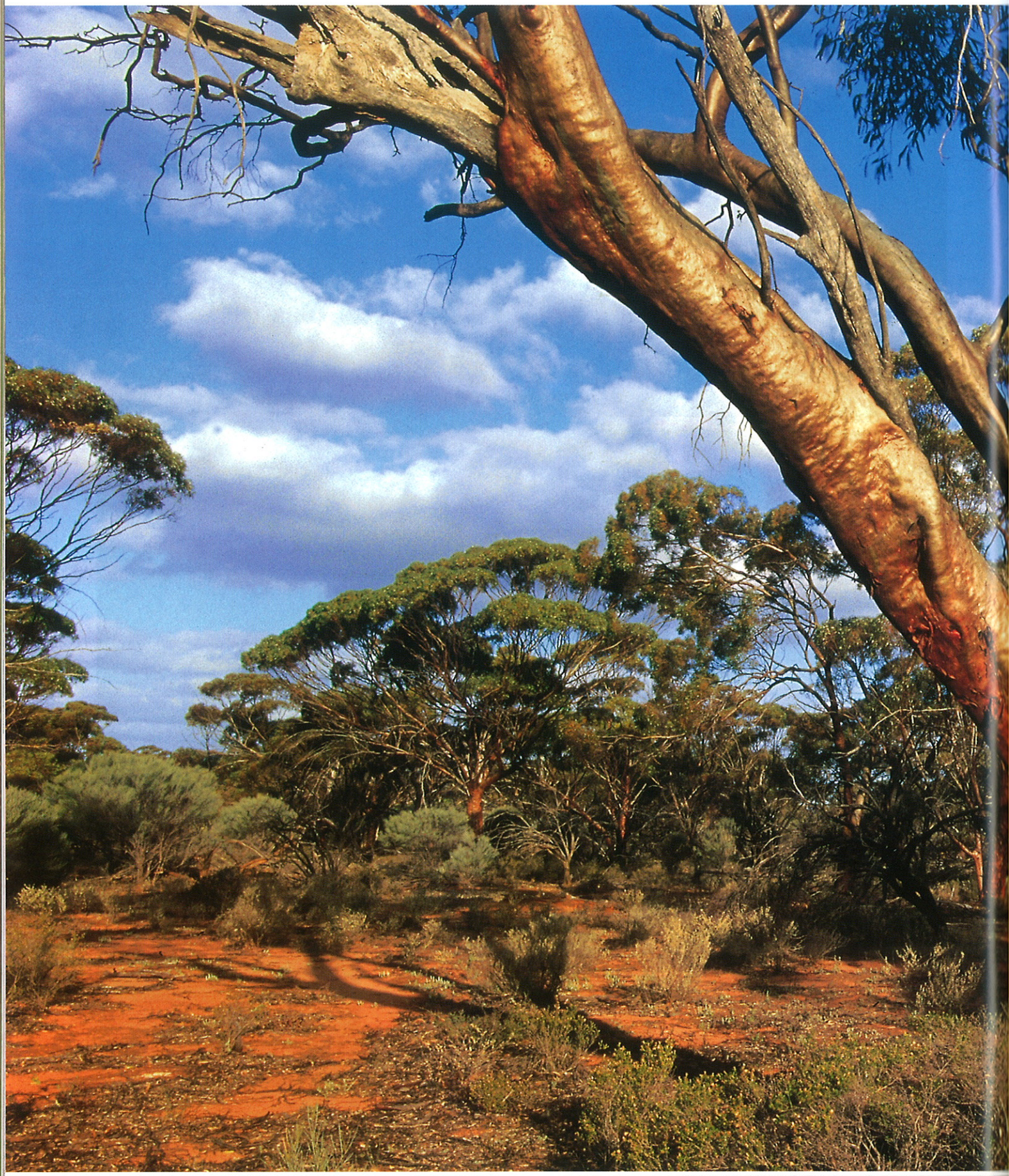


Controlling feral animals in the rangelands

New baiting techniques are having success in controlling feral cats, foxes and wild dogs and thus protecting threatened species in the Western Australian rangelands.

