

## Tracking camels

FERAL camels occupy an estimated 2.8 million square kilometres, or more than 37% of the Australian mainland, but their environmental impact is poorly understood.

To better understand the environmental impact caused by the movement patterns of feral camels, Glenn Edwards and colleagues studied six female camels in central and northern Australia for periods of 6–42 months. Six adult camels were captured and fitted with telemetry collars. These camels were members of herds that contained 6–15 animals.

Data gathered revealed that over 12-month periods areas used were large (between 449–4933 km<sup>2</sup>). Movement rates varied between 1.5 and 4.4 km per day, with an average distance travelled per day of 3.2 km. The study shows that feral camels are extremely mobile and capable of using very large areas.

Aridity was found to play a role in movement patterns. The size of the area used by feral camels was inversely proportional to long-term rainfall. The underlying reason is likely to be habitat productivity: as aridity increases, feral camels must move over larger areas to obtain sufficient forage to satisfy nutritional and energy requirements. Camels also need to access sources of water, which are likely to be more widely dispersed in arid areas.

Information on the size of the areas used, together with movement rates, as gained by this study, can provide a foundation for the design of effective management techniques. Extensive buffer zones are needed in arid regions to protect environmentally sensitive areas.

Edwards GP Eldridge SR Wurst D Berman DM and Garbin V (2001) Movement patterns of female feral camels in central and northern Australia. *Wildlife Research*, 28:283–289.

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## Penguins and oil don't mix

WHEN the bulk oil carrier *Iron Baron* ran aground on a reef at the mouth of Tasmania's Tamar River in 1995, it released some 325 tonnes of bunker fuel oil. The little penguin was the most visibly affected species, with 1894 oiled birds being collected for treatment and rehabilitation.

What effect did this have on little penguin populations? How did rehabilitated birds fare after being released? And what was the long-term impact of oiling on penguin breeding success?

By careful monitoring of penguins for two years following the spill, scientists with the Nature Conservation Branch of the Department of Primary Industry, Water and Environment, sought to answer these questions. Their studies indicated that despite the relatively small amount of oil spilled by the *Iron Baron*, the impact on penguins was extensive: 10 000–20 000 penguins died.

Rehabilitation (including a wash in warm water and detergent, feeding and exercise) of some 1800 penguins, and their subsequent release, allowed at least 44–59% to survive to the end of the study, 20 months later. Heavier birds in good condition and with less oiling at capture tended to have the best odds. About 90% of penguins were not lucky enough to be captured and rehabilitated, and so perished.

During 1995–96, egg laying by rehabilitated oiled penguins was delayed, and the number of pre-fledgling chicks from the eggs laid was lower than in non-oiled birds, but by 1996–97 these differences were absent. However, in both seasons, chicks with rehabilitated parents were smaller than those raised by normal non-oiled birds and their chances of survival were therefore expected to be lower.

Goldsworthy SD Gales R Giese M and Brothers N (2000) Effects of the *Iron Baron* oil spill on little penguins (*Eudyptula minor*) I. Estimates of mortality. *Wildlife Research* 27: 559–571.

Goldsworthy SD Giese M Gales R Brothers N and Hamill J (2000) II. Post-release survival of rehabilitated oiled birds. *Wildlife Research* 27: 573–582.

Giese M Goldsworthy SD Gales R Brothers N and Hamill J (2000) III. Breeding success of rehabilitated oiled birds. *Wildlife Research* 27: 583–591.

Steve Davidson

## Life on the edge

THE LOSS and fragmentation of natural habitat causes ecological changes to the composition of bird communities. But which species do these changes affect most: those living within the habitat or those on habitat edges?

To find out, Lainie Berry conducted a study comparing the influence of habitat edges created due to human activity, or 'edge effects' on the distribution and abundance of birds at Bunyip State Park, Victoria.

Censuses of bird species were conducted in forest-edge and interior sites within the forest during spring. At 16 sites, a total of 1125 individual observations of 38 bird species were made. The structure and composition of vegetation at edge and interior sites was also examined to determine whether edge-associated changes to vegetation contributed to differences in the bird community.

Overall, there was a significantly higher number of bird species and individuals in forest edge than in forest interior sites. This greater diversity appeared to be due to an increase in forest edge specialists,

rather than an influx of open-country species.

Four species were significantly more abundant in edge sites. One possible explanation relates to more foraging opportunities available at habitat edges.

Forest edges did not have a negative impact on the abundance of any one species. However, the species most likely to be negatively affected by edges are rare and have large home ranges, and their low numbers thus make comparison of abundances between edge and interior sites statistically weak.

The presence of forest species and lack of many open-country species at edge sites may have been due to the absence of edge-associated vegetation changes at these sites. Vegetation analysis revealed few differences in structure and composition between edge and interior sites. Only one significant difference was found between edge and interior sites: the total number of plant species per site was greater for edge sites.

Therefore, any changes to the bird community at the forest edge sites were most likely due to the presence of the edge itself, and not the effects of edge-associated changes to vegetation characteristics.

Berry L (2001) Edge effects on the distribution and abundance of birds in a southern Victorian forest. *Wildlife Research*, 28:239–245.

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