







# Kimberley mammals bouncing back

Better management of the wild north Kimberley—made possible by funding provided under the state government's Kimberley Science and Conservation Strategy—is producing exciting results, with populations of several threatened native mammal species already bouncing back.

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The north Kimberley is one of few relatively untouched large wild areas left in the world. Covering about 105,000 square kilometres of high rainfall monsoonal tropics, it is a National Biodiversity Hotspot, with at least 230 plant, 16 fish, 10 frog, 31 reptile, six mammal and two bird species found nowhere else. Mammals endemic to the region include the scaly-tailed possum (*Wyulda squamicaudata*), monjon (*Petrogale burbidgei*) and Kimberley rock rat (*Zyzomys woodwardi*). North Kimberley landscapes are famed for their enormous complexity and beauty. The region includes the entire catchments of the Prince Regent and Mitchell rivers. This vast, natural region has a rich Aboriginal heritage, with



Aboriginal people retaining strong links and responsibility for country.

The dramatic islands and coastlines are unique. The complexity of the northern coast and islands is such that the 2,581 mapped islands between Yampi Sound and the King Edward River give rise to some 12,850 kilometres of coastline, although the straight line distance between Yampi Sound and the King Edward River is only about 400 kilometres.

Prince Regent National Park, rugged sandstone and volcanic country at the core of the north Kimberley, contains more than half the mammal and bird species found in the Kimberley, and more than 500 plant species.

Mitchell Plateau is one of the most scenic and biologically important areas of the state, with spectacular gorges and waterfalls, extensive fan palm forests on its lateritic top and small patches of rainforest around its margins. Up to 50 mammal species, 220 bird species and 86 species of reptiles and amphibians may occur in the area.

### Critical situation

The far north Kimberley is among the least disturbed environments in Australia and, until quite recently, critical weight range animals (those weighing between 35 grams and 5.5 kilograms) were thought to be secure in this region. However, it now appears that a number of native mammals are declining in many parts of northern Australia, the north Kimberley included. Evidence for these declines has come from comparing historical records with current knowledge, large-scale monitoring programs, documentation of Aboriginal knowledge and targeted studies of individual species.

There have been major contractions in the range of a number of mammal species including the brush-tailed rabbit rat (*Conilurus penicillatus*) and the golden bandicoot (*Isoodon auratus*). This continues a trend of declining mammal distributions and extinctions, particularly in the arid zone, ever since European settlement of Australia.

In the Northern Territory, there have been documented declines in the ranges of species such as the black-footed tree rat (*Mesembriomys gouldii*), common brushtail possum (*Trichosurus vulpecula*) and northern quoll (*Dasyurus hallucatus*), which have contracted northwards over a 20 to 30-year period. Surveys by Department of Environment and Conservation (DEC) scientist Tony Start and others in 2003–04 found that similar patterns were evident in the Kimberley, with many animals contracting into the far northern coastal strip. At the local scale too, mammals were declining in many areas. These findings led to serious concerns that another major extinction event was imminent in the north. This is a particularly important conservation issue because the north Kimberley is the last mainland refuge for many mammal species.

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**Main** Mitchell Falls in the Kimberley.

Photo – David Bettini

**Insets from left to right** Kimberley rock rat, brush-tailed phascogale and monjon.

Photos – Jiri Lochman

**Below** King George River.

Photo – Kevin Coate/Sallyanne Cousins





**Above** Golden-backed tree rat.

**Right** Scaly-tailed possum.

*Photos – David Bettini*

While the reasons for mammal declines are complex, there is no doubt that the Kimberley region is under increasing pressure. In 2009, cane toads crossed the Northern Territory border and continue to spread west into WA, despite huge efforts from both community groups and government to halt their progress. Other feral animals, particularly feral cattle, and changing fire regimes are altering both the landscape and plant and animal composition and diversity. Studies by Northern Territory scientist John Woinarski revealed that significant mammal declines in the Northern Territory were linked with fire frequency. The most severe declines were associated with the most fires at those sites. In other regions of Australia, feral cats are implicated as one of the primary causes of mammal declines (along with foxes which are not present in the tropics), though this is not yet proven for tropical savannas.

### **Conservation in action**

The state government's bold vision for this region's long-term conservation—the Kimberley Science and Conservation Strategy—was released in June 2011 and offers a chance to address this situation across the region.