by Jacqui Richards and Dave Algar

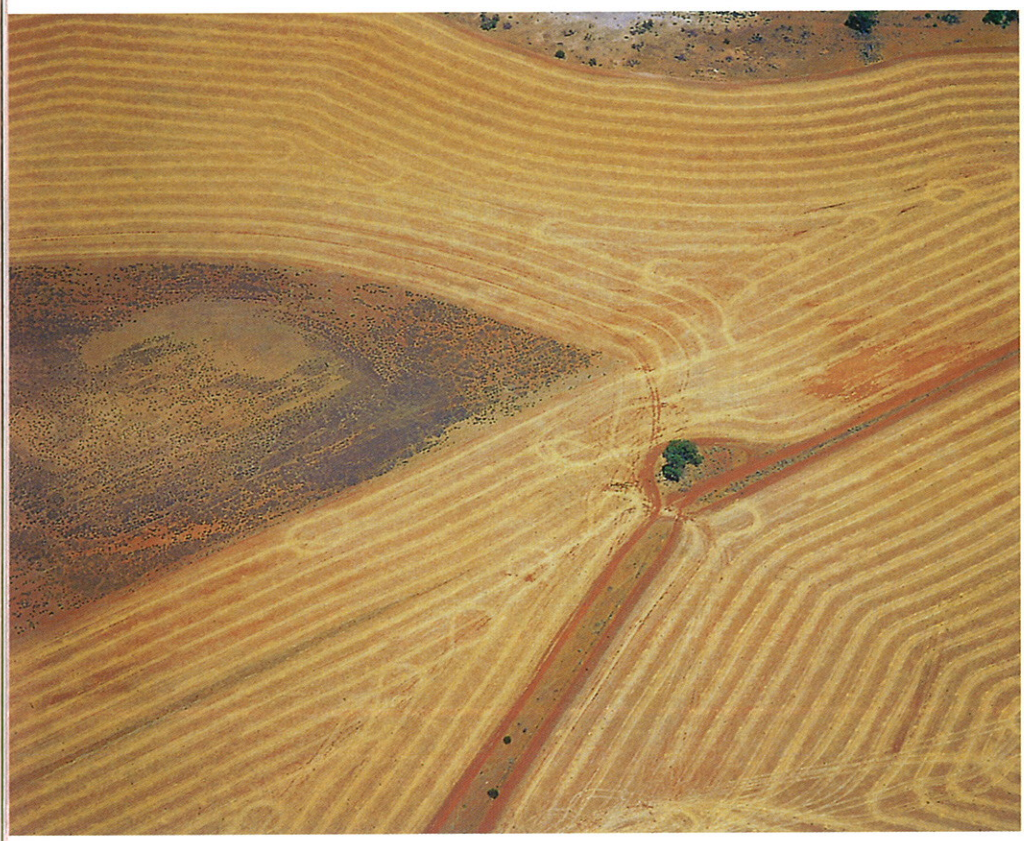
Much of the wheatbelt region of Western Australia has a bleak history of broadscale clearing for agriculture, resulting in rising water tables, salinisation of creeklines and the loss of flora and fauna that once inhabited these ecosystems. However, in the north of the region on the edge of the rangelands lies a parcel of formerly common habitat.

Immediately north of the agricultural zone past Dalwallinu and Wubin lies a vast tract of sandplain and woodlands that has been grazed by sheep and goats, inhabited by feral cats, foxes and wild dogs, and suffered the effects of an increase in wildfires, but has not been cleared. It is a transitional environment incorporating flora typical of the South-West Botanical Province, which was formerly dominated by vast tracts of *Eucalyptus* woodlands and flora from the drier Eremean Botanical Province, dominated by mulga (*Acacia aneura*) shrublands and known locally as the 'mulga-eucalypt line'.

Changing land use patterns

The southern rangelands are characterised by pastoral leases, with a spattering of conservation reserves and an array of mining tenements with interests in iron ore, gold and gypsum. Among these very obvious primary industries, the business of conservation is also increasing, championed by a diverse range of organisations.

Within close proximity to one another lie the Australian Wildlife Conservancy's (AWC's) Mount Gibson Wildlife Sanctuary and the Department of Environment and Conservation's (DEC's) Karara and Lochada stations—pastoral leases on which stock numbers have been reduced or removed in a bid to return them to a more natural state. Bush Heritage Australia's Charles Darwin Reserve and Ninghan Station's Indigenous Protected Area managed by the Pindiddy Aboriginal Corporation, link the properties, adding strength to a regional focus on conservation.



Integrated predator control

DEC, AWC and the Invasive Animals Cooperative Research Centre (IA CRC) started a project in early 2006 on the 'integrated control of introduced predators' in the southern rangelands in an attempt to control feral cats, foxes and wild dogs using a single baiting strategy.

