

THE RELEASE OF REHABILITATED NATIVE MARSUPIALS AND OCCUPANCY OF ARTIFICIAL HOMES ON THE SUNSHINE COAST

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Introduction

Australian native fauna within the South East region of Queensland is constantly under pressure from vegetation removal and human infrastructure expansion. With this expansion comes an increased demand on wildlife rescue services to cope with native fauna that are displaced, injured or orphaned. In a study on eastern pygmy possums Bladon [1] found that land clearing reduced a stable population occupying an area from 83% usage rate to 5%. This increasing demand poses the question of where to relocate animals either displaced or raised in captivity. To release rehabilitated fauna kept in some situations for months in captivity at their place of origin is not always an option. Lack of information on specific origins, extensive vegetation clearing and predation by domestic animals can limit desired outcomes.

The relocation of native fauna has been used in the past as a conservation effort to either protect or increase a species survival effort. At times it is also used to reduce conflicts between people and wild animals [2]. The translocation of magpies by the Environmental Protection Agency is a prime example of this process[3], and in Melbourne over a two year period in the 1990's 3785 common brushtail possums were translocated from the urban environs to forest areas to alleviate conflict with humans [4].

To relocate an animal that has developed strategies for survival, maintained social existence and reproductive capabilities into another area is difficult. Previous studies have shown the survival rate from relocation is low [3]. Pietsch [4] in studying common brushtail translocation found that more than 70% died within a week of release. Baker and Gemmell [5] suggested that translocated Brushtail possums take up to 2 years to successfully reproduce after being kept in captivity.

The Wildlife Volunteers Association Inc. (Wilvos) of the Sunshine Coast are native fauna rehabilitation volunteers that have been in operation for the past 18 years. The common marsupials cared for within the association are short eared brushtails (*Trichosurus canis*), common brushtails (*Trichosurus vulpecula*), ringtail possums (*Pseudocheirus peregrinus*), feathertail gliders (*Acrobates pygmaeus*), squirrel gliders (*Petaurus norfolcensis*) and sugar gliders (*Petaurus breviceps*). Each of these species requires intensive care and specific release needs. The association has developed set caring guidelines for each species and endeavors to mimic the natural environment and dietary requirements during the caring process. Development of such strategies as reduction in the amount of stress contributed by captivity is achieved by providing artificial homes, large enclosures away from human contact and by provision of a diet similar to that of which the animal would source in nature.

The use of artificial homes in the placement of marsupials is an ideal transport mechanism that ensures initial safety and reduction of stress to an animal during the release process. The placement of the homes requires consideration to not only the fauna being released, but also to the residential populations within the natural environment. Smith and Agnew [6] suggested that aspect and height of artificial homes may contribute to occupancy rate. Furthermore Lindenmayer

[7] stated that the dimensions of the nest boxes play a critical role in use. The added benefit of placement of artificial homes within areas lacking natural hollows is that the homes may provide extra denning sites to residential populations. Although the carrying capacity of the area must always be taken into consideration [7].

The development of a release program within the Wilvos was an innovative approach to improve the outcome of releasing animals into the wild. The priorities behind the program were to correctly identify habitat requirements, retain the spatial integrity of local community dynamics and to monitor the outcome of release. This was to reduce the previous practice of indiscriminate placement by carers into their local areas. The format for the release of marsupials within the release program currently involves the following steps:

1. The carer network matches animals to determine suitability as a single unit, paired or groups depending on the species
2. All animals are encouraged to use artificial homes supplied by the association
3. At a weight or socially mature age determined by the carer the animal or animals are ascertained as ready for release
4. The selection of a suitable land for wildlife property is made
5. The animals are transported in their artificial homes by the carer and placed onto the property in a release trailer that has a snake proof cage approximately 2m x 2m x 1m provided by the association.
6. The property owner is educated in the requirements of the animals and shown vegetation and feed quantities for the animals. The animals are left to acclimatize and adjust to their new environment for a period of approximately one week.
7. The animals are monitored for signs of stress or lack of wildness and maturity during this period.
8. The animals and their artificial homes are then placed on trees in locations around the property.

The artificial homes used for the marsupials in care and during release vary with species (Fig.1). The Brushtail possums and gliders are housed either in hollow logs or ply boxes based on the design shown in Figure 1. The ringtail possums are housed in either hollow logs, ply boxes or a thick wire basket 30cm in diameter that is suspended by a chain.

