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### **Post-fire survival and reproduction of rehabilitated and unburnt koalas**

**Daniel Lunney\***, Shaan M. Gresser, Paul S. Mahon, Alison Matthews

*NSW Department of Environment and Conservation, PO Box 1967, Hurstville NSW 2220, Australia*

#### **Summary**

Fire can be a catastrophic event which causes high mortality and injury in wildlife. While rehabilitation of injured animals is common, no studies have measured the success of rehabilitated wildlife following fire. This study compared the long-term survival and reproduction of a group of 16 injured, rehabilitated and released koalas with that of 23 uninjured koalas following fires in fragmented forest in Port Stephens, Australia, in 1994. Individual koalas were monitored for up to three years following release. There was no significant difference in the survival of rehabilitated and uninjured koalas after fire. Annual survival was estimated to be 58% for rehabilitated koalas and 67% for the uninjured koalas. Predation by dogs was the major cause of mortality for both groups. Reproduction did not differ significantly between the two groups over two breeding seasons following fire. It was concluded that rehabilitation of injured koalas was successful from the perspective of the individuals. Furthermore, such efforts have the potential to contribute to the recovery of populations depleted after fire and thus contribute to the long-term survival of koala populations.

#### **Introduction: the problem**

Rehabilitation and release of injured wildlife is common, yet the contribution of such efforts to conservation has rarely been measured. More typically, success is defined by the recovery of individuals to the point where they can be released back into the wild. The survival of these animals is rarely measured following release, either because monitoring is too expensive or too difficult, or because the value of doing so has not hitherto been recognised. Where post-release monitoring occurs, many studies consider only the short-term survival of released individuals, and do not provide information on how survival compares to that of other animals within the population.

A significant problem arises for wildlife managers where catastrophic events cause significant mortality in wildlife populations. In Australia, fire can cause substantial mortality among wildlife. Such events can threaten the long-term survival of isolated populations in fragmented habitats, particularly of less-mobile species and/or species with a low rate of increase. In this case the rehabilitation and release of injured animals may be important in population recovery.

How do we measure the contribution of these animals to population recovery? One approach is to measure the long-term survival and reproduction of rehabilitated animals and compare these rates to uninjured animals from the same population.

#### **The study**

This study compared the long-term survival and reproductive rates of a group of injured, rehabilitated and released koalas after fire with a group of koalas without injury (hereafter called “unburnt” koalas) from a site near Port Stephens, New South Wales. A total of 39

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\* Corresponding author. Fax: +61-2-9585-6606. E-mail address: dan.lunney@npws.nsw.gov.au

koalas was monitored by telemetry for three years following a major fire in January 1994 and two smaller fires later that year. The success of the rehabilitation effort was determined by comparing the long-term survival and reproduction of rehabilitated koalas with unburnt koalas in the same habitat at the same time.

The study was conducted in 7,000 hectares of fragmented coastal forest on the Tomago Sandbeds at Port Stephens, about 150 km north of Sydney, Australia.

There were three fires in the study area during 1994. Approximately 2,500 hectares of koala habitat were burnt in a wildfire in January. The fire intensity varied across this area, with patches of intense crown fire where the canopy was burnt and patches of moderate to low intensity fire where the canopy was only scorched. Small patches of unburnt forest were dispersed throughout. A hazard reduction (low intensity) burn covering approximately 50 hectares was conducted in June. Finally, about 600 hectares were subjected to hot crown scorching and small areas of low intensity fire in September.

Regeneration of the forest began immediately following the fires and within three months the eucalypts were exhibiting typical post-fire epicormic growth (*i.e.* eucalypt post-fire sprouting of leaves from trunks and branches of burnt trees). Koalas were seen among the epicormic growth within months of the fires.

#### *Post-fire rescue and rehabilitation*

Immediately following each of the three fires in 1994, extensive ground searches (600 person days in January 1994) were organised by a local wildlife care group, the Native Animal Trust Fund, to rescue injured and orphaned koalas and other wildlife. Many koalas were caught, examined and released within 24 hours if they were uninjured. Injuries to koalas included burns, particularly on the skin of the hands and feet, and smoke inhalation.