Karara–Lochada was chosen as the 'control' site, where introduced predators were not baited. With a similar suite of habitat types, Mount Gibson was chosen as the 'treatment' site, where introduced predators were controlled with an annual aerial baiting of the entire 130,500-hectare pastoral lease. Instead of the standard dried meat baits injected with 1080 poison that have been used in DEC's *Western Shield* initiative for many years, 70,000 'Eradicat' sausage baits, developed by Dave Algar and his team from DEC, were used in an effort to target feral cats, with the added bonus of also controlling foxes and wild dogs.

The problem with cats

Feral cats are recognised as contributing to the decline of native fauna in Australia (see 'Controversial Cats', *LANDSCOPE*, Summer 2007-2008). Cats were thought to have been introduced to Australia in the 1820s, if not earlier, and had spread throughout the continent by 1890, inhabiting almost every habitat. They were even able to populate the hot, dry deserts of inland Australia, where the fox is absent due to the unpredictable nature of food and water resources.

Historically, baiting programs for feral cats have been ineffective, principally because cats do not readily consume the standard dried meat baits used for introduced predators. Development of the Eradicat bait

Previous page
Main Woodlands.
Photo – Marie Lochman
Insets Spinifex hopping mouse, feral fox, cat and goat.
Photos – Lochman Transparencies

Left The northern wheatbelt is mostly characterised by agricultural land.
Photo – Marie Lochman

Above New baiting techniques target feral foxes.
Photo – Alison Dugand

Above right Sand plots helped determine predator abundance.
Photo – Steffie Hilmer

Right Fox tracks.
Photo – Alison Dugand

Far right A 'hair snag' used to trap DNA and enable species identification.
Photo – Neil Hamilton

has provided an effective method in both experimental and operational baiting campaigns for reducing feral cat numbers across broadscale areas. Cats find the fresher sausage-style bait more palatable and foxes and dogs will consume either.

In semi-arid and arid zones the best time to conduct these baiting programs to maximise their effectiveness is under the cool, dry conditions of late autumn and winter. At this time, rainfall, which will cause degradation of feral cat baits, is less likely to occur than during the summer months and the abundance and activity of all prey types, in particular predator-vulnerable young mammalian prey and reptiles, is at its lowest. Feral cats are therefore more likely to be hungry and more willing to take alternatives to live prey.

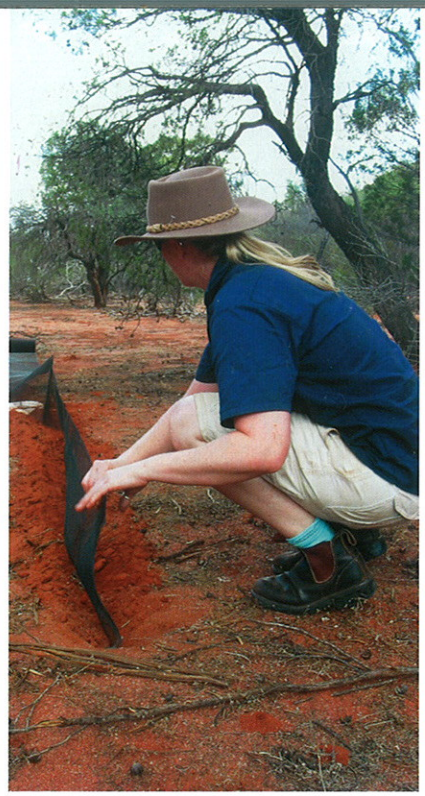
Taking the bait

As part of this monitoring regime eight permanent track survey transects were established at both Karara–Lochada and Mount Gibson, providing a broad coverage of both sites. Ten permanently marked sand plots, positioned at the edge of the tracks and located at one-kilometre intervals along each 10-kilometre transect, were used to survey introduced predator abundance. Each sand plot was positioned within a small clearing in a bush or manufactured with brush and fallen trees to create a one-way or 'blind' sand plot with a single entrance. Sand was placed in the entrance channel to permit detection of any animals entering the plot, and also one metre from the entrance to enable detection of any animals that passed the plot without actually entering it.

Each plot contained three lures: a FAP or Feline Attracting Phonic (audio cat call), Pongo (a delightfully smelly blend of cat faeces and urine), and a non-toxic Eradicat bait. This combination of lures was designed to attract the three introduced predator species to the sand plot and it also provided a reward system to encourage further visits. Each sand plot was then monitored for the presence or absence of tracks for four consecutive days during each survey period. The sand plots were swept each day to clear evidence of any previous animal activity and, at each plot, a record was made of a species' 'visit' or 'pass' and whether the Eradicat bait was removed.