Threats to Kimberley biodiversity occur across all land tenures including parks, pastoral lands and Aboriginal lands. The Kimberley Science and Conservation Strategy therefore has a tenure-blind approach. This means that to adequately address threats, such as fire, feral animals and weeds, cooperation is needed across property boundaries via partnerships between DEC, traditional owners, pastoralists and other key land managers such as the Australian Wildlife Conservancy (AWC). The government has committed \$21.5 million over five years for this terrestrial conservation program, with ongoing funding of \$5.5 million a year.

### **Fire management**

One of the most significant initiatives under the strategy addresses possibly the greatest threat to the biodiversity of the region—extensive bushfires. Large and intense fires in the late dry season have caused changes to vegetation structure such as the loss of large hollow-bearing trees, the removal of shrub layers, increased soil erosion and declines in native animal populations. Fires often rage across hundreds of thousands of hectares because, once started in the heat of the dry season, they are almost impossible to contain, particularly in the rugged parts of the region. Not only do these





**Left** A DEC Aboriginal ranger lighting a back burn at a wildfire.  
*Photo – DEC*

**Below left** Northern quolls have re-established populations near Mitchell Falls.  
*Photo – David Bettini*

**Bottom left** A late dry season wildfire near the Mitchell Falls walk trail.  
*Photo – Ed Hatherley/DEC*



fires occur on a massive scale, they often occur in the same areas year after year, providing insufficient time for the plants and animals to recover.

Since 2008, DEC, in collaboration with traditional owners, the Kimberley Land Council, Aboriginal ranger groups, the Department of Fire and Emergency Services, pastoralists, the AWC and other partners, has developed and applied improved fire management strategies. Contemporary science is being integrated with traditional Aboriginal knowledge. Prescribed burns are being conducted to create a mosaic of burnt and unburnt areas in the late wet and early dry seasons. The resulting patchwork effect from these prescribed burns reduces the amount of fuel available and has resulted in fewer large, intense and damaging fires later in the dry season. For the region’s wildlife this means distances between patches of unburnt habitat are reduced.

This treatment has been applied to large areas of the north Kimberley and funding available under the Kimberley Science and Conservation Strategy has enabled DEC to expand these programs across almost 20 million hectares of land. It is also estimated that this vast prescribed burning program is significantly reducing the amount of carbon released into the atmosphere every year.

**Effects of cattle**

Expansive feral animal and weed control projects are also underway as part of the Kimberley Science and Conservation Strategy.

Cattle are known to have adverse effects on mammal populations due to habitat degradation. Surveys by Sarah Legge of AWC on Mornington





**Above** Golden bandicoot.  
Photo – David Bettini

Station showed dramatic increases in both the numbers of individual animals and species richness after the AWC removed cattle from the area. These changes were most dramatic four years after the removal of cattle and were evident across all habitat types.

DEC initiated cattle-culling operations on the Mitchell Plateau in 2009, and increased the operations as a result of the Kimberley Science and Conservation Strategy's landscape-scale conservation initiative (see 'Looking after country', *LANDSCOPE*, Autumn 2012). Together with changes in fire regimes implemented under the landscape-scale conservation initiative, these measures already seem to have had considerable benefits for the mammals of the Mitchell Plateau.

### **Are we making a difference?**

DEC has the important task of monitoring areas that have been the focus of improved management under the landscape-scale conservation initiative in the north Kimberley.

To determine how the mammals are responding to the new fire and cattle management regimes, they are using a monitoring method developed by John Woinarski in the Northern Territory. This involves placing numerous small-trap quadrats (survey sites) across the landscape to sample representative habitats. Sampling is based on major habitat and vegetation differences, as

different mammal communities are typically associated with different habitats. So far, the results have been extremely encouraging.

### **Animals return**

Northern quolls are still common and abundant in sandstone habitat in the north Kimberley, for example, on the Mitchell Plateau, in Prince Regent National Park and in King Leopold Range Conservation Park. However, since 2008, with DEC's changes in fire regimes, quolls have re-established in areas south of the Mitchell Falls campground, where they were not initially captured in trapping studies. These areas have historically been more frequently burnt. However, quolls are still much less common in the south (around the King Edward River area) and in non-rocky habitats.