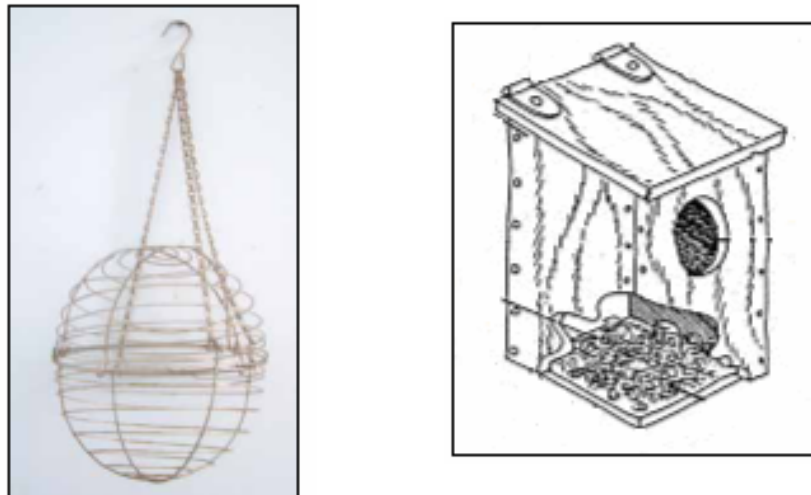


Figure 1: artificial home designs

The aim of this study is to (i) monitor artificial home placement at 12ft and 20ft, and determine the occupancy rates over a 9 month period, and (ii) assess the Wildlife Volunteers Assoc. Inc. rehabilitated fauna release program in its current format.

Methods

Study Area and monitoring period

The study area was situated within the Sunshine Coast Region, Queensland. Private properties made available through the Land for Wildlife Program were selected as release sites (Fig. 2). A total of 37 artificial nesting sites were established over a 12 month period. To these sites 14 brushtail possums, 35 ringtail possums and 11 gliders were released. All release sites were examined over a 9 month period between August 2003 and August 2004. Ten sites were assessed 4 times; at week 1 of release, 3 months, 6 months and 9 months. Four sites were assessed only 2-3 times due to time constraints within the study period.