Introduced predator activity along the transects was measured before and after baiting (in July and August) and at approximately three-monthly intervals (October, December and April) to provide information on the rate and extent of re-invasion into the baited site. Use of these sand plots has also enabled seasonal bait uptake to be assessed.

This 'index of relative abundance' has provided a comparison of predator abundance over time but has provided no information on the actual number or 'absolute abundance' of the cats, foxes and wild dogs of Karara–Lochada and Mount Gibson. New methods, using DNA analysis to determine the real number of introduced predators, are currently being trialled. A 'hair snag'



Top left Lochada Station.
Photo – Steffie Hilmer

Top Setting drift fences and pitfall traps.
Photo – John Angus/DEC

Above left Carpets of wildflowers adorn Mount Gibson.
Photo – Jacqui Richards

Above 'Eradicat' bait.
Photo – Rob Brazell/DEC

(a central post with double-sided tape) was located at the entrance of each of the sand plots so that animals were forced to brush past it as they entered the plot. Collected hair can then be used for DNA analysis to identify individuals and thus provide estimates of the absolute population size of feral cats, foxes and wild dogs.

Results

At the Karara–Lochada control site, fox abundance was quite high from the outset. Plot occupancy results for foxes ranged from 35 per cent to 81 per cent of all sand plots visited. By comparison, at the baited Mount Gibson site, over the same period, plot occupancy rates started at 12 per cent in July 2006 just before the first aerial baiting. An immediate reduction to zero per cent fox abundance was demonstrated after the July 2006 baiting. This absence of foxes continued right through until December 2006. At this time foxes began to reappear (four per cent plot occupancy), but did not re-invade Mount Gibson until March 2007 when plot occupancy rates increased to 18 per cent and continued to climb to 30 per cent just before the second aerial baiting in August 2007.

Cat plot occupancy results mirrored those of foxes at both locations, ranging from 25 to 53 per cent at Karara–Lochada, while at Mount Gibson rates dropped from 23 per cent initially to one per cent immediately after the first baiting and remained at zero per cent through to March 2007. A gradual increase to 10 per cent just before the second aerial baiting in August 2007 meant that cat abundance a year after the baiting was less than half of the initial level, a good indication of the overall effectiveness of the baiting strategy for feral cats. The success of the first baiting program was demonstrated again last year with complete removal of both foxes and cats following the winter baiting.

Introduced predator abundance was lower at Mount Gibson than Karara–Lochada before the start of the program due at least in part to AWC's past baiting for foxes and dogs using 1080 dried meat baits and ongoing wild dog control programs within the region, supported by the Department of Agriculture and Food

Right Kultarr.
Photo – Jiri Lochman

Below right Reticulated dragon (*Ctenophorus reticulatus*).
Photo – Katrin Koch

WA (DAFWA), DEC, AWC and Bush Heritage Australia. Wild dog track counts remained relatively low at both sites in the first couple of years, possibly as a result of DAFWA's wild dog initiative within the pastoral zone whereby pastoral lessees bait regularly in order to control predation of livestock by wild dogs.

Hope for vulnerable prey?

The more intriguing but longer-term part of the predator–prey equation is whether the reduction of introduced predators will benefit prey populations—those small mammals, reptiles, birds and invertebrates that are predated by cats, foxes and dogs.

Pitfall and Elliott trapping were conducted at 12 sites within four habitat or landsystem types characteristic of both Karara–Lochada and Mount Gibson: *Acacia* shrublands on yellow sandplain; *Eucalyptus* woodlands on red loamy sandplain; *Acacia* shrublands on granitic breakaways; and saline flats. The fauna surveys were conducted twice each year—firstly in winter, just before the baiting to assess prey abundance at its lowest, followed by a second survey in spring, when reptiles were active and small mammal and bird populations had received an influx of new recruits after breeding.

Small mammal and reptile populations were certainly higher at Mount Gibson than Karara–Lochada. A greater abundance of introduced predators at Karara–Lochada may be reducing these prey populations. However, it is possible that habitat or rainfall differences between the two sites may also be affecting fauna abundance. The next couple of years will help tease out some of the relationships between predator and prey species.

In the meantime, the fauna surveys at both sites have turned up an array of new species that had not previously been captured in the area. For example, the ranges of the southern ningaui (*Ningaui yvonneae*) and the kultarr (*Antechinomys laniger*) have been extended westwards with captures at Mount Gibson and Karara–Lochada respectively in spring 2007. At Mount Gibson an additional gecko, *Lucasium squarrosus*, the southern shovel-nosed snake (*Brachyurophis semifasciata*) and the spinifex hopping-mouse (*Notomys alexis*) were trapped also for the first time in spring 2007. None had been trapped during the previous three trapping sessions since the start of the collaborative IA CRC project, nor during a range of fauna surveys conducted by AWC or during mining company surveys in the area conducted since 2000.

