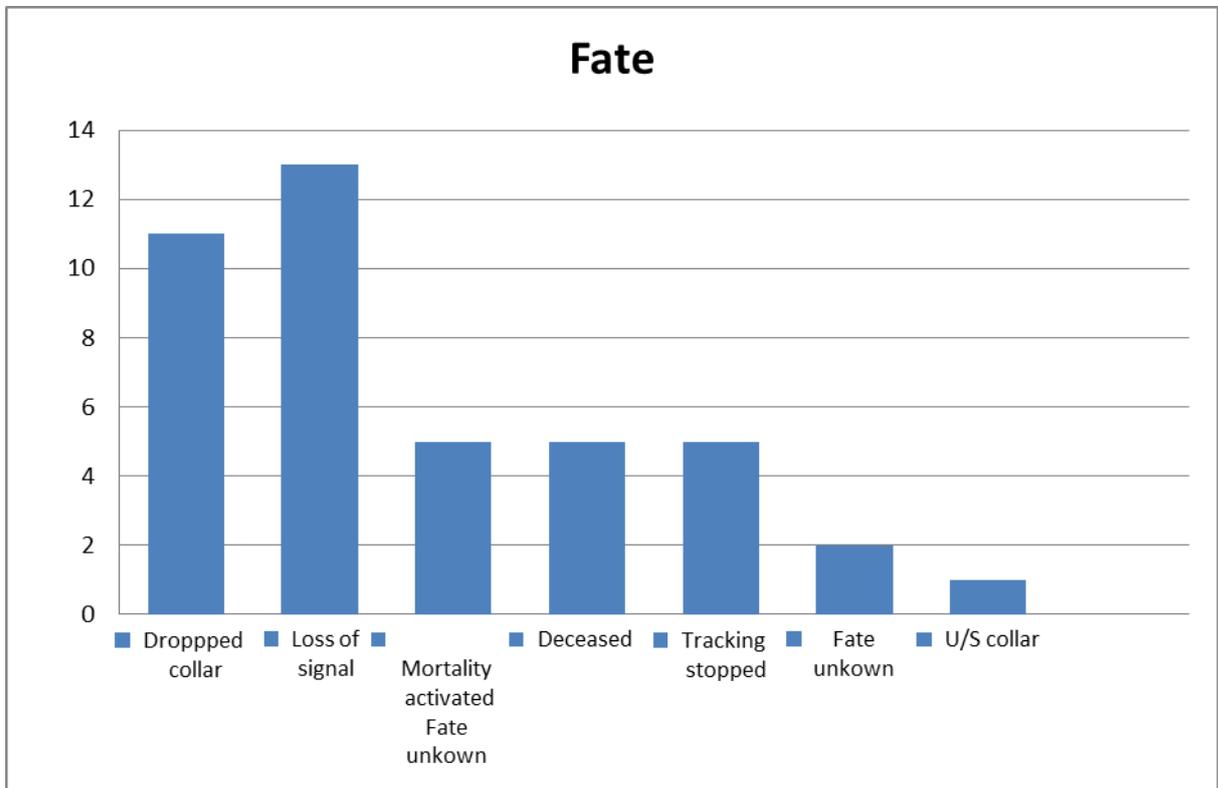


Fig 2. Fate of released possums

Where deceased possums were recovered, an attempt was made to determine the cause of death. Collars (or possum remains) resulting from predation by dog, cat or owl would be expected to be found on the ground and show some evidence of predator damage (bite marks) to the collar. None were found. The discovery of 3 collars still operating inside python faecal pellets after passing through the snake suggests that pythons are a significant predator of possums.

Other causes of death appear to be stress and/or starvation. A necropsy on a possum found deceased after 10 days revealed the stomach contents to be mainly faeces, presumably its own. Another possum was sighted daily after release exposed and on

the ground, although it had been climbing successfully prior to release, and it died after 4 days.

## **Discussion**

A number of site and population issues may influence the outcome for released possums. It was assumed that the release area is at or near carrying capacity especially as it is relatively undisturbed and protected from severe fires. The introduction of rehabilitated possums may be considered as re-enforcement to the existing population. Therefore some possums, either resident or introduced, would be expected to be lost from the population. It is assumed that the released possums are more likely to die as they are unfamiliar with the new environment and may exhibit behaviours that are inappropriate to the release habitat (Pietsch, 1994). Thus it is important to monitor the long term survival of introduced/ additional possums.

There was no obvious difference in the survival of possums based on age or reason that they came into care with handreared possums behaving similarly to adult wild possums. The possum tracked the longest came into care at 100g. There appeared to be no preference for tree, hollow or vegetation type even using trees that had many green ants present, or were small and fully exposed to the sun and trees were revisited randomly.

Access to water did not appear to be a factor in possum survival. As the Top End season has distinct Wet and Dry seasons it was thought that possums may need to be released near a water source in the Dry season. However when this was done, possums dispersed in all directions often heading away from a water source for weeks.

Using necropsy results of a deceased possum it appears that death by starvation takes approximately 10 days. On this basis, possums that survived in excess of 10 days may be considered successfully released. Tracking results show that 69% of possums survived post 10 days. This result is more encouraging than other similar studies on Common Brush tailed Possums, however the absence of foxes could have a significant bearing on this outcome. The results do suggest that the existing rehabilitation practices for possums are adequate, however more emphasis on pre-release behaviour may assist in preventing stress related deaths.

The results of this study will be used to revise the Code of Practice for Wildcare carers and to develop training resource material. Publication of the results of this study will raise community awareness on appropriate care and rehabilitation of native wildlife in the Top End and may encourage other wildlife care groups to review their release practices.

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- Derek Spielman

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## **JO NEYENS AND SARAH HIRST**

**Jo Neyens** has been a member of Wildcare Inc NT for 9 years and a carer of a variety of Top End wildlife. Like most carers she was concerned about the fate of released wildlife, and after participating in and organising the 2006 NWRC, she realized that the results of a study on the survival of released rehabilitated Northern Brushtail possums would be of interest to wildlife carers all over Australia. Wildcare Inc NT was successful in obtaining funding to conduct this study

**SARAH HIRST**: Sarah is a fellow Wildcare member of many years. She has presented at previous NWRCs (usually associated with antilopine wallaroos) and will be assisting in the presentation of the paper on the study of the survival of the released rehabilitated Northern Brushtail possums.