Golden-backed tree rats (*Mesembriomys macrurus*) were rarely captured on the Mitchell Plateau until this year, although they were present in the area in the 2003 survey. However, the 2011–12 surveys showed they had re-established themselves at a number of sites where they formerly occurred. They had also spread into a number of sites in sandstone areas where they had not been recorded since 2007, despite significant annual trapping effort, and turned up for the first time in memory at the Mitchell Falls ranger's camp in 2012.

The brush-tailed rabbit rat has suddenly become very abundant in some areas. Up to 17 individuals were

caught in 2011 and 2012 at Lone Dingo, north of the main Mitchell Plateau, whereas only one was caught here during Tony Start's survey in 2003, which used more traps. This species has also suddenly appeared at sites near Surveyors Pool where it had not been recorded previously.

Seasonal changes don't seem to explain these differences on their own because there is no clear relationship between rainfall and mammal numbers in the north Kimberley as there is in the desert. It appears brush-tailed rabbit rats might respond dramatically to cattle removal, as Lone Dingo and Surveyors Pool are the areas where cattle culling has been most effective. These areas once held up to two beasts per square kilometre, whereas surveys and culling records now show less than one beast per two square kilometres.

Also apparently doing well and well represented in the 2011 and 2012 monitoring and evaluation surveys are golden bandicoots, Ningbing false antechinus (*Pseudantechinus ningbing*), the Kimberley rock rat and other rodents including the pale field rat (*Rattus tunneyi*) and grassland melomys (*Melomys burtoni*). Although the brush-tailed phascogale (*Phascogale tapoatafa*) was not trapped, there have been a number of sightings of this species near the Mitchell Falls campground since 2007. It may be that alternative methods to monitor this species (such as nest boxes) will prove more effective in determining its numbers.



**Above** Mitchell Plateau fan palms (*Livistona eastonii*) occur over much of the Mitchell Plateau.

Photo – David Bettini

**Below** Monjon.

Photo – David Bettini

## Trends and concerns

Overall there are a number of interesting trends in the mammal data from 2007 to now. There appears to have been a period of very low mammal abundance and diversity around 2007–08, followed by significant recovery of populations. The 2007–08 season coincided with very high cattle numbers, with cattle invading areas such as Mitchell Falls campground. Fires were also very large and widespread beyond the Mitchell Falls campground area.

A key habitat in which trapping success has improved enormously since 2007 is the tall forest on top of the Mitchell Plateau itself. In 2007 and 2008, only three animals were caught over almost 1,000 trap nights (0.31 per cent trap success). Since then, trap

success has improved markedly to more than five per cent (an animal in every 20 traps) on the northern Mitchell Plateau. However, trap success is still very low (two per cent) in more inland areas closer to King Edward River. These areas are still often affected by fires lit off the Kalumburu Road, despite the best efforts of DEC and other agencies.

While native mammal populations of the Kimberley have generally bounced back, there are some exceptions. Although often recorded in surveys on Theda Station, the rock ringtail possum (*Petropseudes dahli*) was not recorded in the Mitchell Plateau, King Leopold or Prince Regent areas in 2011–12. The nabarlek (*Petrogale concinna*) or little rock-wallaby has not been confirmed in the area, although people who sight this animal could easily confuse it with the monjon, which is reasonably common. The huge black-footed tree rat, which grows to 800 grams, has not been recorded at all during the surveys, nor was it recorded in 2003. The last recorded animals were captured in 1981–82. More research is needed in the north Kimberley to determine the status of this giant rodent.

## What does it all mean?

It appears that concerted efforts to better manage fire and feral animals (cattle in particular) by DEC and other organisations such as AWC are improving the status of threatened and other mammals in the Kimberley region. DEC's monitoring and evaluation found there was a very strong relationship between mammal abundance and diversity and fire frequency, with areas being burnt more than once every two years having far fewer mammals. Sites in which the fire frequency was less than one in five years (such as parts of the Prince Regent National Park) have the highest rates of mammal trap success.

However, there are still areas of high cattle density and high fire frequency (such as the King Edward River area) where improvements need to occur. When patterns of fire frequency are mapped, it is clear that there are more fires the further away the area is from the coast. These areas will be the focus of efforts under the Kimberley Science and Conservation Strategy in coming years.



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