Research continues

The results for the first two years of the project have certainly provided encouraging signs. They have shown that introduced predators can be controlled for many months after the winter baiting. However their numbers, particularly foxes, gradually increase over the summer and autumn to a level that is likely to inhibit native fauna recovery. To address this fox re-invasion, additional baiting using fox baits will be conducted at Mount Gibson in March–April 2009 to supplement the July 2008 aerial Eradicat baiting. In doing so, we aim to suppress fox numbers until the subsequent aerial Eradicat baiting in July 2009. The ongoing intensive monitoring of predator and prey distribution and abundance, as well as the influence of environmental conditions, will again enable us to determine whether this additional control method yields even better results in reducing predator abundance, and perhaps ultimately, an increase in prey abundance.

At Karara–Lochada a predator control program will start in mid-2008, replicating that of Mount Gibson. The

Left Fat-tailed dunnart (*Sminthopsis crassicaudata*) at the base of a pit trap. *Photo – Katrin Koch*

Below left A wheatbelt stone gecko (*Diplodactylus granariensis*). *Photo – Steffie Hilmer*

addition of another baited area, while removing the control site, will enable us to determine whether the baiting strategy trialled at Mount Gibson is also effective at Karara–Lochada where introduced predator numbers are high. The baseline data gathered in the first two years of the project at Mount Gibson and Karara–Lochada will then be used to assess future changes in predator and prey abundance as the project heads towards completion in another two years' time.

Student involvement

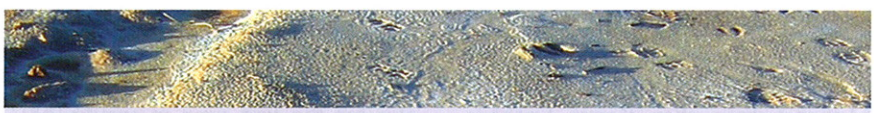
In conjunction with the baiting program, several students have taken part in a range of sub-projects. Danielle Oliver from The University of Western Australia recently conducted a study examining the fauna assemblages at the control and baited sites, determining the relative abundance of prey species available to introduced predators and describing any differences between the sites. Katrin Koch from the Johann Wolfgang Goethe University in Frankfurt, Germany, has been examining the stomach contents of foxes and cats to describe their diet and determine whether niche separation in diet occurs between feral cats and foxes.

Steffi Hilmer, also from the Johann Wolfgang Goethe University, is halfway through a four-year PhD study into the physiology of feral cats. She has been measuring energy consumption and thermoregulation of feral cats from a range of Australian mainland and island habitats, looking for physiological differences that may have evolved since their colonisation of the continent. Her work will provide an understanding of the feral cats' successful colonisation of the Australian continent and place this predator in an ecological framework, together with native Australian wildlife, that may in turn provide a novel approach for further projects focusing on the control of feral cats.

Fauna reconstruction

AWC plans to re-introduce a suite of threatened mammal species such as the numbat (*Myrmecobius fasciatus*), red-tailed phascogale (*Phascogale calura*), bilby (*Macrotis lagotis*) and banded and rufous hare-wallabies (*Lagostrophus fasciatus* and *Lagorchestes hirsutus*), which formerly occurred in the region. Initially, animals will be housed in a large fenced enclosure free of introduced predators in a similar fashion to AWC's Scotia Wildlife Sanctuary in western New South Wales, where seven threatened mammals have been successfully reintroduced into a 4,000-hectare enclosure.

A longer term vision of AWC is to one day re-introduce those same species back to the greater unfenced part of Mount Gibson and surrounding areas, to recreate the former mammal community on a regional scale. Similarly, DEC will be able to continue reintroductions of threatened fauna in WA, particularly in the semi-arid and arid zones where feral cats remain a factor inhibiting the success of translocations. The techniques developed by DEC, AWC and the IA CRC at Mount Gibson Wildlife Sanctuary and Karara–Lochada stations will hopefully make this vision a reality within the next few years.



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The Invasive Animals Cooperative Research Centre (IA CRC) aims to counteract the impact of invasive animals in Australia through the development and application of new technologies and by integrating approaches across agencies and jurisdictions. Its website (www.invasiveanimals.com) provides information about IA CRC programs.

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