Rehabilitation of koalas typically occurred in three stages: 1. intensive care, where koalas were housed in enclosed cribs, monitored continuously and treated as required; 2. moderate-intensity care, where koalas were housed in an aviary-sized enclosure but were still under frequent observation; and 3. low-intensity care, where koalas were kept in a large enclosure with trees, shelter and feeding stations, and allowed to redevelop their climbing skills and strength before release. The length of time in rehabilitation varied between individuals. The average time in care was 168 days (range 52 to 423 days). Severe injuries, such as claw loss which prevented individuals from climbing, required the longest periods in rehabilitation. A total of 16 koalas, 11 from the January fire, one from the June fire and four from the September fire, was released back into the study site following rehabilitation. Only 1 individual from the January fire died in care, and no animals were euthanased. All released koalas were monitored in the program.

#### *Unburnt koalas (comparison group)*

Twenty-three unburnt koalas were captured from June 1994 to July 1996 and monitored alongside the rehabilitated koalas. These koalas were captured from the same area as the koalas that went into care.

#### *Radio-tracking*

Rehabilitated and unburnt koalas were individually marked with a microchip and ear tag and fitted with a collar-mounted radio-transmitter prior to release. Koalas were released in the area where they were rescued or captured. Koalas were typically tracked for five days per week from March 1994 to September 1996 and then once per week until the completion of the project. Individuals were tracked until they were observed directly. Once a koala was

located, the presence of any young on their back was noted. If the koala was found dead, the cause of death was recorded or veterinary advice was sought. Radiotracking was concluded in February 1997 and the radio-transmitters were removed.

## **Conclusion**

This study found no significant difference between the post-release survival of rehabilitated and unburnt koalas after fire. Furthermore, there was no significant difference in reproduction between the two groups. In other words, it showed that serious injury and a protracted period of care did not disadvantage rescued and rehabilitated koalas and that rehabilitated koalas did survive and breed at a rate comparable to unburnt koalas from the same area.

The value of having a comparison group has been illustrated by considering the low survival rates found for both groups of koalas. If the only group examined had been the rehabilitated koalas, the low survival rate may easily have led to the conclusion that rehabilitation was not a success. This is because koala survival elsewhere, particularly in southern Victoria, can be high. Therefore having a comparable measure, differing only in injury and rehabilitation, is vital for interpreting success in a given location at a given time.

In addition to the direct contribution that rehabilitated animals can make to population recovery, there are other long-term benefits from such rehabilitation programs. Rehabilitation of wildlife gives community groups an opportunity to be involved in wildlife management and increase awareness of their local environment. Without the participation and support of the local community, wildlife management programs, particularly in rapidly urbanising areas such as Port Stephens, are less likely to succeed in their local conservation goals. There have been many debates within the scientific community on the ecological value of rehabilitating wildlife, but the care and rehabilitation of wildlife by the community will continue regardless of these debates. We propose that further research into the post-release survival and reproduction of rehabilitated wildlife following fire should be encouraged to better understand and improve the value of these community-based efforts, in line with other studies that have evaluated the contribution of rehabilitated wildlife after release from different traumas

It is our view that this rehabilitation program was beneficial to the conservation of the Port Stephens koala population because it had been depleted, particularly by the 1994 fire. Further, we consider that when a population is reduced by a catastrophic event, such as fire, the introduction of rehabilitated individuals with breeding potential will contribute to an increase in the recovery rate of the population. This may be important for populations that are already recognised as declining, as is the case with koalas in coastal New South Wales. Moreover, as the remnants become smaller and more isolated, the likelihood that fire will burn the entire remnant is greater and so the value of future rehabilitation will correspondingly rise. This scenario is increasingly likely as urban development continues to fragment the forested areas in the coastal zone of eastern Australia.

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