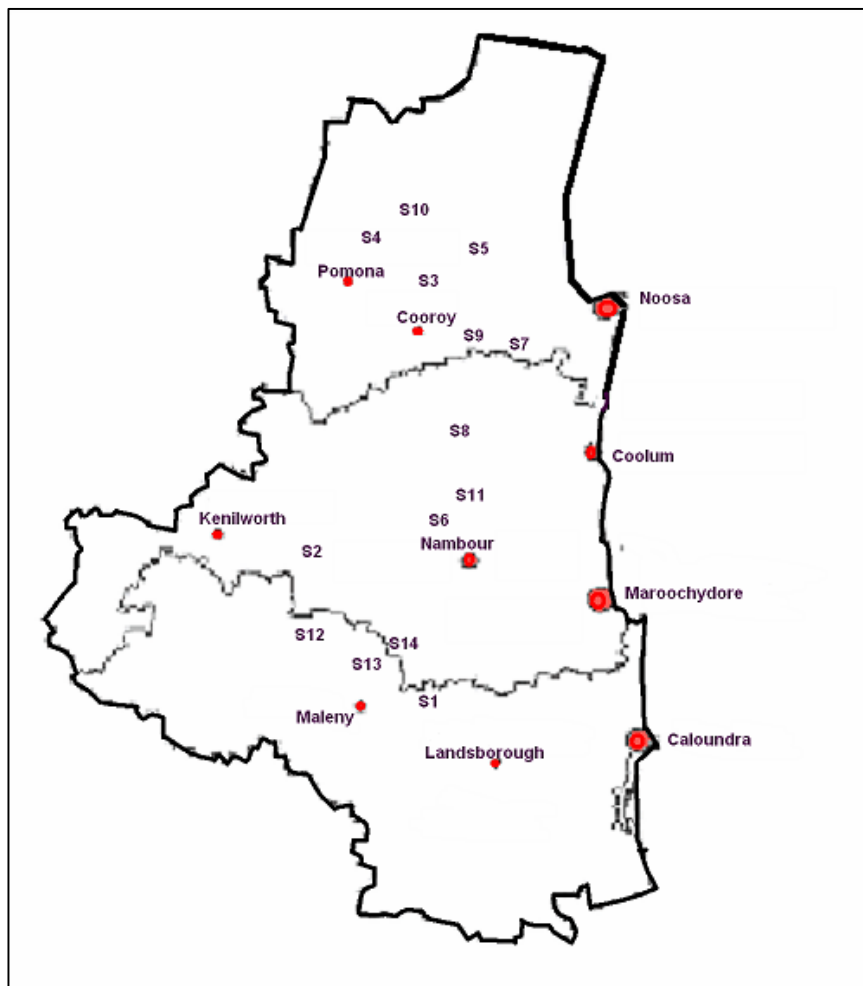


Figure 2: Location of artificial home placement in the Sunshine Coast Region

Monitoring Data Collection and Analysis

The monitoring procedure encompassed the following criteria. Regular communication with property owners regarding sightings or vocalizations heard within the area of release and visual examination of the dens. Photographic documentation was performed by digital camera (Olympus) with 8 x optical zoom to reduce close distance contact. If den occupation was not apparent or exogenous influences were determined follow up procedures were used. These included tracking, scat identification, hair analysis, tree marking and night watching to determine the outcome. Night watching observations were performed using Electronic Listening and Digital Recording Devices (Orbitor) and Infrared Camera (Model LWMC-2110, OzSpy). To determine the box occupancy it was expressed as a percentage of the number of boxes occupied by marsupials divided by the number of boxes checked [6].

Results

Box performance

A total of 37 artificial nest homes were placed at 14 sites within the Sunshine Coast region. Ten release sites were examined 4 times over a 9 month period; at week 1 of release, 3 months, 6 months and 9 months. Four sites were assessed only 2-3 times due to time constraints within the study period. To these sites a total of 14 brushtail possums, 35 ringtail possums and 11 gliders were released. Due to the inclusion of sites late in the project the occupancy rate was calculated only on those sites extending over a nine month period. The occupancy rate by marsupials within denning range of the nest boxes at the end of the 9 month period was 47% (N=11) (Fig. 3) for homes placed at 12ft. At sites 4, 6, and 10 where several artificial homes were placed the released and wild possums moved between homes through the study period. The homes placed at 20ft had 0% occupancy (N=6) throughout the 9 month period.

The denning occupancy rate (Fig. 4) within the site areas increased at 1 month to 93% as local residents claimed territorial rights over the areas. It then gradually declined over time to begin stabilizing at 6 months (50%) to the resultant 47% as previously mentioned. The occupancy rate of released marsupials was initially 60% (N=12), at 1 and 3 months there was a decrease to an average 33%. There was a further decline at 6 months to 25%. This decline continued at 9 months as the animals further adjusted to their new environments to end with an occupancy rate of 20%. Occupied homes at 12ft were only used over extended periods of time by three species, the common brushtail, the short eared brushtail and a fawn-footed melomys.

