

# Reintroduction of the Idnya (western quoll, *Dasyurus geoffroyi*) to the Ikara-Flinders Ranges National Park in South Australia

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## Introduction

### *The reintroduction in general*

The trial reintroduction of the Idnya or western quoll to the Ikara-Flinders Ranges National Park has gone extremely well. In April 2014, 41 idnya were successfully released within the National Park and were radio tracked for six months. During this 6 months of monitoring feral cats were identified as the main cause of idnya mortality, with 12 idnya confirmed (via DNA analysis) to have died due to cat attack in 2014 (Moseby *et al.* 2015). Excitingly, successful breeding was seen in this first year, with approximately 60 pouch young born in the park. Juvenile survival appears to be high, with 25 free-roaming juveniles captured and processed during annual trapping in December 2014 as they began dispersing away from their mothers.

Following the success of the first year, the Department of Environment, Water and Natural Resources (DEWNR) and the Foundation for Australia's Most Endangered Species (FAME) were given approval to carry out a second release of 37 idnya in May of 2015, and a third release of 15 animals in May 2016. Again, both of these releases were monitored via radio-tracking and cage trapping and these animals have settled into the National Park. Successful breeding occurred again in both years, with a number of the females released this year confirmed to have pouch young. In addition, some of the previous year's juvenile females have also had pouch young (F1 and F2 generation). In all, 92 free-ranging juveniles have been caught in the park over the last 2 years, with more anticipated to disperse in December 2016. Unfortunately, despite an increase in feral cat control throughout the park, several idnya have again been lost to feral cat attack.

Regular monitoring has allowed us to determine that idnya are dispersing throughout the park and have maintained good body condition, suggesting they are finding sufficient food. They are using a variety of shelter sites, including hollow logs, burrows, rock crevices and tree hollows. This will be discussed further below. Monitoring of the idnya is ongoing, however the field component of my study has now finished.

### *Project aims*

Australia has the highest mammal extinction rate in the world. One way to address and slow fauna declines is via reintroduction programs, however the success of these programs is often low. The aim of my project was to investigate ways to improve reintroduction success, using the trial reintroduction of the idnya, or western quoll

to the Flinders Ranges as a case study. Whilst predation is the leading cause of reintroduction failure world-wide, there are many other factors that may contribute to the failure of reintroduction programs. We wanted to investigate what else could be done to improve reintroductions success, such as:

1. Ensuring the habitat within the release site has adequate shelter sites
2. Exploring different release methods
3. Choosing individuals with the right 'personality' for reintroduction, and
4. Investigating what part stress plays in reintroduction success.

## **Materials and Methods**

### *Study Site*

The field component of this study was performed throughout the Ikara-Flinders Ranges National Park.

### *Aim 1 – Shelter site availability and use*

Prior to the idnya reintroduction a survey of 80 randomly selected 1 ha (100 m x 100 m) plots was undertaken within 8 different habitat types throughout the release area. These surveys were conducted to determine the availability of suitable shelter sites. The features of all potential shelter sites (including tree hollows, rock crevices, hollow logs, and burrows) were recorded. For comparison, shelter site use was then investigated via radio-tracking the idnya for six months following release.

### *Aim 2 – The effect of release method on reintroduction success*

To test the effects of release method on animal survival and movement patterns 16 idnya (9 males, 7 females) were soft-released. These animals were released into individual 10 x 10 m enclosures built within the release area (see image below). These idnya were held for a period of ten days with food and water, after which the enclosure gates were opened and the animals were free to come and go as they please. In addition, 25 idnya (12 males, 13 females) were hard-released directly into the environment, with no supplementary food or water. All idnya were checked for survival (using a mortality signal emitted from the radio collar) each day following release, to determine the number of days known to be alive. Idnya were also radio-tracked to determine the distance moved from the release site.

### *Aim 3 – Can personality traits be identified in idnya and how do they effect survival following release?*

All idnya were held at the Native Animal Rescue Centre (NAR) in Perth prior to transportation to the Flinders Ranges. Personality testing was conducted for 69 individuals. Each animal was given a series of repeated tests and their responses recorded on camera (see image below). These tests included a mirror test, a predator scent test, and a novel object test. We also recorded their tendency to eat on their first night in captivity, their handling behaviour every time we trapped them, and how quickly they ran off when released into the Flinders. Idnya were then monitored (via cage trapping and radio-tracking) for six months following release, to determine survival, dispersal and breeding success of individuals of each behaviour type.

### *Aim 4 – Investigating stress in the reintroduction process*

Scat samples were collected from the idnya throughout the reintroduction program, including when they were trapped, during their time in captivity, and for 3 months following release. Hormone analysis was performed in collaboration with Dr Kerry Fanson at the Deakin University lab (see image below).

## **Results**

### *Aim 1 – Shelter site availability and use*

The National Park has sufficient shelter sites to meet the needs of the idnya (at least 5/ha). Idnya chose to use a variety of shelter sites, including hollow logs, rock crevices and rabbit warrens. Interestingly, female idnya sought out tree hollows when it came time to den their young. This occurred in both field-work years of the

study and has not been recorded in the literature before. Idnya did not chose to use any artificial shelters provided throughout the release site.

#### *Aim 2 – The effect of release method on reintroduction success*

A soft release method appeared favourable in keeping idnya closer to their release site early on, however over time the method of release (hard vs soft) made little difference to the overall survival and body condition of idnya.

#### *Aim 3 – Can personality traits be identified in idnya and how do they effect survival following release?*

We have determined that different personality types can be identified in idnya and are best identified by looking for consistent individual differences in behaviour using a novel object test or repeated measures of handling behaviour. Preliminary analysis has determined that personality appears to have no effect on survival, dispersal or breeding success of idnya following release. However, we have found positive correlations between foraging behaviour whilst in captivity and body condition following release. A positive correlation was also found between exploratory/bold behaviour and large home range sizes. Data analysis is ongoing.

#### *Aim 4 – Investigating stress in the reintroduction process*

Data analysis is still underway for this component of the study. To date we have validated the first enzyme immunoassay to analyse stress hormones (faecal glucocorticoid metabolites) in idnya scat. This non-intrusive and easily repeatable collection technique can give us a wealth of knowledge not only about how stressful animals find the reintroduction process and when the ‘peak’ stressful events occur, but also will be used to compare how animals cope with the different release methods trialled and how animals of differing personality’s cope with stress.



Images: 1. A soft-release pen in the Ikara-Flinders Ranges National Park. 2. Recording idnya behaviour at NAR. 3. Hormone analysis in the lab

## Discussion

The reintroduction of the idnya to the Ikara-Flinders Ranges National Park went extremely well and was a fantastic project to work on. Data analysis and manuscript preparation is still underway, however preliminary results, which have been communicated via numerous conference presentations, have been well received. Our results will benefit and guide future successful reintroductions of this species to other parts of their former range. We thank you for providing funding toward this research.

## References

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