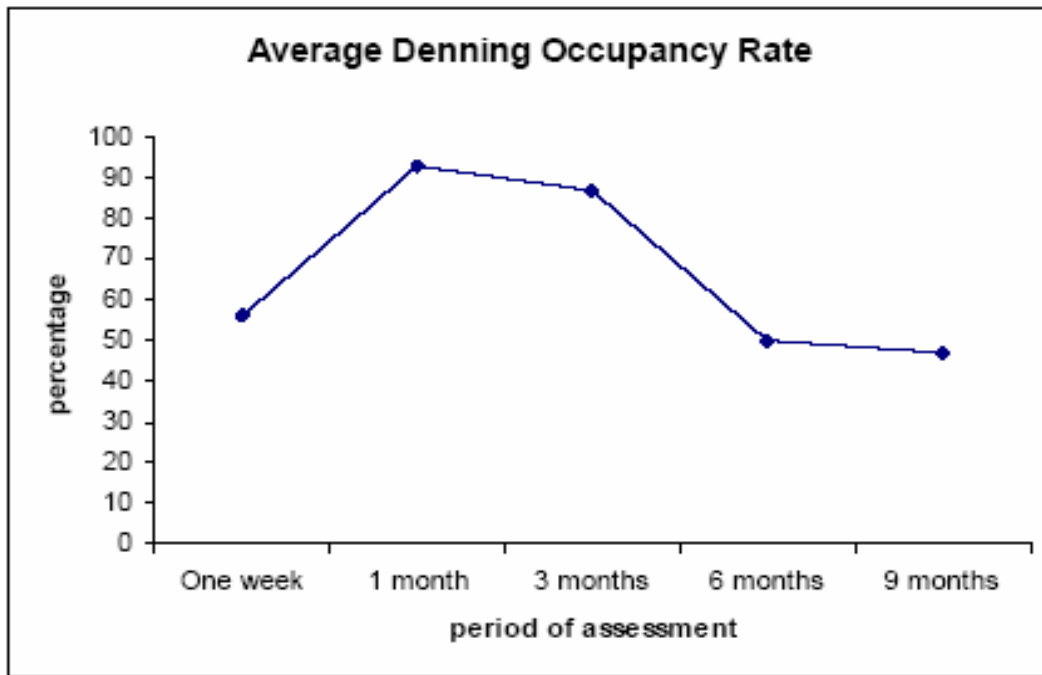


Figure 3: Occupancy rate of marsupials in artificial homes at 12ft

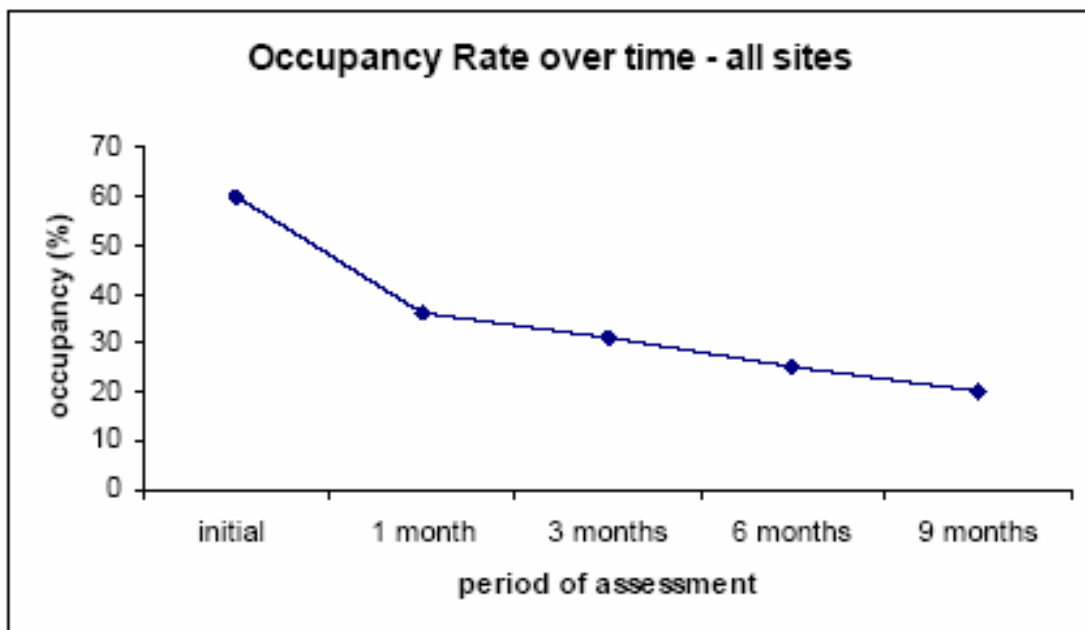


Figure 4: Occupancy rate of relocated marsupials over 9 month assessment period

Release program performance

The presence of predator species; fox, dingo and goanna in close proximity to placed homes was seen at Sites 1, 2, 3 and 10. Diurnal tracking showed high use of Site 10 as a feeding area for residential marsupials, mice, bandicoots, hares and pigs. Boxes at Site 8 contained ants and native bees. At sites 12 and 9 ringtails released nested in Pandanus palms located in 90% rainforest canopy. Injury to released animals by other animals and by human interference occurred on Sites 1 and 3. The artificial drey used at Site 13 showed no contribution to nest and had deteriorated. Rehabilitated brushtail homes positioned facing the east and on exposed tree trunks resulted in high weathering and nil occupancy. Sites 1, 4, 6 and 10 showed presence of wild possums and no occupation by rehabilitated possums. At Site 2 the property owner continued to feed the released animals with the box containing old corn cobs, apple and orange. At sites 4, 6 and 12 released brushtails relocated to areas where native or non native fruit trees were established. Gliders released at sites 3 and 5 established in hollow bearing vegetation within the property and did not return to artificial homes. A short eared brushtail released at a weight of less than 2kg was returned to care from site 14. Released animals at Sites 2 and 14 socialized with property owners within 1 week after release.

Discussion

The release program within the WILVOS was an innovative approach to improve the outcome of releasing animals into the wild. The priorities behind the program were to correctly identify habitat requirements, retain the spatial integrity of local community dynamics and increase the success rate of relocation. This was to reduce the previous practice of indiscriminate placement by carers into their local areas. The release of wildlife brought into rehabilitation encompasses several different approaches. Where the animal is an adult or juvenile that has been impacted through human intervention, i.e. injured by a vehicle, abuse, or habitat removal or has been subjected to domestic animal attack it may require the animal to be relocated to another area to reduce the likelihood of a reoccurrence. Wildlife brought into care as an orphan also requires placement within a new habitat after extensive time in care.

This study shows that captive fauna released into the wild can adjust when given conditions suitable for the species. The occupancy level in this study at 9 months was comparable to that reported by Lindenmayer and Smith [6, 8]. Lindenmayer [9] has also found that utilization of artificial homes by wild forest inhabitants generally will not occur within the first 2 years of placement. In this study wild forest inhabitants occupied artificial homes throughout the study period. Although it was only specific to homes built from ply and retained hollow logs.

The location and availability of suitable nest sites is thought to influence possum movements and determine residency in an area [10]. The occupancy in the artificial homes by wild residents may indicate a need for artificial homes due to the lack of natural nesting sites in the areas. Or it could be a dominant hierarchy of the area where wild residents are using scent, occupancy and marking to deter relocated fauna from establishing rights over an area. Changes in occupancy of individuals between homes on some sites could also indicate a denning response was occurring. This was occurring with wild populations and released animals.

No occupancy was observed in artificial homes placed at 20ft. This may be due to the positioning (height or direction) or the exposure on the tree as previously seen by Smith and Agnew [6]. This does not stipulate that at some period these homes will not be used. Many bird species prefer that location and exposure. Gliders are also well known to occupy sites at that height. It was however found in this study not to be necessary for possum habitation.

The use of wooden nest boxes and artificial wire dreys can be concluded as not successful in relation to ringtail occupancy. This may have been due to the placement of the boxes in areas that did not provide seclusion within the tree foliage. It may also be due to the inactive contribution by the ringtails in the activity of drey maintenance. The ringtails may either be not able to contribute due to the constraints of the external wire or do not have the skills that would be naturally acquired by the parental interactions.

Glider and ringtail occupancy was found to be nil throughout the study. As stated by Lindenmayer [7] home design can influence occupancy levels. For gliders their natural hollows are small in dimensions, particular the internal diameter and opening. The selection of hollows is largely dependent upon the

species instinct to feel protected from predators. The entrance and internal dimensions of the current artificial home is much larger than that observed in the wild. The release of gliders can be suggested as successful when vegetation is selected to give the species opportunity to establish in natural hollows. The occupancy of artificial boxes was nil in the study because of this selection process. The release of gliders into areas with high abundance of *Eucalyptus*, *Melaleuca* and *Acacia* old or mature growth increased their chances of establishing residency. Dispersal after translocation of possums is believed to be multidirectional with dispersal ranging between 2kms and 14 kms from relocation areas [11]. The dispersal of ringtails in this study was more successfully achieved when vegetation prior to release was selected specific to the species. Obtaining properties with established palm trees and dense vegetation appears to be ideal for ringtail establishment. The dense vegetation providing the protection and seclusion they require.

Predation by residential fauna can influence residence of artificial homes. In a study of 22 ringtail possums released Russell *et al*[13] found that 18 were killed by predation. Primary predators being lace monitors (*Varanus varius*) and diamond pythons (*Morelia spilota spilota*). In this study predation was seen by lace monitors, foxes and dingoes. Familiarity with humans was also an issue that created difficulties with releasing short eared possums and ringtails. This imprinting was extended after release by property owner intervention.

Conclusion

This study has shown that the rehabilitation and release of native fauna is a multifaceted event. It has also shown that with the right approach the release of native fauna into a new environment can be achieved. Aspects required to improve release viability are prior assessment of predatorial influences, recognition of associated species co-habitat requirements, topographic and temporal selection of the new habitat, species specific artificial housing and food sourcing needs. If these aspects are identified the release process and final settlement into a new environment can be achieved over time.

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